Model 9590
Graticule Generator
&
Model HD 9590
High Definition Graticule Generator

Instruction Manual

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INFORMATION TO USERS IN EUROPE

NOTE

CISPR 22 CLASS A DIGITAL DEVICE OR PERIPHERAL

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to the European Union EMC directive. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

INFORMATION TO USERS IN THE U.S.A.

NOTE

FCC CLASS A DIGITAL DEVICE OR PERIPHERAL

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

WARNING

Changes or Modifications not expressly approved by Evertz Microsystems Ltd. could void the user's authority to operate the equipment.

Use of unshielded plugs or cables may cause radiation interference. Properly shielded interface cables with the shield connected to the chassis ground of the device must be used.

REVISION HISTORY

REVISION	DESCRIPTION	DATE
Preliminary		March 99
1.0	Revised to firmware version 1.9 for 9590 and version 1.6 for HD9590	April 99
1.1	Added Chapter 4 for Desktop Remote Panel Revised to firmware version 2.0 for 9590 and HD9590	June 99
1.2	Revised to firmware version 2.07 for 9590 and HD9590 Added 1080I/50 and 1080P/24 video standards for HD9590	Feb 01
1.3	Revised Remote Control Cable Pinout in Table 2-3	May 01
1.4	Revised to firmware version 2.09 for HD9590 and version xxx for 9590 Incorporated manual change sheet 1.3-1 Added Auto video standard for 9590 Added Auto, 1080P/30 and 1080P/25 video standards for HD9590 Display Video standard on Front panel display of HD9590	Feb 01

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This document describes the new features added to the HD9590 with firmware version 2.09. The numbers shown in this document refer to section numbers in revision 1.3 of the manual.

1. OVERVIEW OF CHANGES

Changes to 9590:

- Added Auto Video Standard Detection

Changes to HD9590:

- Added Auto Video Standard Detection
- Added support for Video Standards 1080P30, 1080P25
- On front panel the video standard LED blinks when the incoming video is not the same as the video standard set on the Graticule Genenerator
- Displays Video Standard Setting on display.
- New procedure for Firmware upgrades shows Firmware version on Front panel
- Miscellaneous Bug Fixes

2. AUTO VIDEO STANDARD DETECTION AND SUPPORT FOR NEW IMAGE FORMATS

Sections 3.2.10 and 3.2.11 of the manual have been revised to read as follows. A new section describes the auto video detection operation.

3.2.10. Selecting the Video Standard (9590)

Vid Std =	525	625	Auto

This menu item selects the video standard in use.

Select **525** when using 525 line video at 29.97 frames per second. (Specified by SMPTE/ANSI 125M)

Select **625** when using 625 line video at 25 frames per second. (Specified by EBU Tech 3267)

Select **Auto** when you want the 9590 to automatically detect the video standard of the incoming video. The **525** and **625** front panel LEDs will indicate the current video standard.

3.2.11. Selecting the Video Standard (HD9590)

Vid Std =	1080I/60	1080I/50	1080P/24SF	1080P/30	1080P/25	1080P/24	1035I/60	720P/60	Auto

This menu item selects the video standard in use. Newer HD9590 units autodetect 1/1.001 field rates. See section 3.12 for information about selecting 1/1.001 field rates on older HD9590 models.

Select **1080I/60** when using high definition video with a total raster of 1125 lines at 30 frames per second and an interlace scanned active picture of 1920 pixel x 1080 lines as specified by SMPTE 274M

Select **1080I/50** when using high definition video with a total raster of 1125 lines at 25 frames per second and an interlace scanned active picture of 1920 pixel x 1080 lines as specified by SMPTE 274M

Select **1080P/24SF** when using high definition video with a total raster of 1125 lines at 24 frames per second and a segmented progressive scanned active picture of 1920 pixel x 1080 lines as specified by SMPTE RP211

Select **1080P/30** when using high definition video with a total raster of 1125 lines at 30 frames per second and a progressive scanned active picture of 1920 pixel x 1080 lines as specified by SMPTE 274M

Select **1080P/25** when using high definition video with a total raster of 1125 lines at 25 frames per second and a progressive scanned active picture of 1920 pixel x 1080 lines as specified by SMPTE 274M

Select **1080P/24** when using high definition video with a total raster of 1125 lines at 24 frames per second and a progressive scanned active picture of 1920 pixel x 1080 lines as specified by SMPTE 274M

Select **1035I/60** when using high definition video with a total raster of 1125 lines at 30 frames per second and an interlace scanned active picture of 1920 pixel x 1035 lines as specified by SMPTE 260M

Select **720P/60** when using high definition video with a total raster of 750 lines at 60 frames per second and a progressive scanned active picture of 1280 pixel x 720 lines as specified by SMPTE 296M

Select **AUTO** when you want the HD9590 to automatically detect the video standard from the incoming video. See section 3.2.11.1 for more information about operating the HD9590 in auto video standard mode.

3.2.11.1 Operating the HD9590 In Auto Video Standard Mode

When the HD9590 video standard is set to *AUTO* it will attempt to detect the video standard of the incoming video and change the current video standard to match. When the incoming video does not match the current standard, the front panel video standard LED that is currently ON will begin to blink. After approximately 5 seconds the Graticule Generator will switch to the new video standard. This delay prevents random standards switches that otherwise may occur between some of the video formats. The new video standard will be displayed on the front panel. Video standards changes will not occur while the Graticule Generator is in the *Setup* mode, or while the on screen objects are being moved using the shaft encoder knobs.

Most of the supported standards can be detected, but there are some exceptions.

- The standards 1080I/60 and 1080P/30SF are the same as far as the Graticule Generator is concerned. When the video input is in either of these standards the Graticule generator will display the standard as 1080I/60
- The standards 1080I/50 and 1080P/25SF are the same as far as the Graticule Generator is concerned. When the video input is in either of these standards the Graticule generator will display the standard as 1080I/50
- On certain earlier revisions of the High Definition Graticule Generator hardware it is necessary to select whether the video clock rate is 1/1 or 1/1.001. (See section 3.12) On these units the *Video Freq* menu item must be correctly selected in order for Auto Video Standard Detection to work correctly. For example on these early units the HD9590 can automatically switch between 1080i/59.94 and 1080p/23.98sF because the video frequency divider is set to 1/1.001 in both cases. However, it can not switch between 1080i/59.94 and 1080i/50 because the video frequency divider is different for these two standards.
- Auto Video Standard Detection cannot distinguish between 1035I/60 and 1080I/60. The light will not blink if the Graticule Generator is in 1035I/60 or 1080I/60 mode and the other standard is coming in the input. If 1035I/60 video is on the input the Graticule Generator will detect it as 1080i/60 and output a 1080i/60 formatted video signal. The only way to force 1035I/60 mode is to select it manually from the *Video Std*. Menu. Since there is no LED to indicate 1035i/60 mode, no LED will blink if the HD9590 is in 1035i/60 and another video standard is placed on the input.

3. PROCEDURE FOR UPDATING THE FIRMWARE CHANGED

The procedure for updating the firmware has been changed slightly. This allows the user to display the firmware version before the upload proceeds. Part II of the update procedures in the manual has been changed to read as follows

Part II – Invoke upload mode via the front panel

HD9590: If you are using the integrated control panel or the rack mount control panel, press the **ON/OFF, 4** and **9** buttons simultaneously. If you are using the desktop remote control panel press the **ESC** and **GRID** buttons simultaneously. The control panel display should now show the current firmware version of the unit. To proceed with the upgrade turn one of the shaft encoder knobs clockwise (to the right) and you will see the message `UPLOAD:Setup=yes`

4. MISCELLANEOUS BUG FIXES

- Fixed misalignment problem for graticules on 1080p24 – graticules were previously 1 line off

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1. OVERVIEW

The Evertz 9590 and HD9590 Graticule Generators are one rack units, multi format digital video graticule generators that key various alignment markers and mattes over a source video picture in a wide variety of applications. The model 9590 is for standard definition (525 and 625 line) digital video. The model HD9590 is for high definition (1125 and 750 line) digital video. Their operation is identical, except where the video formats are concerned. Throughout this manual, unless otherwise stated, descriptions apply equally to either model.

Possible Applications:

- alignment of film images to the video raster during film to tape transfer
- safe action and safe title and center marker for locating action point of interest and title graphics
- aspect ratio measurements
- letterbox or side marker cropping for image formats that do not match the video raster size
- alignment of graphics objects
- video tape quality control measurements

The standard Graticule Generators version consists of a 1 RU chassis with integrated control panel. The Graticule Generator is also available in a remote control version, which has a blank front panel and either a rack mountable, or a desktop remote control panel.

Commonly used configurations, stored as factory presets simplify routine operation to just a few pushbuttons. The ability to customize these factory presets to your application and store them as *USER PRESETS,* gives the Graticule Generator tremendous flexibility while maintaining simple operation for day to day use.

Features:

- Model 9590 keys Graticule markers directly into SMPTE 259M Serial digital video. Front panel switchable between 525/30 and 625/25 video formats.
- Model HD9590 keys Graticule markers directly into SMPTE 292M High Definition Serial digital video. Front panel switchable between 1080i/60, 1080i/50, 1035i/60, 1080p/24, 1080p/24sF and 720P/60 video formats.
- Two rectangular boxes that can be independently resized reshaped and moved anywhere on raster.
- A grid consisting of horizontal and vertical line pairs that can be positioned independently or in pairs anywhere on the raster.
- Programmable horizontal and vertical hard matte
- Adjustable *mask* starting line in vertical blanking interval to pass VITC or VITS
- Two User programmable cross markers positionable anywhere on the raster
- Circle creation for aspect ratio
- Automatic creation of aspect ratios for *matte*, *box* and *circle* objects
- On screen aspect ratio display
- Automatic centering of all objects or individual object by object control of centering
- Switchable 16:9 or 4:3 pixel aspect ratios to allow easy alignment where anamorphic compression has taken place (model 9590 only)
- Single button keyer On/off control
- Adjustable object brightness (white level)
- Front panel lock-out control
- Easy to operate front panel menu system gives access to advanced object control features for the most demanding application, while limiting normal day to day use to just a few preset buttons.

- Factory Presets allow quick setup to common object placements on the raster.
- Ten User-definable presets with individual write protect allow unlimited customization to any requirement.
- Optional Rack mount or Desktop remote control chassis
- Optional program stream output channel (has independent matte keying capability)

1.1. HOW TO USE THIS MANUAL

This manual is organized into 7 chapters: Overview, Installation, Rack Mount Panel Operation, Desk Top Remote Panel Operation, Technical Description, Appendix A & Appendix B. The overview section contains a short tutorial and glossary to define concepts and terms used throughout the remainder of the manual. We highly recommend taking the time to become familiar with the terms and concepts described here before proceeding into the rest of the manual.

Chapter 2 gives a detailed description of the rear panel connectors, and how the Graticule Generator should be connected into your system.

Chapter 3 gives a detailed description of the operation using the integrated front panel controls or the rack mountable remote panel. It includes details of the front panel menus, starting with an overview of the pushbuttons and front panel indicators. The menu system is described with a menu tree diagram, and then detailed discussions of each branch of the menu tree. Chapter 4 gives a detailed description of the operation using the desk top remote panel.

Chapter 5 gives an overview of how to update the firmware in the unit and other technical issues.

Appendix A gives a description of the Video Standard Definitions.

Appendix B outlines the Factory Presets for 9590 & HD9590.

Items of special note are indicated with a double box like this.

1.2. GLOSSARY

1.2.1. Definitions

CCIR-601 (This document now known as ITU-R601). An international standard for component digital television from which was derived SMPTE 125M and EBU 3246-E standards. CCIR-601 defines the sampling systems, matrix values and filter characteristics for both Y, B-Y, R-Y and RGB component digital television signals.

SERIAL DIGITAL Digital information that is transmitted in serial form. Often used informally to refer to serial digital television signals.

4:2:2 A commonly used term for a component digital video format. The details of the format are specified in the CCIR-601 standard. The numerals 4:2:2 denote the ratio of the sampling

frequencies of the luminance channel to the two colour difference channels. For every four luminance samples, there are two samples of each colour difference channel.

4Fsc Four times subcarrier sampling rate uses in composite digital systems. In NTSC this is 14.3 MHz. In PAL this is 17.7 MHz.

ANALOG APERTURE Defines a subset region of the production aperture, which coincides with the nominal transmission blanking. Normally it is centered on the production aperture.

ASPECT RATIO Defines the ratio of the horizontal dimension to the vertical dimension of an image area when displayed according to the specifications of the video standard.

CENTRE OF IMAGE The centre of an image is defined as the center of the clean aperture. Horizontally there will be an equal number of pixels within the clean aperture to the left and right of the center point. Vertically there will be an equal number of lines within the clean aperture above and below the center point.

CLEAN APERTURE Defines a subset region of the production aperture, which is completely inside the blanking region. Normally it is centered on the production aperture. The clean aperture lies completely inside the picture area remaining after application of the widest blanking permitted for the standard. The dimensions for the clean aperture define the nominal aspect ratio for that standard. Where both composite and component versions of a standard exist, clean aperture is defined with respect to the image lattice specified for the component version.

EDGE PROCESSING REGION The region of the production aperture that lies outside the clean aperture. Blanking transitions should occur completely within the edge processing region.

IMAGE LATTICE A two-dimensional array of pixels.

PIXEL ASPECT RATIO Defines the ratio of the horizontal dimension to the vertical dimension of a pixel when an image is displayed at its defines aspect ratio.

PRODUCTION APERTURE Defines a maximum possible image extent in a given standard. The production aperture represents the desirable extent for image acquisition, generation and processing prior to blanking. Where both composite and component versions of a standard exist, production aperture is defined with respect to the image lattice specified for the component version.

SAFE ACTION Defines the image region where all significant action must take place. It is defined as a fixed percentage of the clean aperture for a given video standard.

SAFE TITLE Defines the image region where the most important image information including titles and graphics must be confined top ensure visibility of the information on the majority of home television receivers. It is defined as a fixed percentage of the clean aperture for a given video standard.

1.2.2. Specific 9590 Terminology/Definitions

OBJECT This is the object that is generated by the Graticule Generator and burned onto the video output. The Graticule Generator can generate the following objects: 1 grid consisting of a pair

of horizontal lines and a pair of vertical lines, hard matte box, 2 cross markers, 2 boxes, and 1 circle.

OBJECT ASPECT RATIO This is the ratio of the horizontal dimension to the vertical dimension of an object when displayed according to the specifications of the video standard. The object aspect ratio is affected by the pixel aspect ratio being used.

OBJECT PARAMETER Each object has a set of parameters appropriate for the object. These parameters control the appearance, position and behaviour of the object on the screen. Some object parameters are mutually exclusive with others, so the menu structure intelligently shows only the object parameters that are available in the current mode.

ENABLED OBJECT An enabled object is one that is currently burnt onto the video output.

PRESET Used to store the state of all objects in non-volatile storage for future use. When recalled from non-volatile storage. Factory presets are read only and are pre-configured at the factory. User presets are read/write with an optional write protect capability and can be customized by the user.

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2. INSTALLATION

2.1. REAR PANEL

The following sections describe the purpose of the rear panel connectors of the 9590 and HD9590. Sections 2.1.1 to2.1.4 describe the specific signals that should be connected to the units.

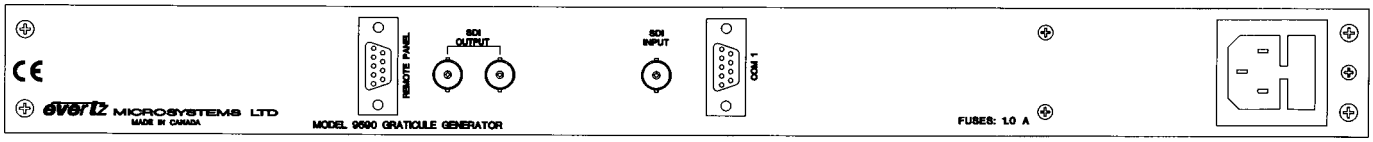

Figure 2-1: Model 9590 Rear Panel Layout

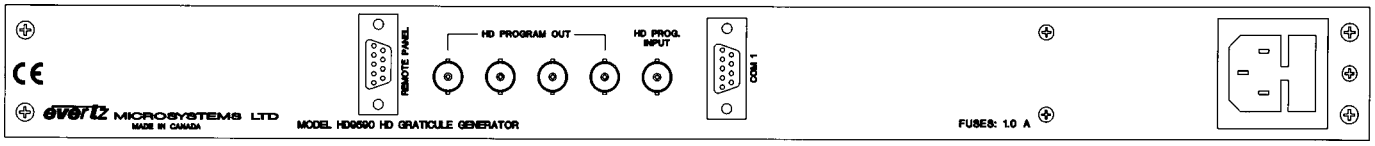

Figure 2-2: Model HD9590 Rear Panel Layout

2.1.1. Digital Video Connections (9590)

SDI INPUT Input BNC connector for 10-bit serial digital video signals, compatible with the SMPTE 259M-C standard. See section 5.1.3 for specifications of standard definition video formats supported.

SDI PROGRAM OUT is the main serial digital video output. There are two BNC connectors which output identical program video in serial component, compatible with the SMPTE 259M-C standard.

2.1.2. Digital Video Connections (HD9590)

HD PROG INPUT Input BNC connector for 10-bit serial digital video signals, compatible with the SMPTE 292M standard. See section 5.1.1 for specifications of high definition video formats supported.

HD PROGRAM OUT is the main serial digital video output. There are four BNC connectors which output identical program video in serial component, compatible with the SMPTE 292M standard.

2.1.3. Remote Control Connections

COM1 A 9 pin female 'D' connector for the RS-232 serial interface used for updating the firmware. On older units where the Connector is located beside the power connector, it is labelled **SERIAL REMOTE**.

Pin #	Name	Description
1	GND	Chassis ground
2	Tx-/TxD	RS-232 Transmit Output / RS-422 Tx-
3	Rx-/RxD	RS-232 Receive Input / RS-422 Rx-
4		
5	Sig Gnd	RS-232 Signal Ground
6		
7	Rx+/RTS	RS-232 RTS Input / RS-422 Rx+
8	Tx+/CTS	RS-232 CTS Output / RS-422 Tx+
9		

Table 2-1: COM 1 Connector Pin Definitions

REMOTE PANEL This female 9 pin D is for the RS-422 serial interface to the optional remote control panel. This connector is not installed on units with integrated control panels. See 2.5 for information about connecting the remote panel to the main unit.

Pin #	Name	Description
1	GND	Chassis ground
2	TX-	RS-422 Transmit – Output
3	RX+	RS-422 Receive + Input
4		
5		
6	GND	Transmit ground
7	TX+	RS-422 Transmit + Output
8	RX-	RS-422 Receive – Input
9		

Table 2-2: Remote Panel Connector Pin Definitions

2.1.4. Power Connections

LINE: The Graticule Generator has a universal power supply operating on either 115v/60 Hz or 230v/50 Hz AC operation.

2.2. MOUNTING

The Graticule Generator is equipped with rack mounting angles and fits into a standard 19 inches by 1.75 inches by 17.75 inches (483 mm x 45 mm x 451mm) rack space. The mounting angles may be removed if rack mounting is not desired.

2.3. POWER REQUIREMENTS

2.3.1. Selecting the Correct Mains Voltage

Power requirements are 115 or 230 volts AC at 50 or 60 Hz. The Graticule Generator has a universal power supply that automatically senses the input voltage. Power should be applied by connecting a 3-wire grounding type power supply cord to the power entry module on the rear panel. The power cord should be minimum 18 AWG wire size; type SVT marked VW-1, maximum 2.5 m in length.

The power entry module combines a standard power inlet connector, two 5 x 20 mm fuse holders and an EMI line filter.

2.3.2. Changing the Fuse

The fuse holder is located inside the power entry module. To change the fuses, pull out the fuse holder from the power entry module using a small screwdriver. The fuse holder contains two fuses, one for the line and one for the neutral side of the mains connection. Pull out the blown fuse and place a fuse of the correct value in its place. Use slo blo (time delay) 5 x 20 mm fuses rated for 250 Volts with a current rating of 1 amp. Carefully reinsert the fuseholder into the power entry module.

Never replace with a fuse of greater value.

2.4. CONNECTING THE DIGITAL VIDEO

2.4.1. Video Input and output (9590)

The 9590 requires that a digital video source be connected to the SDI INPUT BNC. The 9590 may be configured to accept either 525 or 625 line digital video in the component (4:2:2) format. The *VID STD* parameter on the front panel *SETUP* menu must be set correctly to match the video input. (See section 3.2.10 for information on changing the video type setting.)

The SDI PROG OUT outputs contain the input video with the selected alignment markers & letterbox keyed in. Two identical digital video outputs are provided.

2.4.2. Video Input and output (HD9590)

The HD9590 requires that a digital video source be connected to the HD PROG INPUT BNC. The HD9590 may be configured to accept either 1125 line high definition digital video with either 1035 or 1080 active lines or 750 line high definition digital video with 720 active lines. The *VIDEO STD* parameter on the front panel *SETUP* menu must be set correctly to match the video input. (See section 5.1.3 for information on video standards supported and section 3.2.11 for information on changing the video type setting.) On older graticule generators the *VID FREQ* parameter must also be set to match the bit rate of the incoming signal.

The HD PROG OUT outputs contain the input video with the selected alignment markers & letterbox keyed in. Four identical digital video outputs are provided.

2.5. CONNECTING THE REMOTE CONTROL PANEL (RCP AND DCP VERSIONS ONLY)

The Graticule Generator can be sold with integrated front panel control, or with a rack mountable or desktop remote control panel. When the units are shipped with the remote panel, the front panel of the unit has only the PSU Status indicator.

The REMOTE PANEL 9 pin D connector on the rear panel is used to connect the remote control panel to the main electronics unit. The 9 pin straight through cable provided can be used to connect the remote panel to the graticule generator. For longer distances, simply make your own cable of the required length according to the diagram in Table 2-3. Communications to the remote panel is through an RS-422 connection, so the panel can be located up to 1000 feet from the main electronics unit. A plug in 12 VDC adapter supplies power for the remote control panel.

Grat Gen End			**Remote Panel End**	
9 pin D Male	**Pin**	**Belden 9729**	**9 pin D Female**	**Pin**
	1			1
Tx-	2	-------1a------	Rx-	2
Rx+	3	-------2b------	Tx+	3
Rx Gnd	4	---drain 2----	RxGnd	4
	5			
Tx Gnd	6	---drain-1----	TxGnd	6
Tx+	7	-------1b-----	Rx+	7
Rx-	8	-------2a------	Tx-	8
	9			9
Frame Gnd	Shield	---drain-1----	Frame Gnd	Shield

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3. HOW TO OPERATE THE GRATICULE GENERATOR USING THE RACK MOUNT CONTROL PANEL

The standard Graticule Generators version consists of a 1 RU chassis with integrated control panel. The Graticule Generator is also available in a remote control version, which has a blank front panel and either a rack mountable, or a desktop remote control panel. Operation of the Graticule Generator from the integrated control panel or the rack mount control panel is identical and is described in this chapter. For information on controlling the Graticule Generator from the desktop remote panel see chapter 4. For information about connecting the rack mount remote panel to the Graticule Generator electronics see section 2.5

3.1. AN OVERVIEW OF THE KEY AND DISPLAY FUNCTIONS

The display area consists of a 16 digit alphanumeric display, 11 LED status indicators and a 24 pushbutton keypad.

The keypad is used to select and control the attributes, position and size of each of the Graticule Generator objects. The Setup menu provides a means of setting overall constraints on the Graticule Generator, allowing you to configure the device to your application. Ten user preset buttons and one factory preset button allow you to save and recall frequently used collections of objects, to simplify operation of the Graticule Generator.

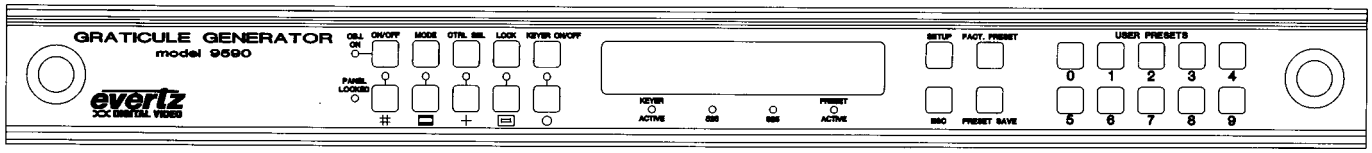

Figure 3-1: Model 9590 Front Panel Layout

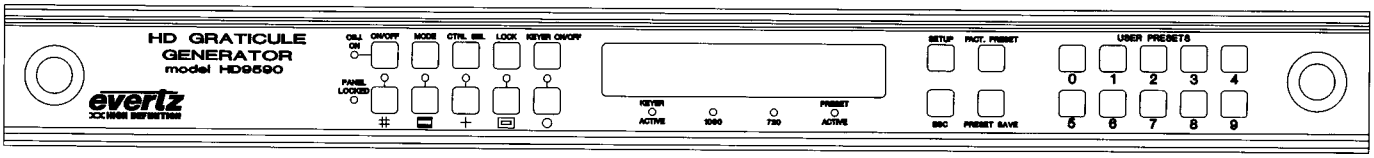

Figure 3-2: Model HD9590 Front Panel Layout

The remainder of this section gives an overview of each of the front panel buttons. Sections 3.2.12 to 3.8 give detailed information on controlling each of the screen objects.

3.1.1. The Object Pushbutton Group

The Object key group consists of the **ON/OFF, MODE, CTRL SEL, LOCK, KEYER ON/OFF,** and five object keys. The object key group is used to select individual objects and control their behaviours on the screen.

GRID ☒ Pressing this button selects and turns on the *grid object*.

MASK  Pressing this button selects and turns on the *mask* object

CURSOR  Pressing the button once selects and turns on the first *cursor* object. Pressing the button a second time selects and turns on the second *cursor* object

BOX  Pressing the button once selects and turns on the first *box* object. Pressing the button a second time selects and turns on the second *box* object

CIRCLE  Pressing this button selects and turns on the *circle object*

ON/OFF This button turns a particular *object ON* or *OFF*. If the *object* is set to *ON* you will see it in the output video. If the *object* is set to *OFF* you will not see it in the output video.

The *ON/OFF* status of each *object* is stored individually. You must select the *object* before you can change its *ON/OFF* status.

MODE This button controls various *MODES* for a particular *object* such as the aspect ratio and whether it is centred on the screen on not. Some of the *MODES* are automatically determined by the *setup* menu items, and may be hidden if they are not applicable. You must select the *object* before you can change its *MODE.*

CTRL SEL This button controls which attributes for a particular object (white level, position, size or shape) will be adjusted by turning the shaft encoder knobs. Some of the object controls are affected by the setup menu items, and the object mode, and may be hidden if they are not applicable. You must select the *object* before you can change its *CTRL SEL*ection.

LOCK Pressing the *LOCK* button initiates a **global** panel lock. All front panel controls except the *LOCK* button are inhibited when *LOCK* is enabled. When the panel is *LOCKED* the *PANEL. LOCKED* LED illuminates. Pressing the *LOCK* button will toggle the *LOCK* state *ON* and *OFF*.

KEYER ON/OFF Pressing this button allows the user to toggle the **global** *KEYER* state *ON (enabled)* and *OFF (disabled)*. When the *KEYER* is *ON* all enabled *objects* will be present in the video output. When the *KEYER* is *OFF* none of the enabled *OBJECTS* will be present in the video output.

3.1.2. The Setup Button Group

SETUP Pressing this button allows you to program various **global** attributes for the objects, and to configure the overall operating modes for the Graticule Generator. See section 3.2 for a complete description of the setup modes.

ESC This button is used to exit out of menus or to abort setup operations.

3.1.3. The Preset Button Group

The Preset key group consists of the **FACT PRESET** and **PRESET SAVE** buttons and ten **USER PRESET** buttons. The Preset key group is used to load one of the pre-programmed arrangements of object, or to save and recall up to ten different user setups.

FACT PRESET This button is used to recall the *factory presets*. Press this button to recall the *factory presets* that was previously selected. Turn one of the shaft encoder knobs to cycle through the available *factory presets*. The name of the selected preset will be shown on the front panel display, and the selected collection of object settings will be loaded into to the Graticule Generator. The *PRESET ACTIVE* LED will illuminate when one of the *factory presets* is loaded. See section 3.9 for a description of each of the factory presets.

***Factory presets* cannot be recalled if the keyer is off.**

PRESET SAVE This button allows the user to save the current *object* settings to one of the ten *user preset* memory locations. To save the current object settings to one of the *user preset* locations press the **PRESET SAVE** button once, then the desired the **USER PRESET** button. You will be prompted to press the **USER PRESET** button a second time to confirm the operation. Each of the *user preset* memory locations can be individually write-protected. See section 3.10 for a complete description of how to use the *user presets*.

***User presets* cannot be deleted directly from memory they can only be overwritten by another configuration saved to the same memory location.**

USER PRESETS These ten buttons are used to store or recall the non-volatile *USER PRESETS*. To recall a *USER PRESET* press the corresponding button once. See section 3.9 for a complete description of how to use the *user preset*.

***User presets* cannot be recalled if the *keyer* is *off*.**

3.1.4. Shaft Encoders (Knobs)

The shaft encoders' function is to change the value of one or more of the current object's parameters based on the current control option. When the mode or setup menus are enabled the shaft encoders are used to select menu options. The shaft encoders are also used to select the various *factory presets*.

When objects are being moved/resized on screen, the left knob controls horizontal movements, and the right knob controls vertical movements.

Horizontal move operations will be to the right for clockwise changes and to the left for counter-clockwise changes. Vertical move operations will be down for clockwise changes and up for counter-clockwise changes.

3.1.5. Status Indicators

There are 11 status indicators located on the front panel that show operational status of the Graticule Generator at a glance.

Most of the LED's are common to the Standard and High definition Graticule Generators. The LEDs above each of the object buttons indicate that the respective object is currently selected.

OBJ ON Indicates that selected *object* is turned on.

PANEL LOCKED Indicates that Graticule Generator front panel controls are locked against accidental changes.

KEYER ACTIVE Indicates that the Graticule Generator keyer is enabled. The enabled graticule objects will be keyed into the video path.

PRESET ACTIVE Indicates that one of the *factory presets* or *user presets* is currently in use. If any *object* parameter is modified this LED will extinguish.

The video Standard LED's indicate what video standard the Graticule Generator is currently configured for. The Standard Definition Graticule Generator has the following LEDs:

525 Indicates that the unit is currently configured for operation with *525* line/ 59.94 field per second video.

625 Indicates that the unit is currently configured for operation with 6*25* line/ 50 field per second video.

The High Definition Graticule Generator has the following LEDs:

1080 Indicates that the unit is currently configured for operation with 1080 active line video.

720 Indicates that the unit is currently configured for operation with 720 active line video.

3.2. FRONT PANEL SETUP MENU

The key to the operational flexibility of the Graticule Generator lies in the front panel *SETUP* menu system. The *SETUP* menu system uses the 16 digit alphanumeric display and provides a quick, intuitive method of configuring the Graticule Generator, guiding you to the correct setup for your application. The *SETUP* Menu contains items that pertain to the overall operation of the Graticule Generator. In addition each object is controlled by its own *MODE* and *CTRL SEL* settings. These context sensitive menus show only the items applicable to the selected object for the current *SETUP* settings. See sections 3.2.12 to 3.8 for information on controlling each of the objects through their *MODE* and *CTRL SEL* menus.

The two keys in the Setup key group (**SETUP**, **ESC**) are used to cycle through the various items on the *SETUP* menu. The *SETUP* menu consists of a main menu with two or more choices for each menu item. Figure 3-3 is an overview of the *SETUP* menu for the Standard Definition Graticule Generator. Figure 3-4 is an overview of the *SETUP* menu for the High Definition Graticule Generator. The menu items are shown on the left with grey shading and the various choices are shown on the right with no background shading.

On screen =	show	hide		
Mask apert =	prod	clean	analg	
Box % apert =	prod	clean	analg	
Pix =	analog 4:3	analog 16:9	digital 4:3	digital 16:9
Obj blink =	short	long	none	
Ln disp =	int rel	int abs		
Mask start =	9f2			
Feedback =	aspect	pos		
Force centre	yes	no		
Standard	525	625	Auto	

Figure 3-3: Overview of the 9590 Setup Menu

n screen =	show	hide						
ask apert =	prod	clean						
ox % calc =	prod	clean						
bj blink =	short	long	none					
n disp =	int rel	int abs						
ask start =	9f2							
eedback =	aspect	pos						
orce centre	yes	no						
id Std =	1080I/60	1080I/50	1080P/24SF	1080P/30	1080P/25	1080P/24	1035I/30	720P/60
id freq =	1/1.001	1/1						

Figure 3-4: Overview of the HD9590 Setup Menu

To enter the front panel programming menu, press the **SETUP** key. Pressing the **SETUP** key again allows you to move vertically within the menu tree. The menu item is shown on the left of the front panel display and the value for that item is shown on the right. The current value for that menu item will be shown. Turn the left or right shaft encoder knobs reveal the choices for the current menu item. When you have selected the desired sub menu choice press the **SETUP** key to save your choice and advance to the next menu item.

The menu choice that is shown for an item when you press the SETUP key will be saved as the new value for that menu item. If you do not wish to save a new value press the ESC key to exit the *SETUP* menu.

When you have made all the desired changes, press the **ESC** key to return to the normal display mode. After a 30-second timeout, the Graticule Generator exits from the *SETUP* menu automatically.

Each of the menu items is described in the sections below, with an explanation of what each choice does.

When you make a change to one of the *SETUP* parameters you will need to press the *SETUP* button to save the change.

3.2.1. Controlling On Screen Aspect Ratio Display

On screen =	show	hide

This menu item allows the user to enable or disable the aspect ratio on-screen display for the *grid, box*, *mask*, and *circle* objects. The on-screen display will turn off after ten seconds of front panel inactivity. To inhibit the on-screen display completely select **hide**. The on screen aspect ratio display shows the actual aspect ratio of the selected object. This may be slightly different than the target aspect ratio (selected by the object's aspect ratio mode) due to rounding of the dimensions to the closest line or pixel.

3.2.2. Choosing the Raster limits for the Mask Aspect Ratio and Size Calculation

Mask apert =	prod	clean	analg

This menu item sets how the aspect ratio and size calculations for the *mask* and *grid* objects are calculated. In either setting, the *mask* and *grid* objects can be positioned all the way out to the *production aperture*. When you choose one of the automatic aspect ratios for the *mask* object, its initial size and position will be calculated with respect to the mask aperture setting. See section 3.5.2.1 for information on selecting the *mask* aspect ratio.

Select **prod** when you want to use the *production aperture* as the reference for the *mask* and *grid* object aspect ratio and size.

Select **clean** when you want to use the *clean aperture* as the reference for the *mask* and *grid* object aspect ratio and size.

Select **analg** when you want to use the *nominal analog blanking* as the reference for the *mask* and *grid* object aspect ratio and size.

3.2.3. Choosing the Raster limits for the Box Size Calculation

Box % apert=	prod	clean	analg

This menu item sets how the size percentage calculations for the *box* object are calculated. In either setting, the *box* object perimeter can be positioned all the way out to the *production aperture*.

Select **prod** when you want to use the *production aperture* as the reference for the *box* object size calculation.

Select **clean** when you want to use the *clean aperture* as the reference for the *box* object size calculation.

Select **analg** when you want to use the *nominal analog blanking* as the reference for *box* object size calculation.

3.2.4. Setting the Pixel Aspect Ratio (9590 only)

Pix =	analog 4:3	analog 16:9	digital 4:3	digital 16:9

This menu item sets the pixel aspect ratio relative to that of the input video.

Select **analog 4:3** when you are working with normal aspect ratio video and you want to define the 4:3 aspect ratio according to the nominal analog blanking.

Select **analog 16:9** when the input video has been compressed from a 16:9 format to a 4:3 format and you want to define the 16:9 aspect ratio according to the nominal analog blanking. Objects will be drawn in their compressed state, so that they will appear normal when the video is expanded again.

Select **digital 4:3** when you are working with normal aspect ratio video and you want to define the 4:3 aspect ratio according to the clean aperture.

Select **digital 16:9** when the input video has been compressed from a 16:9 format to a 4:3 format and you want to define the 16:9 aspect ratio according to the clean aperture. Objects will be drawn in their compressed state, so that they will appear normal when the video is expanded again.

3.2.5. Choosing the Object Blink Time

Obj blink =	short	long	none

This menu item sets how long objects blink when they are selected.

Select **long** when you want a selected object to blink for twenty seconds before it reverts back to being displayed continuously.

Select **short** when you want a selected object to blink for three seconds before it reverts back to being displayed continuously.

Select **none** when you want to disable object blinking.

3.2.6. Choosing How Line Numbers are Displayed

Ln disp =	int rel	int abs

When the selected video standard uses an interlaced raster, this menu item changes the format that the front panel display uses to show line numbers.

Select **int rel** to view line numbers in an *interlaced relative* format. In this format lines are numbered relative to the beginning of each *field* and shown with their field number. (E.g. in 525 line video, line 21F1 is the first line of active video in field 1, line 21F2 is the first line of active video in field 2)

Select **int abs** to view line numbers in an *interlaced absolute* format. In this format lines are numbered in an interlaced raster with the line numbers relative to the beginning of the complete frame. (E.g. in 525 line video, line 21 is the first line of active video in field 1, line 283 is the first line of active video in field 2)

When the video standard uses a progressive (non-interlaced) raster, this menu item is not available. Line numbering is always done in a progressive system referenced to the beginning of the frame.

3.2.7. Choosing Where the Vertical Mask Starts in the VBI

Mask Start =	9F2

This menu item determines starting line in the vertical blanking interval for the *mask* object. Turn one of the shaft encoder knobs to adjust the line number. Vertical interval line numbers before this line will NOT be masked.

3.2.8. Displaying Object Aspect Ratio or Position on the Front Panel

Feedback =	aspect	pos

This menu item sets whether the front panel display will show the object aspect ratio or position when an object's size or position is being controlled.

Select **aspect** when you want to show the object position as an aspect ratio and a percentage.

Select **pos** when you want to show the object position as horizontal and vertical position values.

3.2.9. Forcing all Objects to be Centred on the Raster

Force centre	yes	no

This menu item sets whether the *grid, mask, box* and *circle* objects are all always centred on the screen, or whether object centring will be individually controlled by their *object* modes. The *cursor* objects are **not** controlled by this menu item and must be centred using their individual *mode* settings.

Select **yes** to force the *grid, mask, box* and *circle* objects to be centred on the raster.

Select **no** to use the individual *mode* settings for the *grid, mask, box* and *circle* objects to control whether the objects are centred on the raster.

3.2.10. Selecting the Video Standard (9590)

Vid Std =	525	625	Auto

This menu item selects the video standard in use.

Select **525** when using 525 line video at 29.97 frames per second. (Specified by SMPTE/ANSI 125M)

Select **625** when using 625 line video at 25 frames per second. (Specified by EBU Tech 3267)

Select **Auto** when you want the 9590 to automatically detect the video standard of the incoming video. The **525** and **625** front panel LEDs will indicate the current video standard.

3.2.11. Selecting the Video Standard (HD9590)

Vid Std =	1080I/60	1080I/50	1080P/24SF	1080P/30	1080P/25	1080P/24	1035I/60	720P/60	Auto

This menu item selects the video standard in use. Newer HD9590 units autodetect 1/1.001 field rates. See section 3.2.12 for information about selecting 1/1.001 field rates on older HD9590 models.

Select **1080I/60** when using high definition video with a total raster of 1125 lines at 30 frames per second and an interlace scanned active picture of 1920 pixel x 1080 lines as specified by SMPTE 274M

Select **1080I/50** when using high definition video with a total raster of 1125 lines at 25 frames per second and an interlace scanned active picture of 1920 pixel x 1080 lines as specified by SMPTE 274M

Select **1080P/24SF** when using high definition video with a total raster of 1125 lines at 24 frames per second and a segmented progressive scanned active picture of 1920 pixel x 1080 lines as specified by SMPTE RP211

Select **1080P/30** when using high definition video with a total raster of 1125 lines at 30 frames per second and a progressive scanned active picture of 1920 pixel x 1080 lines as specified by SMPTE 274M

Select **1080P/25** when using high definition video with a total raster of 1125 lines at 25 frames per second and a progressive scanned active picture of 1920 pixel x 1080 lines as specified by SMPTE 274M

Select **1080P/24** when using high definition video with a total raster of 1125 lines at 24 frames per second and a progressive scanned active picture of 1920 pixel x 1080 lines as specified by SMPTE 274M

Select **1035I/60** when using high definition video with a total raster of 1125 lines at 30 frames per second and an interlace scanned active picture of 1920 pixel x 1035 lines as specified by SMPTE 260M

Select **720P/60** when using high definition video with a total raster of 750 lines at 60 frames per second and a progressive scanned active picture of 1280 pixel x 720 lines as specified by SMPTE 296M

Select **AUTO** when you want the HD9590 to automatically detect the video standard from the incoming video. See section 3.2.11.1 for more information about operating the HD9590 in auto video standard mode.

3.2.11.1. Operating the HD9590 In Auto Video Standard Mode

When the HD9590 video standard is set to *AUTO* it will attempt to detect the video standard of the incoming video and change the current video standard to match. When the incoming video does not match the current standard, the front panel video standard LED that is currently ON will begin to blink. After approximately 5 seconds the Graticule Generator will switch to the new video standard. This delay prevents random standards switches that otherwise may occur between some of the video formats. The new video standard will be displayed on the front panel. Video standards changes will not occur while the Graticule Generator is in the *Setup* mode, or while the on screen objects are being moved using the shaft encoder knobs.

Most of the supported standards can be detected, but there are some exceptions.

- The standards 1080I/60 and 1080P/30SF are the same as far as the Graticule Generator is concerned. When the video input is in either of these standards the Graticule generator will display the standard as 1080I/60
- The standards 1080I/50 and 1080P/25SF are the same as far as the Graticule Generator is concerned. When the video input is in either of these standards the Graticule generator will display the standard as 1080I/50
- On certain earlier revisions of the High Definition Graticule Generator hardware it is necessary to select whether the video clock rate is 1/1 or 1/1.001. (See section 3.2.12) On these units the *Video Freq* menu item must be correctly selected in order for Auto Video Standard Detection to work correctly. For example on these early units the HD9590 can automatically switch between 1080i/59.94 and 1080p/23.98sF because the video frequency divider is set to 1/1.001 in both cases. However, it can not switch between 1080i/59.94 and 1080i/50 because the video frequency divider is different for these two standards.
- Auto Video Standard Detection cannot distinguish between 1035I/60 and 1080I/60. The light will not blink if the Graticule Generator is in 1035I/60 or 1080I/60 mode and the other standard is coming in the input. If 1035I/60 video is on the input the Graticule Generator will detect it as 1080i/60 and output a 1080i/60 formatted video signal. The only way to force 1035I/60 mode is to select it manually from the *Video Std*. Menu. Since there is no LED to indicate 1035i/60 mode, no LED will blink if the HD9590 is in 1035i/60 and another video standard is placed on the input.

3.2.12. Selecting the Video Field Rate (HD9590)

Vid Freq =	1/1.001	1/1

On certain earlier revisions of the High Definition Graticule Generator hardware it is necessary to select the video frame rate manually using this menu item. On later versions of the hardware that autodetect the frame rate this menu item will not be present.

Select **1/1.001** when using high definition video with a frame rate of 23.976, 29.97 or 59.94 frames per second.

Select **1/1** when using high definition video with a frame rate of 24, 30 or 60 frames per second.

3.3. CONTROLLING THE INDIVIDUAL OBJECTS

The Graticule Generator has separate controls for each of its seven objects (*grid*, *mask*, *box1*, *box2*, *cursor1*, *cursor2*, and *circle*). To turn on the *object* press the corresponding button. To select the second object of a particular type (*box2* or *cursor2*) press the corresponding button a second time. The selected object will blink momentarily (if the *OBJ BLINK* item on the *SETUP* menu is enabled), and will be automatically turned on. The LED above the button will come on indicating that the object is selected. To turn off the object, press the **ON/OFF** button when the LED is illuminated. All objects will be automatically de-selected after two minutes of inactivity on the front panel. Individual objects will also be deselected when another object is selected.

3.3.1. Controlling the Object Modes

When an object is selected the **MODE** button is used to control its modes (such as aspect ratio, and whether it is centred or not). Pressing the **MODE** button cycles through a list of possible modes for the currently selected object, and the shaft encoders will change the setting for that mode. After a 30-second timeout, the Graticule Generator exits from the *mode select* menu. If the **ESC** button is pressed, the Graticule Generator also exits from the *mode select* menu. When an object is selected, the last modes in use by that object are enabled.

3.3.1.1. Display Mode

Display modes are used to control the appearance of the object on the output video, ex. dashed and solid lines.

3.3.1.2. Centre Mode

If the object's centre mode is enabled, the object's centre will be fixed to the horizontal and vertical centre of the clean aperture. The centre mode will not be available when the *Force Centre Setup Menu* item is set to *yes.*

3.3.2. Aspect Ratio Mode

The aspect ratio mode of the *mask, box, and circle* objects forces the selected object's size parameters to follow one of the following fixed aspect ratios*: 1:1, 4:3(1.33:1), 14:9 (1.55:1), 1.67:1, 16:9 (1.78:1), 1.85:1, 2.35:1*. When the object aspect ratio is set to *Off* the object's dimensions are not constrained to follow a fixed aspect ratio.

When an object is being controlled in aspect ratio mode, the horizontal size will be adjusted first, then the aspect ratio applied to determine the correct vertical size. The pixel aspect ratio and the object aspect ratio are both used to calculate the vertical size of an object of a given horizontal size. The following formula is used to calculate the vertical size:

Number of V lines = Number of H pixels x (Pixel aspect ratio / Object aspect ratio)

This calculation will be rounded to the closest line or to the closest line pair if object centring is on.

Example: Draw a box in 525/4:3 mode with an aspect ratio of 4:3, with a width of 708 pixels.

V lines = H pixels x (Pixel AR / Object AR
= 708 x ((160/177) / (4/3))
= 480

The selected object aspect ratio defines the ideal dimensions of the object. The on screen and front panel aspect ratio displays show the actual object aspect ratio rounded to 2 decimal places. It may vary slightly from the selected object aspect ratio due to the effects of rounding to the closest line, and object centring.

3.3.3. Controlling the Object Attributes

The **CTRL SEL** button is used to select which *object* attributes (white level, size, position, etc) will be adjusted using the shaft encoder knobs. The particular items available in the *CTRL SEL* menu are determined by settings in the *SETUP* menu and the object *MODES* in force at the time.

Sections 3.4 to 3.8 give a complete description of how to control each of the individual objects. In the sections describing the *CTRL SEL* items, the relevant settings from the *MODE* and *SETUP* menus are shown where necessary.

3.3.4. Front Panel Display when Controlling the Objects

When an object is selected the name of the selected object will appear on the display. After a 3-second timeout, the display will show the current value of the object parameters being controlled by the knobs (as determined by the *CTRL SEL* menu). If all of the parameters cannot be displayed at the same time, the display will cycle through the parameters.

When the object is turned off by pressing the **ON/OFF** key, the Front display will show that the object is turned off. If the object is subsequently turned on, the front panel will indicate that it is on, then will show the object parameters after a 3-second timeout.

When object attributes are being modified by turning one of the shaft encoders, the attribute being controlled is displayed along with its current value. If there are more parameters to be displayed, the display will cycle through the remaining parameters after a 3-second timeout.

3.4. CONTROLLING THE GRID OBJECT

The *grid* object consists of two horizontal lines and two vertical lines that intersect the horizontal lines.

3.4.1. Turning the *Grid* Object On and Off

To turn on the *grid* object press the ***GRID*** button. The *grid* object will blink momentarily (if the *obj blink* item on the *setup* menu is enabled), and the *grid* will be turned on. The LED above the ***GRID*** button will come on indicating that the *grid* object is selected. To turn off the *grid* object, press the **ON/OFF** button when the LED is illuminated.

3.4.2. Controlling the *Grid* Modes

When the *grid* object is selected the **MODE** button is used to control whether it is centred or not. Press the **MODE** button until the desired mode item is shown on the front panel, along with the current setting. To select one of the other choices for that mode item, turn one of the shaft encoders knobs. When you have chosen the desired setting for the mode item press the **MODE** button again to save the new setting and view the next mode item. Continue pressing the **MODE** key until you see the message `Mode Select Off`. The shaft encoders revert to controlling the selected *attribute* for the *grid*.

3.4.2.1. Centring the *Grid* on the Raster

Centre:	H + V	Off

This item is used to control whether the *grid* object is centred on the raster or not. The *centre* item is only available when the *SETUP* menu item *force centre* is set to *off.*

Select **H + V** to force the *grid* object to be centred on the raster.

Select **off** to allow the *grid* object to be moved off centre. In this *MODE* it is possible to independently position each line on the *grid*, or to position and size the whole *grid*, depending what *CTRL SEL* item is chosen.

3.4.3. Controlling the *Grid* Attributes

When the *grid* object is selected the **CTRL SEL** button is used to select which of its attributes (such as white level, position, size, or individual lines of the object) will be adjusted by turning the shaft encoder knobs. Press the **CTRL SEL** button until the desired *CTRL SEL* item is shown on the front panel. When you have chosen the desired *CTRL SEL* item press the **GRID** button again or turn one of the shaft encoder knobs to begin controlling the selected attribute of the *grid*.

The items that are shown in the *grid CTRL SEL* menu depend on the *MODE* settings and the settings in the *SETUP* menu. In the sections describing the *CTRL SEL* items, the relevant settings from the *grid MODE* and *SETUP* menus are shown where necessary.

3.4.3.1. Controlling the *Grid* White Level

Level The white level can be adjusted in the range of “0” through “14”, in single digit increments, using either shaft encoder with “0” corresponding to “black” and “14” corresponding to “white”.

3.4.3.2. Controlling the *Grid* Size (*Grid* Centred)

Setup menu	Force centre	*no*
Mode menu	Centre	*H + V*

Size When the *grid* is centred, the left shaft encoder is used to adjust the height and the right shaft encoder is used to adjust the width of the *grid* about the centre of the raster.

3.4.3.3. Controlling the *Grid* Size and Position (*Grid* not centred)

Setup menu	Force centre	*no*
Mode menu	Centre	*off*

When the *grid* centring is Off the H and V lines can be positioned independently in one of four modes.

V track The left shaft encoder is used to adjust the vertical position of the *grid*, i.e. move the *grid* up or down and the right shaft encoder is used to adjust the height of the *grid*.

V no track The left shaft encoder is used to adjust the top of the *grid* and the right shaft encoder is used to adjust the bottom of the *grid*.

H track The left shaft encoder is used to adjust the horizontal position of the *grid*, i.e. move the *grid* left or right and the right shaft encoder is used to adjust the width of the *grid*.

H no track The left shaft encoder is used to adjust the left side of the *grid* and the right shaft encoder is used to adjust the right side of the *grid*.

3.5. CONTROLLING THE MASK OBJECT

The *mask* object consists of a horizontal masked area at the top and bottom of the raster, and a vertical masked area at the left and right side of the raster. The *Setup Mask Start* menu item controls the first line in the vertical that will be blanked by the *mask* object. See section 3.2.7 for further information. Throughout the remainder of section 3.4.3.2 the *mask* dimensions refer to the boundaries between the masked and unmasked area.

3.5.1. Turning the Mask Object On and Off

To turn on the *mask* object press the ***MASK*** button. A dashed line at the edge of the *mask* object will blink momentarily (if the *obj blink* item on the setup menu is enabled), and the *mask* will be turned on. The LED above the ***MASK*** button will come on indicating that the *mask* object is selected. To turn off the *mask* object, press the **ON/OFF** button when the LED is illuminated.

3.5.2. Controlling the *Mask* Modes

When the *mask* object is selected the **MODE** button is used to control its modes, such as aspect ratio, and whether it is centred or not. Press the **MODE** button until the desired mode item is shown on the front panel, along with the current setting. To select one of the other choices for that mode item, turn one of the shaft encoders knobs. When you have chosen the desired setting for the mode item press the **MODE** button again to save the new setting and view the next mode item. Continue pressing the **MODE** key until you see the message `Mode Select Off`. The shaft encoders revert to controlling the selected *attribute* for the *mask*.

3.5.2.1. Controlling the Aspect Ratio of the *Mask*

Aspect ratio	Off	1:1	4:3	14:9	16:9	1.67:1	1.85:1	2.35:1

This item is used to control whether the *mask* object shape is constrained to a specific aspect ratio, or whether its horizontal and vertical dimensions can be independently controlled.

Select **Off** to allow the *mask* object's horizontal and vertical dimensions to be independently controlled.

Select one of the specific aspect ratios to constrain the horizontal and vertical dimensions of the *mask* object so that its aspect ratio is maintained. The setting of the *Mask Apert* item in the *Setup* menu control the maximum horizontal or vertical size of the *mask* when one of the specific aspect ratios is selected.

The user is still able to adjust the size of the *mask* all the way out to the production aperture regardless of the *Mask Apert* setting.

3.5.2.2. Centring the Mask on the Raster

Centre:	H + V	Off

This item is used to control whether the *mask* object is centred on the raster or not. The *centre* item is only available when the *SETUP* menu item *force centre* is set to *off.*

Select **H + V** to force the *mask* object to be centred on the raster.

Select **off** to allow the *mask* object to be moved off centre. In this *MODE* it is possible to independently position the top, bottom, left and right limits of the *mask*, or to size the whole *mask*, depending on the settings of the *aspect ratio MODE item* and what *CTRL SEL* item is chosen.

3.5.3. Controlling the *Mask* Attributes

When the *mask* object is selected the **CTRL SEL** button is used to select which of its attributes (white level, position, size, or individual edges of the object) will be adjusted by turning the shaft encoder knobs. Press the **CTRL SEL** button until the desired *CTRL SEL* item is shown on the front panel. When you have chosen the desired *CTRL SEL* item press the **MASK** button again or turn one of the shaft encoder knobs to begin controlling the selected attribute of the *mask*.

The items that are shown in the *mask CTRL SEL* menu depend on the *MODE* settings and the settings in the *SETUP* menu. In the sections describing the *CTRL SEL* items, the relevant settings from the *mask MODE* and *SETUP* menus are shown where necessary.

3.5.3.1. Controlling the *Mask* White Level

Level The white level can be adjusted in the range of “0” through “14”, in single digit increments, using either shaft encoder with “0” corresponding to “black” and “14” corresponding to “white”.

3.5.3.2. Controlling the *Mask* Size (*Mask* Centred, Aspect Ratio Off)

Setup menu	Force centre	*no*
Mode menu	Aspect ratio	*off*
Mode menu	Centre	*H + V*

or

Setup menu	Force centre	*yes*
Mode menu	Aspect ratio	*off*

Size When the *mask* is centred and aspect ratio *MODE* is Off, the left shaft encoder is used to adjust the height and the right shaft encoder is used to adjust the width of the *mask* about the centre of the raster.

3.5.3.3. Controlling the *Mask* Size (*Mask* Centred, Aspect Ratio On)

Setup menu	Force centre	*Yes*						
Mode menu	Aspect ratio	1:1	4:3	14:9	16:9	1.67:1	1.85:1	2.35:1

Or

Setup menu	Force centre	*No*						
Mode menu	Aspect ratio	1:1	4:3	14:9	16:9	1.67:1	1.85:1	2.35:1
Mode menu	Centre	*H + V*						

Size When the *mask* is centred and aspect ratio MODE is On, the left and right shaft encoders are used to adjust the overall *size* of the *mask* proportionately about its centre while maintaining the selected *aspect ratio*. The size is adjusted about the centre of the raster.

3.5.3.4. Controlling the *Mask* Size and Position (*Mask* not centred, Aspect Ratio Off)

Setup menu	Force centre	*no*
Mode menu	Aspect ratio	*off*
Mode menu	Centre	*off*

When the *mask* centring is Off and aspect ratio MODE is Off the H and V lines can be positioned independently in one of four modes.

V track The left shaft encoder is used to adjust the vertical position of the *mask*, i.e. move the *mask* up or down and the right shaft encoder is used to adjust the height of the *mask*.

V no track The left shaft encoder is used to adjust the top of the *mask* and the right shaft encoder is used to adjust the bottom of the *mask*.

H track The left shaft encoder is used to adjust the horizontal position of the *mask*, i.e. move the *mask* left or right and the right shaft encoder is used to adjust the width of the *mask*.

H no track The left shaft encoder is used to adjust the left side of the *mask* and the right shaft encoder is used to adjust the right side of the *mask*.

3.5.3.5. Controlling the *Mask* Size and Position (*Mask* not centred, Aspect Ratio On)

Setup menu	Force centre	*No*						
Mode menu	Aspect ratio	1:1	4:3	14:9	16:9	1.67:1	1.85:1	2.35:1
Mode menu	Centre	*Off*						

When the *mask* centring is Off and aspect ratio mode is On the position and overall *size* of the *mask* can be adjusted proportionately about the centre of the *mask* based upon the *aspect ratio* selected.

Position The left shaft encoder is used to adjust the vertical *position* of the *mask,* i.e. move the *mask* up or down and the right shaft encoder is used to adjust the horizontal *position* of the *mask*, i.e. move the *mask* left or right.

Size The left shaft encoder is used to adjust the size of the *mask* with the bottom right corner fixed. The right shaft encoder is used to adjust the size of the *mask* with the top left corner fixed. The aspect ratio of the *mask* is maintained as the size is adjusted.

3.6. CONTROLLING THE CURSOR OBJECTS

There are two *cursor* objects, called *cursor1* and *cursor2*. Each of the *cursor* objects consists of a horizontal and vertical line that intersect at their mid points. Each of the *cursor* objects can be controlled independently, and operate the same way. References throughout this section to the *cursor* object apply to either *cursor1* or *cursor2*.

3.6.1. Turning the *Cursor* Objects On and Off

To turn on the *cursor1* object press the ***CURSOR*** button. The *cursor1* object will blink momentarily (if the *obj blink* item on the Setup menu is enabled), and the *cursor1* object will be turned on. The LED above the ***CURSOR*** button will come on indicating that the *cursor1* object is selected. To turn off the *cursor1* object, press the **ON/OFF** button when the *cursor1* object is selected. To turn on the *cursor2* object press the ***CURSOR*** button a second time. The *cursor2* object will blink momentarily (if the *obj blink* item on the Setup menu is enabled), and it will be turned on. To turn off the *cursor2* object, press the **ON/OFF** button when the *cursor2* object is selected.

3.6.2. Controlling the *Cursor* Modes

When the *cursor* object is selected, the **MODE** button is used to control its modes, such as aspect ratio, and whether it is centred or not. Press the **MODE** button until the desired mode item is shown on the front panel, along with the current setting. To select one of the other choices for that mode item, turn one of the shaft encoders knobs. When you have chosen the desired setting for the mode item press the **MODE** button again to save the new setting and view the next mode item. Continue pressing the **MODE** key until you see the message `Mode Select Off`. The shaft encoders revert to controlling the selected *attribute* for the *cursor*.

3.6.2.1. Centring the Cursor on the Raster

`Centre:`	`H + V`	`Off`

This item is used to control whether the *cursor* object is centred on the raster or not. The *cursor* object centring is not affected by the *SETUP* menu item *force centre* item.

Select **yes** to force the *cursor* object to be centred on the raster.

Select **off** to allow the *cursor* object to be moved off centre. In this *MODE* it is possible to independently position the *cursor*, depending on what *CTRL SEL* item is chosen.

3.6.3. Controlling the *Cursor* Attributes

When the *cursor* object is selected the **CTRL SEL** button is used to select which of its attributes (white level, position, or size) will be adjusted by turning the shaft encoder knobs. Press the **CTRL SEL** button until the desired *CTRL SEL* item is shown on the front panel. When you have chosen the desired *CTRL SEL* item press the **CURSOR** button again or turn one of the shaft encoder knobs to begin controlling the selected attribute of the *cursor*.

3.6.3.1. Controlling the *Cursor* White Level

Level The white level can be adjusted in the range of "0" through "14", in single digit increments, using either shaft encoder with "0" corresponding to "black" and "14" corresponding to "white".

3.6.3.2. Controlling the *Cursor* Size

Size The size of the *cursor* can be adjusted using either of the shaft encoders. The size will change proportionately about the centre of the *cursor*.

H/V Size The left shaft encoder is used to adjust the height of the *CURSOR* vertical line, and the right shaft encoder is used to adjust the width of the *cursor* horizontal line.

3.6.3.3. Controlling the *Cursor* Position (*Cursor* not centred)

Mode menu	Centre	*off*

When the *cursor* centring is Off the position of the *cursor* can be adjusted.

Position The left shaft encoder is used to adjust the vertical *position* of the *cursor,* i.e. move the *cursor* up or down and the right shaft encoder is used to adjust the horizontal *position* of the *cursor*, i.e. move the *cursor* left or right.

3.7. CONTROLLING THE BOX OBJECTS

There are two *box* objects, called *box1* and *box2*. Each of the *box* objects can be controlled independently, and operate the same way. Often *box1* is used to mark the safe action area and *box2* is used to mark the safe title area. References throughout this section to the *box* object apply to either *box1* or *box2*.

3.7.1. Turning the Box Objects On and Off

To turn on the *box1* object press the ***BOX*** button. The *box1* object will blink momentarily (if the *obj blink* item on the Setup menu is enabled), and the *box1* object will be turned on. The LED above the ***BOX*** button will come on indicating that the *box1* object is selected. To turn off the *box1* object, press the **ON/OFF** button when it is selected. To turn on the *box2* object press the ***BOX*** button a second time. The *box2* object will blink momentarily (if the *obj blink* item on the Setup menu is enabled), and the *box2* object will be turned on. To turn off the *box2* object, press the **ON/OFF** button when it is selected.

3.7.2. Controlling the *Box* Modes

When the *box* object is selected, the **MODE** button is used to control its modes, such as aspect ratio, and whether it is centred or not. Press the **MODE** button until the desired mode item is shown on the front panel, along with the current setting. To select one of the other choices for that mode item, turn one of the shaft encoders knobs. When you have chosen the desired setting for the mode item press the **MODE** button again to save the new setting and view the next mode item. Continue pressing the **MODE** key until you see the message `Mode Select Off`. The shaft encoders revert to controlling the selected *control* for the *box*.

3.7.2.1. Controlling the Aspect Ratio of the *Box*

Aspect ratio	Off	1:1	4:3	14:9	16:9	1.67:1	1.85:1	2.35:1

This item is used to control whether the *box* object shape is constrained to a specific aspect ratio, or whether its horizontal and vertical dimensions can be independently controlled.

Select **Off** to allow the *box* object's horizontal and vertical dimensions to be independently controlled.

Select one of the specific aspect ratios to constrain the horizontal and vertical dimensions so that the aspect ratio of the *box* object is maintained.

3.7.2.2. Choosing a Solid or Dashed Box

Disp:	solid	dashed

This item is used to control whether the *box* object is composed of solid or dashed lines.

Select **solid** to draw the *box* object with solid lines.

Select **dashed** to draw the *box* object with broken lines.

3.7.2.3. Centring the Box on the Raster

Centre:	H + V	Off

This item is used to control whether the *box* object is centred on the raster or not. The *centre* item is only available when the *SETUP* menu item *force centre* is set to *off.*

Select **H + V** to force the *box* object to be centred on the raster.

Select **off** to allow the *box* object to be moved off centre. In this *MODE* it is possible to independently position each line on the *box*, or to position and size the whole *box*, depending on the settings of the *aspect ratio MODE item* and what *CTRL SEL* item is chosen.

3.7.3. Controlling the *Box* Attributes

When the *box* object is selected the **CTRL SEL** button is used to select which of its attributes (white level, position, size, or individual sides of the *box*) will be adjusted by turning the shaft encoder knobs. Press the **CTRL SEL** button until the desired *CTRL SEL* item is shown on the front panel. When you have chosen the desired *CTRL SEL* item press the **BOX** button again or turn one of the shaft encoder knobs to begin controlling the *box*.

The items that will be shown in the *box CTRL SEL* menu depend on the *MODE* settings and the settings in the *SETUP* menu. In the sections describing the *CTRL SEL* items, the relevant settings from the *box MODE* and *SETUP* menus are shown where necessary.

3.7.3.1. Controlling the *Box* White Level

Level The white level can be adjusted in the range of "0" through "14", in single digit increments, using either shaft encoder with "0" corresponding to "black" and "14" corresponding to "white".

3.7.3.2. Controlling the *Box* Size (*Box* Centred, Aspect Ratio Off)

Setup menu	Force centre	*no*
Mode menu	Aspect ratio	*off*
Mode menu	Centre	*H + V*

or

Setup menu	Force centre	*yes*
Mode menu	Aspect ratio	*off*

Size When the *box* is centred and aspect ratio MODE is Off, the left shaft encoder is used to adjust the height and the right shaft encoder is used to adjust the width about the centre of the raster.

3.7.3.3. Controlling the *Box* Size and Position (*Box* centred, Aspect Ratio On)

Setup menu	Force centre	*Yes*						
Mode menu	Aspect ratio	1:1	4:3	14:9	16:9	1.67:1	1.85:1	2.35:1

Or

Setup menu	Force centre	*No*						
Mode menu	Aspect ratio	1:1	4:3	14:9	16:9	1.67:1	1.85:1	2.35:1
Mode menu	Centre	*H + V*						

Size When the *box* is centred and aspect ratio MODE is On, the left and right shaft encoders are used to adjust the overall *size* of the *box* proportionately about the centre of the raster based upon the *aspect ratio* selected.

3.7.3.4. Controlling the *Box* Size and Position (*Box* not centred, Aspect Ratio Off)

Setup menu	Force centre	*no*
Mode menu	Aspect ratio	*off*
Mode menu	Centre	*off*

When the *box* centring is Off and aspect ratio MODE is Off the sides of the *box* can be positioned independently in one of four modes.

Size The left shaft encoder is used to adjust the height of the *box*, and the right shaft encoder is used to adjust the width of the *box* about the centre of the *box*.

Position The left shaft encoder is used to adjust the vertical position of the *box*, i.e. move the *box* up or down, and the right shaft encoder is used to adjust the horizontal position of the *box*, i.e. move the *box* left or right.

H no track The left shaft encoder is used to adjust the left side of the *box* and the right shaft encoder is used to adjust the right side of the *box*.

V no track The left shaft encoder is used to adjust the top of the *box* and the right shaft encoder is used to adjust the bottom of the *box*.

3.7.3.5. Controlling the *Box* Size and Position (*Box* not centred, Aspect Ratio On)

Setup menu	Force centre	*No*						
Mode menu	Aspect ratio	1:1	4:3	14:9	16:9	1.67:1	1.85:1	2.35:1
Mode menu	Centre	*off*						

When the *box* centring is Off and aspect ratio mode is On the position and overall *size* of the *box* can be adjusted proportionately about the centre of the *box* based upon the *aspect ratio* selected.

Position The left shaft encoder is used to adjust the vertical *position* of the *box,* i.e. move the *box* up or down and the right shaft encoder is used to adjust the horizontal *position* of the *box*, i.e. move the *box* left or right.

Size The left shaft encoder is used to adjust the size of the *box* with the bottom right corner fixed. The right shaft encoder is used to adjust the size of the *box* with the top left corner fixed.

3.8. CONTROLLING THE CIRCLE OBJECT

3.8.1. Turning the *Circle* Object On and Off

To turn on the *circle* object press the **CIRCLE** button. The *circle* object will blink momentarily (if the *obj blink* item on the Setup menu is enabled), and the *circle* will be turned on. The LED above the **CIRCLE** button will come on indicating that the *circle* object is selected. To turn off the *circle* object, press the **ON/OFF** button when the LED above the **CIRCLE** button is illuminated.

3.8.2. Controlling the *Circle* Modes

When the *circle* object is selected, the **MODE** button is used to control its modes, such as aspect ratio, and whether it is centred or not. Press the **MODE** button until the desired mode item is shown on the front panel, along with the current setting. To select one of the other choices for that mode item, turn one of the shaft encoders knobs. When you have chosen the desired setting for the mode item press the **MODE** button again to save the new setting and view the next mode item. Continue pressing the **MODE** key until

you see the message `Mode Select Off`. The shaft encoders revert to controlling the selected *control* for the object.

3.8.2.1. Centring the Circle on the Raster

Centre:	H + V	Off

This item is used to control whether the *circle* object is centred on the raster or not. The *centre* item is only available when the *SETUP* menu item *force centre* is set to *off.*

Select **yes** to force the *circle* object to be centred on the raster.

Select **off** to allow the *circle* object to be moved off centre. In this *MODE* the it is possible to independently position each line on the *circle*, or to position and size the whole *circle*, depending on the settings of the *aspect ratio MODE item* and what *CTRL SEL* item is chosen.

3.8.2.2. Controlling the Aspect Ratio of the *Circle*

Aspect ratio	Off	1:1	4:3	14:9	16:9	1.67:1	1.85:1	2.35:1

This item is used to control whether the *circle* object shape is constrained to a specific aspect ratio, or whether its horizontal and vertical dimensions can be independently controlled.

Select **Off** to allow the *circle* object's horizontal and vertical dimensions to be independently controlled.

Select one of the specific aspect ratios to constrain the horizontal and vertical dimensions so that the aspect ratio of the *circle* object is maintained.

3.8.3. Controlling the *Circle* Attributes

When the *circle* object is selected the **CTRL SEL** button is used to select which of its attributes (white level, position, size, or individual axes of the *circle*) will be adjusted by turning the shaft encoder knobs. Press the **CTRL SEL** button until the desired *CTRL SEL* item is shown on the front panel. When you have chosen the desired *CTRL SEL* item press the **CIRCLE** button again or turn one of the shaft encoder knobs to begin controlling the selected attribute of the *circle*.

The items that will be shown in the *circle CTRL SEL* menu depend on the *MODE* settings and the settings in the *SETUP* menu. In the sections describing the *CTRL SEL* items, the relevant settings from the *circle MODE* and *SETUP* menus are shown where necessary.

3.8.3.1. Controlling the *Circle* White Level

Level The *circle* white level can be adjusted in the range of “0” through “14”, in single digit increments, using either shaft encoder with “0” corresponding to “black” and “14” corresponding to “white”.

3.8.3.2. Controlling the *Circle* Size (*Circle* Centred, Aspect Ratio Off)

Setup menu	Force centre	*no*
Mode menu	Aspect ratio	*off*
Mode menu	Centre	*H + V*

or

Setup menu	Force centre	*yes*
Mode menu	Aspect ratio	*off*

Size When the *circle* is centred and aspect ratio MODE is Off, the left shaft encoder is used to adjust the height and the right shaft encoder is used to adjust the width about the centre of the raster.

3.8.3.3. Controlling the *Circle* Size and Position (*Circle* centred, Aspect Ratio On)

Setup menu	Force centre	*Yes*						
Mode menu	Aspect ratio	1:1	4:3	14:9	16:9	1.67:1	1.85:1	2.35:1

Or

Setup menu	Force centre	*No*						
Mode menu	Aspect ratio	1:1	4:3	14:9	16:9	1.67:1	1.85:1	2.35:1
Mode menu	Centre	*H + V*						

Size When the *circle* is centred and aspect ratio MODE is On, the left and right shaft encoders are used to adjust the overall *size* of the *circle* proportionately about the centre of the *circle* while maintaining the *aspect ratio* selected.

3.8.3.4. Controlling the *Circle* Size and Position (*Circle* not centred, Aspect Ratio Off)

Setup menu	Force centre	*no*
Mode menu	Aspect ratio	*off*
Mode menu	Centre	*off*

When the *circle* centring is Off and aspect ratio MODE is Off the position and the H and V size of the *circle* lines can be positioned independently.

Size The left shaft encoder is used to adjust the height of the *circle*, and the right shaft encoder is used to adjust the width of the *circle*.

Position The left shaft encoder is used to adjust the vertical position of the *circle*, i.e. move the *circle* up or down, and the right shaft encoder is used to adjust the horizontal position of the *circle*, i.e. move the *circle* left or right.

3.8.3.5. Controlling the *Circle* Size and Position (*Circle* not centred, Aspect Ratio On)

Setup menu	Force centre	*No*						
Mode menu	Aspect ratio	1:1	4:3	14:9	16:9	1.67:1	1.85:1	2.35:1
Mode menu	Centre	*off*						

When the *circle* centring is Off and aspect ratio mode is On the position and overall *size* of the *circle* can be adjusted proportionately about the centre of the *circle* based upon the *aspect ratio* selected.

Size Either of the shaft encoders can be used to adjust the size of the *circle* around its centre, while maintaining the selected aspect ratio for the H and V axes.

Position The left shaft encoder is used to adjust the vertical *position* of the *circle,* i.e. move the *circle* up or down and the right shaft encoder is used to adjust the horizontal *position* of the *circle*, i.e. move the *circle* left or right.

3.9. LOADING FACTORY PRESETS

The **FACT PRESET** button is used to recall the most recently used *factory preset*. Turn one of the shaft encoder knobs to cycle through the available *factory presets*. The name of the selected preset will be shown on the front panel display, and the selected collection of object settings will be loaded into to the Graticule Generator. The *PRESET ACTIVE* LED will illuminate when one of the Factory presets is loaded. The *factory presets* available at the time of printing are shown in Appendix B. In the front panel descriptions of the *factory presets CA* refers to clean aperture, *AN* refers to analog blanking aperture and *PA* refers to production aperture.

3.10. WORKING WITH THE USER PRESETS

The Graticule Generator has ten memory locations to store user defined presets. Each preset contains a collection of object parameters that define what objects are on, and the *OBJECT MODES AND CTRL SEL* settings for the objects. There are ten *user preset* locations for each video standard. Each of the *user preset* locations can be write-protected, or can left unlocked, so users can save their favourite settings. When the Graticule Generator is first turned on, the ten *user preset* locations are filled with ten of the *factory presets*.

3.10.1. Saving User Presets

To save the current object settings into one of the ten *user preset* memory locations, press the **PRESET SAVE** button. The Front panel display will show `Store Preset #`. Then press the **USER PRESET** button corresponding to the location you wish to store the settings to. The Front panel display will show `SAVE to store n` where n is the number of the *user preset*. Press the **PRESET SAVE** button a second time to confirm the operation (The Front panel display will show `Preset n stored)` or press the **ESC** button to abort the store operation. If the user attempts to store a preset into a write protected location the front panel will display the message `Preset n locked`.

User Presets **cannot be deleted directly from memory they can only be overwritten by another configuration saved to the same memory location.**

3.10.2. Recalling User Presets

To load the current object settings from one of the ten *user preset* memory locations; press *the* **USER PRESET** button corresponding to the location you wish to restore the settings from.

Recalling one of the *user presets* will overwrite the current object settings and can not be undone. Make sure you want to overwrite your current settings before you recall one of the *user presets*

***User presets* cannot be recalled if the *keyer* is *off*.**

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4. HOW TO OPERATE THE GRATICULE GENERATOR USING THE DESKTOP REMOTE CONTROL PANEL

The standard Graticule Generators version consists of a 1 RU chassis with integrated control panel. The Graticule Generator is also available in a remote control version, which has a blank front panel and either a rack mountable, or a desktop remote control panel. Operation of the Graticule Generator from the desktop remote panel is described in this chapter. For information on controlling the Graticule Generator from the integrated control panel or the rack mount control panel see chapter 4. For information about connecting the desktop remote panel to the Graticule Generator electronics see section 2.5.

4.1. AN OVERVIEW OF THE KEY AND DISPLAY FUNCTIONS

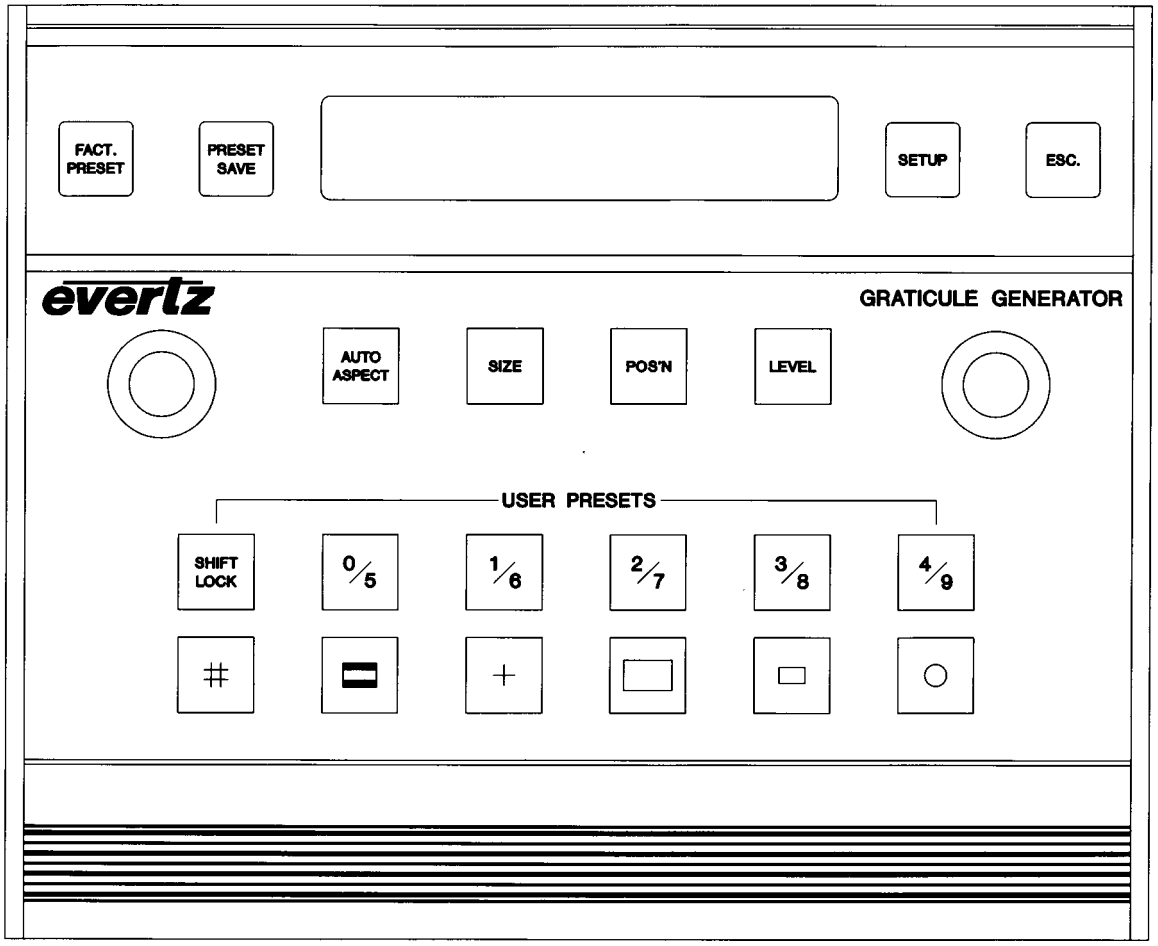

Figure 4-1: Desktop Remote Panel Layout

The desktop remote control panel contains a 16 digit alphanumeric display, and a 20 pushbutton keypad.

The keypad is used to select and control the attributes, position and size of each of the Graticule Generator objects. Each of the keys is backlit and will be illuminated so that they are easily visible in a

darkened control room. When the button is active, it will be illuminated brightly, or it may blink between dim and bright illumination. The Setup menu provides a means of setting overall constraints on the Graticule Generator, allowing you to configure the device to your application. Six user preset buttons and one factory preset button allow you to save and recall frequently used collections of objects, to simplify operation of the Graticule Generator.

The remainder of this section gives an overview of each of the front panel buttons. Sections 4.2.10 to 4.8 give detailed information on controlling each of the screen objects.

4.1.1. The Object Push-button Group

The Object key group consists of the six object keys. The object key group is used to select individual objects and turn them on or off. Then one of the object buttons is pressed it turns on the respective object and selects it for control. The button will blink when the object is selected. To turn off the object, press the button a second time while it is blinking. The selected object will be automatically de-selected after two minutes of inactivity on the front panel. Individual objects will also be deselected when another object is selected. Objects that are turned On but not selected will have their corresponding button brightly illuminated.

GRID  Pressing this button selects and turns on the *grid object*.

MASK  Pressing this button selects and turns on the *mask* object

CURSOR  Pressing the button once selects and turns on the *cursor* object.

BOX1  Pressing the button once selects and turns on the *box1* object.

BOX2  Pressing the button once selects and turns on the *box2* object.

CIRCLE  Pressing this button selects and turns on the *circle object*

AUTO ASPECT This button controls whether the Graticule Generator operates in one of the fixed aspect ratios or whether the objects can be independently sized and positioned. See section 4.3.1 for more information about *auto aspect ratio* mode.

4.1.2. The Setup Button Group

This button group consists of two buttons located adjacent to the display. The actions of this button group affect all objects.

SETUP Pressing this button allows you to program various **global** attributes for the objects, and to configure the overall operating modes for the Graticule Generator. See section 4.2 for a complete description of the setup modes.

ESC This button is used to exit out of menus or to abort setup operations.

4.1.3. The Preset Group

This button group consists of the **FACT PRESET, PRESET SAVE** and **SHIFT LOCK** buttons and the adjacent five numbered buttons. The actions of this button group allow you to save and recall various setups for the Graticule Generator.

FACT PRESET This button is used to recall the *factory presets*. Press this button to recall the *factory presets* that was previously selected. Turn one of the shaft encoder knobs to cycle through the available *factory presets*. The name of the selected preset will be shown on the front panel display, and the selected collection of object settings will be loaded into the Graticule Generator. The *FACT PRESET* button will brightly illuminate when one of the *factory presets* is loaded. See section 4.9 for more information about factory presets.

PRESET SAVE This button allows the user to save the current *object* settings to one of the ten *user preset* memory locations. Each of the *user preset* memory locations can be individually write-protected. See section 4.10 for a complete description of how to use the *user presets*.

User presets **cannot be deleted directly from memory they can only be overwritten by another configuration saved to the same memory location.**

SHIFT LOCK The state of the **SHIFT LOCK** button determines whether *user preset* locations 0 to 4 or 5 to 9 will be selected with the **USER PRESET** buttons. Press the **SHIFT LOCK** button to toggle the *shift lock* function on or off. *Shift lock* is *On* when the **SHIFT LOCK** button is brightly illuminated. See section 4.8.2 for a complete description of how to use the *user presets*.

USER PRESETS These five buttons used in conjunction with the **SHIFT LOCK** button are used to store or recall the nonvolatile *USER PRESETS*. To recall a *USER PRESET* press the corresponding button once. See section 4.8.2 for a complete description of how to use the *user presets*.

4.1.4. Shaft Encoders (Knobs)

The shaft encoders' function is to change the value of one or more of the current object's parameters based on the current control option. When the *auto aspect* mode or *setup* menus are enabled the shaft encoders are used to select menu options.

When the *size* or *position* of an object is being controlled, the left knob controls horizontal movements, and the right knob controls vertical movements. Horizontal move operations will be to the right for clockwise changes and to the left for counterclockwise changes. Vertical move operations will be down for clockwise changes and up for counterclockwise changes.

4.1.5. Status Indicators

Most of the push buttons may be illuminated brightly to show operational status of the Graticule Generator at a glance. When the Object buttons are blinking, it indicates that the object is selected for control. When the object buttons are illuminated brightly that means that the corresponding object is turned On.

4.2. SETUP MENU

The key to the operational flexibility of the Graticule Generator lies in the *SETUP* menu system. The *SETUP* menu system uses the 16 digit alphanumeric display and provides a quick, intuitive method of configuring the Graticule Generator, guiding you to the correct setup for your application. The *SETUP* Menu contains items that pertain to the overall operation of the Graticule Generator.

The two keys in the Setup key group (**SETUP**, **ESC**) are used to cycle through the various items on the *SETUP* menu. The *SETUP* menu consists of a main menu with two or more choices for each menu item. Figure 4-2 is an overview of the *SETUP* menu for the Standard Definition Graticule Generator.

n screen =	show	hide						
ask apert =	prod	clean						
ox % calc =	prod	clean						
bj blink =	short	long	none					
n disp =	int rel	int abs						
ask start =	9f2							
eedback =	aspect	pos						
orce centre	yes	no						
id Std =	1080I/60	1080I/50	1080P/24SF	1080P/30	1080P/25	1080P/24	1035I/30	720P/60
id freq =	1/1.001	1/1						

Figure 4-3 is an overview of the *SETUP* menu for the High Definition Graticule Generator. The menu items are shown on the left with grey shading and the various choices are shown on the right with no background shading.

On screen =	show	hide		
Mask apert =	prod	clean	analg	
Box % apert =	prod	clean	analg	
Pix =	analog 4:3	analog 16:9	digital 4:3	digital 16:9
Obj blink =	short	long	none	
Ln disp =	int rel	int abs		
Mask start =	9f2			
Feedback =	aspect	pos		
Force centre	yes	no		
Standard	525	625	Auto	

Figure 4-2: Overview of the 9590 Setup Menu

n screen =	show	hide						
ask apert =	prod	clean						
ox % calc =	prod	clean						
bj blink =	short	long	none					
n disp =	int rel	int abs						
ask start =	9f2							
eedback =	aspect	pos						
orce centre	yes	no						
id Std =	1080I/60	1080I/50	1080P/24SF	1080P/30	1080P/25	1080P/24	1035I/30	720P/60
id freq =	1/1.001	1/1						

Figure 4-3: Overview of the HD9590 Setup Menu

To enter the *Setup* menu, press the **SETUP** key. Pressing the **SETUP** key again allows you to move vertically within the menu tree. The menu item is shown on the left of the front panel display and the value for that item is shown on the right. The current value for that menu item will be shown. Turn the left or right shaft encoder knobs reveal the choices for the current menu item. When you have selected the desired sub menu choice press the **SETUP** key to save your choice and advance to the next menu item.

The menu choice that is shown for an item when you press the SETUP key will be saved as the new value for that menu item. If you do not wish to save a new value press the ESC key to exit the *SETUP* menu.

When you have made all the desired changes, press the **ESC** key to return to the normal display mode. After a 30-second timeout, the Graticule Generator exits from the *SETUP* menu automatically.

Each of the menu items is described in the sections below, with an explanation of what each choice does.

When you make a change to one of the *SETUP* parameters you will need to press the *SETUP* button to save the change.

4.2.1. Controlling On Screen Aspect Ratio Display

On screen =	show	hide

This menu item allows the user to enable or disable the aspect ratio on-screen display for the *grid, box*, *mask*, and *circle* objects. The on-screen display will turn off after ten seconds of front panel inactivity. To inhibit the on-screen display completely select **hide**. The on screen aspect ratio display shows the actual aspect ratio of the selected object. This may be slightly different than the target aspect ratio (selected by the object's aspect ratio mode) due to rounding of the dimensions to the closest line or pixel.

4.2.2. Choosing the Raster limits for the Mask Aspect Ratio and Size Calculation

Mask apert =	prod	clean	analg

This menu item sets how the aspect ratio and size calculations for the *mask* and *grid* objects are calculated. In either setting, the *mask* and *grid* objects can be positioned all the way out to the *production aperture*. When you choose one of the automatic aspect ratios for the *mask* object, its initial size and position will be calculated with respect to the mask aperture setting. See section 4.5.2 for information on selecting the *mask* aspect ratio.

Select **prod** when you want to use the *production aperture* as the reference for the *mask* and *grid* object aspect ratio and size.

Select **clean** when you want to use the *clean aperture* as the reference for the *mask* and *grid* object aspect ratio and size.

Select **analg** when you want to use the *nominal analog blanking* as the reference for the *mask* and *grid* object aspect ratio and size.

4.2.3. Choosing the Raster limits for the Box Size Calculation

Box apert =	prod	clean	analg

This menu item sets how the size percentage calculations for the *box* object are calculated. In either setting, the *box* object perimeter can be positioned all the way out to the *production aperture*.

Select **prod** when you want to use the *production aperture* as the reference for the *box* object size calculation.

Select **clean** when you want to use the *clean aperture* as the reference for the *box* object size calculation.

Select **analg** when you want to use the *nominal analog blanking* as the reference for *box* object size calculation.

4.2.4. Setting the Pixel Aspect Ratio (9590 only)

Pix =	analog 4:3	analog 16:9	digital 4:3	digital 16:9

This menu item sets the pixel aspect ratio relative to that of the input video.

Select **analog 4:3** when you are working with normal aspect ratio video and you want to define the 4:3 aspect ratio according to the nominal analog blanking.

Select **analog 16:9** when the input video has been compressed from a 16:9 format to a 4:3 format and you want to define the 16:9 aspect ratio according to the nominal analog blanking. Objects will be drawn in their compressed state, so that they will appear normal when the video is expanded again.

Select **digital 4:3** when you are working with normal aspect ratio video and you want to define the 4:3 aspect ratio according to the clean aperture.

Select **digital 16:9** when the input video has been compressed from a 16:9 format to a 4:3 format and you want to define the 16:9 aspect ratio according to the clean aperture. Objects will be drawn in their compressed state, so that they will appear normal when the video is expanded again.

4.2.5. Choosing the Object Blink Time

Obj blink =	short	long	none

This menu item sets how long objects blink when they are selected.

Select **long** when you want a selected object to blink for twenty seconds before it reverts back to being displayed continuously.

Select **short** when you want a selected object to blink for three seconds before it reverts back to being displayed continuously.

Select **none** when you want to disable object blinking.

4.2.6. Choosing How Line Numbers are Displayed

Ln disp =	int rel	int abs

When the selected video standard uses an interlaced raster, this menu item changes the format that the front panel display uses to show line numbers.

Select **int rel** to view line numbers in an *interlaced relative* format. In this format lines are numbered relative to the beginning of each *field* and shown with their field number. (E.g. in 525 line video, line 21F1 is the first line of active video in field 1, line 21F2 is the first line of active video in field 2)

Select **int abs** to view line numbers in an *interlaced absolute* format. In this format lines are numbered in an interlaced raster with the line numbers relative to the beginning of the complete frame. (E.g. in 525 line video, line 21 is the first line of active video in field 1, line 283 is the first line of active video in field 2)

When the video standard uses a progressive (non-interlaced) raster, this menu item is not available. Line numbering is always done in a progressive system referenced to the beginning of the frame.

4.2.7. Choosing Where the Vertical Mask Starts in the VBI

Mask Start =	9F2

This menu item determines starting line in the vertical blanking interval for the *mask* object. Turn one of the shaft encoder knobs to adjust the line number. Vertical interval line numbers before this line will NOT be masked.

4.2.8. Displaying Object Aspect Ratio or Position on the Front Panel

Feedback =	aspect	pos

This menu item sets whether the front panel display will show the object aspect ratio or position when an object's size or position is being controlled.

Select **aspect** when you want to show the object position as an aspect ratio and a percentage.

Select **pos** when you want to show the object position as horizontal and vertical position values.

4.2.9. Forcing all Objects to be Centred on the Raster

Force centre	yes	no

This menu item sets whether the *grid, mask, box, circle* and *cursor* objects are all always centred on the screen, or whether object centring is controlled by the *auto aspect ratio* mode.

Select **yes** to force the *grid, mask, box* and *circle* objects to be centred on the raster.

Select **no** to use the *auto aspect ratio* mode to control whether the objects are centred on the raster. See section 4.3.1 for more information about centring objects with the *auto aspect ratio* mode.

4.2.10. Selecting the Video Standard (9590)

Vid Std =	525	625	Auto

This menu item selects the video standard in use.

Select **525** when using 525 line video at 29.97 frames per second. (Specified by SMPTE/ANSI 125M)

Select **625** when using 625 line video at 25 frames per second. (Specified by EBU Tech 3267)

Select **Auto** when you want the 9590 to automatically detect the video standard of the incoming video. The **525** and **625** front panel LEDs will indicate the current video standard.

4.2.11. Selecting the Video Standard (HD9590)

Vid Std =	1080I/60	1080I/50	1080P/24SF	1080P/30	1080P/25	1080P/24	1035I/60	720P/60	Auto

This menu item selects the video standard in use. Newer HD9590 units autodetect 1/1.001 field rates. See section 4.2.12 for information about selecting 1/1.001 field rates on older HD9590 models.

Select **1080I/60** when using high definition video with a total raster of 1125 lines at 30 frames per second and an interlace scanned active picture of 1920 pixel x 1080 lines as specified by SMPTE 274M

Select **1080I/50** when using high definition video with a total raster of 1125 lines at 25 frames per second and an interlace scanned active picture of 1920 pixel x 1080 lines as specified by SMPTE 274M

Select **1080P/24SF** when using high definition video with a total raster of 1125 lines at 24 frames per second and a segmented progressive scanned active picture of 1920 pixel x 1080 lines as specified by SMPTE RP211

Select **1080P/30** when using high definition video with a total raster of 1125 lines at 30 frames per second and a progressive scanned active picture of 1920 pixel x 1080 lines as specified by SMPTE 274M

Select **1080P/25** when using high definition video with a total raster of 1125 lines at 25 frames per second and a progressive scanned active picture of 1920 pixel x 1080 lines as specified by SMPTE 274M

Select **1080P/24** when using high definition video with a total raster of 1125 lines at 24 frames per second and a progressive scanned active picture of 1920 pixel x 1080 lines as specified by SMPTE 274M

Select **1035I/60** when using high definition video with a total raster of 1125 lines at 30 frames per second and an interlace scanned active picture of 1920 pixel x 1035 lines as specified by SMPTE 260M

Select **720P/60** when using high definition video with a total raster of 750 lines at 60 frames per second and a progressive scanned active picture of 1280 pixel x 720 lines as specified by SMPTE 296M

Select **AUTO** when you want the HD9590 to automatically detect the video standard from the incoming video. See section 4.2.11.1 for more information about operating the HD9590 in auto video standard mode.

4.2.11.1. Operating the HD9590 In Auto Video Standard Mode

When the HD9590 video standard is set to *AUTO* it will attempt to detect the video standard of the incoming video and change the current video standard to match. When the incoming video does not match the current standard, the front panel video standard LED that is currently ON will begin to blink. After approximately 5 seconds the Graticule Generator will switch to the new video standard. This delay prevents random standards switches that otherwise may occur between some of the video formats. The new video standard will be displayed on the front panel. Video standards changes will not occur while the Graticule Generator is in the *Setup* mode, or while the on screen objects are being moved using the shaft encoder knobs.

Most of the supported standards can be detected, but there are some exceptions.

- The standards 1080I/60 and 1080P/30SF are the same as far as the Graticule Generator is concerned. When the video input is in either of these standards the Graticule Generator will display the standard as 1080I/60
- The standards 1080I/50 and 1080P/25SF are the same as far as the Graticule Generator is concerned. When the video input is in either of these standards the Graticule Generator will display the standard as 1080I/50
- On certain earlier revisions of the High Definition Graticule Generator hardware it is necessary to select whether the video clock rate is 1/1 or 1/1.001. (See section 4.2.12) On these units the *Video Freq* menu item must be correctly selected in order for Auto Video Standard Detection to work correctly. For example on these early units the HD9590 can automatically switch between 1080i/59.94 and 1080p/23.98sF because the video frequency divider is set to 1/1.001 in both cases. However, it

can not switch between 1080i/59.94 and 1080i/50 because the video frequency divider is different for these two standards.

- Auto Video Standard Detection cannot distinguish between 1035I/60 and 1080I/60. The light will not blink if the Graticule Generator is in 1035I/60 or 1080I/60 mode and the other standard is coming in the input. If 1035I/60 video is on the input the Graticule Generator will detect it as 1080i/60 and output a 1080i/60 formatted video signal. The only way to force 1035I/60 mode is to select it manually from the *Video Std*. Menu. Since there is no LED to indicate 1035i/60 mode, no LED will blink if the HD9590 is in 1035i/60 and another video standard is placed on the input.

4.2.12. Selecting the Video Field Rate (HD9590)

Vid Freq =	1/1.001	1/1

On certain earlier revisions of the High Definition Graticule Generator hardware it is necessary to select the video frame rate manually using this menu item. On later versions of the hardware that autodetect the frame rate this menu item will not be present.

Select **1/1.001** when using high definition video with a frame rate of 23.976, 29.97 or 59.94 frames per second.

Select **1/1** when using high definition video with a frame rate of 24, 30 or 60 frames per second.

4.3. CONTROLLING THE INDIVIDUAL OBJECTS

The Graticule Generator has separate controls for each of its objects (*grid*, *mask*, *box1*, *box2*, *cursor*, and *circle*). To turn on the *object* press the corresponding button. The selected object will blink momentarily (if the *OBJ BLINK* item on the *SETUP* menu is enabled), and will be automatically turned on. The object's button will blink indicating that the object is selected. To turn off the object, press the object's button when it is blinking. All objects will be automatically de-selected after two minutes of inactivity on the front panel. Individual objects will also be deselected when another object is selected.

4.3.1. Controlling the Object Aspect Ratios

The **AUTO ASPECT** button is used to control the aspect ratio of the circle, the boxes and the mask, and whether they are centred or not. When you press the **AUTO ASPECT** button the Graticule Generator enters *auto aspect ratio select* mode and the current aspect ratio for the objects is displayed. Turn one of the shaft encoder knobs to select from a list of available aspect ratios. After a 30-second timeout, the Graticule Generator exits from the auto aspect ratio select mode. If the **ESC** button is pressed, the Graticule Generator also exits from the auto aspect ratio select mode.

The auto aspect ratio mode forces the *mask and box* objects to be centred and their size to follow one of the following fixed aspect ratios*: 1:1, 4:3(1.33), 14:9 (1.55), 1.67, 16:9 (1.78), 1.85, 2.35*. Auto aspect ratio mode forces the *circle* object a *1:1* aspect ratio, and forces the *grid*, *cursor* and *circle* objects to be centered. When the *auto aspect ratio* mode is set to *Off* the *mask, box, and circle* objects' dimensions are not constrained to follow a fixed aspect ratio and the *setup menu force centre* item determines whether all the objects will be forced to the centre of the raster.

When an object is being controlled in aspect ratio mode, the horizontal size will be adjusted first, then the aspect ratio applied to determine the correct vertical size. The pixel aspect ratio and the object aspect ratio are both used to calculate the vertical size of an object of a given horizontal size. The following formula is used to calculate the vertical size:

Number of V lines = Number of H pixels x (Pixel aspect ratio / Object aspect ratio)

This calculation will be rounded to the closest line or to the closest line pair if object centring is on.

Example: Draw a box in 525/4:3 mode with an aspect ratio of 4:3, with a width of 708 pixels.

V lines = H pixels x (Pixel AR / Object AR
= 708 x ((160/177) / (4/3))
= 480

The selected object aspect ratio defines the ideal dimensions of the object. The on screen and front pane aspect ratio displays show the actual object aspect ratio rounded to 2 decimal places. It may vary slightly from the selected object aspect ratio due to the effects of rounding to the closest line, and object centring.

The setting of the *Mask Apert* item in the *Setup* menu control the maximum horizontal or vertical size of the *mask* when one of the specific aspect ratios is selected. The user is still able to adjust the size of the *mask* all the way out to the production aperture regardless of the *Mask Apert* setting.

4.3.2. Controlling the Object Size

The **SIZE** button is used to control the size of the selected object (the one with its button blinking). The horizontal and vertical size of the object can be controlled independently using the left and right shaft encoder knobs respectively, if *auto aspect ratio* mode is Off. If one of the *auto aspect ratios* is selected, then either of the shaft encoder knobs will adjust the size of the abject about the centre of the raster while constraining its dimensions to the selected aspect ratio. See the specific section for each object for specifics about controlling the size of specific objects in each mode. The *size adjust* function will be deselected after 3 minutes of panel activity, or when the another button is pressed.

4.3.3. Controlling the Object Position

Press the **POS** button to control the position of the selected object (the one with its button blinking) when *auto aspect ratio* mode is Off and the *Setup menu Force Centre* item is set to *no*. The horizontal and vertical position of the object can be controlled independently using the left and right shaft encoder knobs respectively. If one of the *auto aspect ratios* is selected or the *Setup menu Force Centre* item is set to *yes*, then the position of the *mask, box, and circle* objects is fixed to the centre of the clean aperture. The position of the cursor is not affected by the *Setup menu Force Centre* item or *auto aspect ratio mode*. See the specific section for each object for specifics about controlling the size of specific objects in each mode. The *position adjust* function will be deselected after 3 minutes of panel activity, or when the another button is pressed.

4.3.4. Controlling the Object White Level

Press the **LEVEL** button to control the white level of the selected object (the one with its button blinking). The white level can be adjusted in the range of "0" through "14", in single digit increments, using either shaft encoder with "0" corresponding to "black" and "14" corresponding to "white". The *level adjust* function will be deselected after 3 minutes of panel activity, or when the another button is pressed.

4.3.5. Remote Panel Display when Controlling the Objects

When an object is selected the name of the selected object will appear on the display. After a 3-second timeout, the display will show the current value of the object parameters. If all of the parameters cannot be displayed at the same time, the display will cycle through the parameters.

When the object is turned off by pressing its button again while it is blinking, the display will show that the object is turned off. If the object is subsequently turned on, the display will indicate that it is on, then will show the object parameters after a 3-second timeout.

When object attributes are being modified by turning one of the shaft encoders, the attribute being controlled is displayed along with its current value. If there are more parameters to be displayed, the display will cycle through the remaining parameters after a 3-second timeout.

4.4. CONTROLLING THE GRID OBJECT

The *grid* object consists of two horizontal lines and two vertical lines that intersect the horizontal lines.

4.4.1. Turning the *Grid* Object On and Off

To turn on the *grid* object press the ***GRID*** button. The *grid* object will blink momentarily (if the *obj blink* item on the *setup* menu is enabled), and the *grid* will be turned on. The ***GRID*** button will blink indicating that the *grid* object is selected. To turn off the *grid* object, press the ***GRID*** button when it is blinking.

4.4.2. Centring the *Grid* on the Raster

When *auto aspect ratio mode* is On the *grid* object will always be centred on the raster. When *auto aspect ratio* mode is Off the *SETUP* menu item *force centre* controls whether the *grid* will be centred or not (see section 4.2.9 for more information about *auto aspect ratio* mode). When the *force centre* item is Off it is possible to independently position and size the *grid*, using the **SIZE** and **POS** buttons and turning one of the shaft encoders as outlined in the following sections.

4.4.2.1. Controlling the *Grid* White Level

Press the **LEVEL** button to adjust the *grid* white level. The white level can be adjusted in the range of "0" through "14", in single digit increments, using either shaft encoder with "0" corresponding to "black" and "14" corresponding to "white".

4.4.3. Controlling the *Grid* Size

Press the **SIZE** button, when the *grid* button is blinking, to adjust the *grid* size. The size of the *grid* can be adjusted in one of two modes, depending on the setting of the *Setup menu Force Centre* item and the *Auto aspect ratio* mode. The remote panel display will show the *grid* size while the **SIZE** button is brightly illuminated. The *size adjust* function will be deselected after 3 minutes of panel activity, or when the another button is pressed.

4.4.3.1. Controlling the *Grid* Size (*Objects* centred or Aspect Ratio mode On)

Setup menu	Force centre	*Yes*

Or

Auto Aspect ratio	1:1	4:3	14:9	16:9	1.67	1.85	2.35

When *Force Centre* is On or *auto aspect ratio* mode is On, the left shaft encoder is used to adjust the height and the right shaft encoder is used to adjust the width about the centre of the raster when the **SIZE** button is selected.

4.4.3.2. Controlling the *Grid* Size and Position (*Objects* not centred, Aspect Ratio Off)

Setup menu	Force centre	*no*
Auto Aspect ratio		*off*

When *Force Centre* is Off and, and *auto aspect ratio* mode is Off the left shaft encoder is used to adjust the top of the *grid* and the right shaft encoder is used to adjust the bottom of the *grid* when the **POS** button is selected. The left shaft encoder is used to adjust the left side of the *grid* and the right shaft encoder is used to adjust the right side of the *grid* when the **SIZE** button is selected.

4.5. CONTROLLING THE MASK OBJECT

The *mask* object consists of a horizontal masked area at the top and bottom of the raster, and a vertical masked area at the left and right side of the raster. The *Setup Mask Start* menu item controls the first line in the vertical that will be blanked by the *mask* object. See section 4.2.7 for further information. Throughout the remainder of section 4.4.2 the *mask* dimensions refer to the boundaries between the masked and unmasked area.

4.5.1. Turning the Mask Object On and Off

To turn on the *mask* object press the ***MASK*** button. A dashed line at the edge of the *mask* object will blink momentarily (if the *obj blink* item on the setup menu is enabled), and the *mask* will be turned on. The ***MASK*** button will blink indicating that the *mask* object is selected. To turn off the *mask* object, press the ***MASK*** button when it is blinking.

4.5.2. Controlling the Aspect Ratio of the *Mask*

Auto Aspect ratio	Off	1:1	4:3	14:9	16:9	1.67	1.85	2.35

The **AUTO ASPECT** button is used to control the aspect ratio of the *mask,* the *boxes* and the *circle* objects, and whether they are centred or not. The auto aspect ratio mode forces the *mask* object to be centred and its size to follow one of the following fixed aspect ratios*: 1:1, 4:3(1.33), 14:9 (1.55), 16:9 (1.78), 1.67, 1.85, 2.35*. When the *auto aspect ratio* mode is set to *Off* the *mask's* dimensions are not constrained to follow a fixed aspect ratio and the *setup menu force centre* item determines whether they will be forced to the centre of the raster. See section 4.3.1 for more information about *auto aspect ratio* mode.

4.5.2.1. Centring the Mask on the Raster

When *auto aspect ratio mode* is On the *mask* object will always be centred on the raster. When *auto aspect ratio* mode is Off the *SETUP* menu item *force centre* controls whether the *mask* will be centred or not (see section 4.2.9.) When the *force centre* item is Off it is possible to independently position and size the *mask*, using the **SIZE** and **POS** buttons and turning one of the shaft encoders as outlined in the following sections.

4.5.2.2. Controlling the *Mask* White Level

Press the **LEVEL** button to adjust the *mask* white level. The white level can be adjusted in the range of "0" through "14", in single digit increments, using either shaft encoder with "0" corresponding to "black" and "14" corresponding to "white".

4.5.3. Controlling the *Mask* Size

Press the **SIZE** button, when the *mask* button is blinking, to adjust the *mask* size. The size of the *mask* can be adjusted in one of three modes, depending on the setting of the *Setup menu Force Centre* item and the *Auto aspect ratio* mode. The remote panel display will show the *mask* size while the **SIZE** button is brightly illuminated. The *size adjust* function will be deselected after 3 minutes of panel activity, or when the another button is pressed.

4.5.3.1. Controlling the *Mask* Size (*Objects* centred, Aspect Ratio Off)

Setup menu	Force centre	*Yes*
Auto Aspect ratio		*Off*

When *Force Centre* is On and *auto aspect ratio* is Off, the left shaft encoder is used to adjust the height and the right shaft encoder is used to adjust the width about the centre of the raster then the **SIZE** button is selected.

4.5.3.2. Controlling the *Mask* Size(Aspect Ratio On)

Auto Aspect ratio	1:1	4:3	14:9	16:9	1.67	1.85	2.35

When *auto aspect ratio* mode is On, the shaft encoders are used to adjust the overall *size* of the *mask* proportionately about the centre of the raster based upon the *aspect ratio* selected. The left knob adjusts the top right corner of the *mask* and the right knob adjusts the bottom right corner of the *mask*.

4.5.3.3. Controlling the *Mask* Size and Position (*Objects* not centred, Aspect Ratio Off)

Setup menu	Force centre	*no*
Auto Aspect ratio		*off*

When *Force Centre* is Off and, and *auto aspect ratio* mode is Off the left shaft encoder is used to adjust the bottom side of the *mask*, and the right shaft encoder is used to adjust the right side of the *mask*.

4.5.4. Controlling the *Mask* Position

Press the **POS** button while the *mask* button is blinking to control the position of the *mask*. When *auto aspect ratio* mode is Off and the *Setup menu Force Centre* item is set to *no* the left shaft encoder is used to adjust the vertical position of the *mask*, i.e. move the *mask* up or down, and the right shaft encoder is used to adjust the horizontal position of the *mask*, i.e. move the *mask* left or right. The remote panel display will show the mask position while the **POS** button is brightly illuminated. The *position adjust* function will be deselected after 3 minutes of panel activity, or when the another button is pressed.

If one of the *auto aspect ratios* is selected or the *Setup menu Force Centre* item is set to *yes*, then the position of the *mask* is fixed to the centre of the clean aperture. The display will show `Mask centred`.

4.6. CONTROLLING THE CURSOR OBJECT

The *cursor* object consists of a horizontal and vertical line that intersect at their mid points.

4.6.1. Turning the *Cursor* Object On and Off

To turn on the *cursor* object press the ***CURSOR*** button. The *cursor* object will blink momentarily (if the *obj blink* item on the Setup menu is enabled), and the *cursor* object will be turned on. The ***CURSOR*** button will blink indicating that the *cursor* object is selected. To turn off the *cursor* object, press the ***CURSOR*** button when it is blinking.

4.6.2. Centring the Cursor on the Raster

When *auto aspect ratio mode* is On the *cursor* object will always be centred on the raster. When *auto aspect ratio* mode is Off the *SETUP* menu item *force centre* controls whether the *cursor* will be centred or not (see section 4.2.9 for more information about *auto aspect ratio* mode). When the *force centre* item is Off it is possible to independently position and size the *cursor*, using the **SIZE** and **POS** buttons and turning one of the shaft encoders as outlined in the following sections.

4.6.3. Controlling the *Cursor* White Level

Press the **LEVEL** button to adjust the *cursor* white level. The white level can be adjusted in the range of "0" through "14", in single digit increments, using either shaft encoder with "0" corresponding to "black" and "14" corresponding to "white".

4.6.3.1. Controlling the *Cursor* Size

Press the **SIZE** button, when the *cursor* its button is blinking, to adjust the *cursor* size. The shaft encoders are used to adjust the size of the *cursor*. The remote panel display will show the *cursor* size while the **SIZE** button is brightly illuminated. The *size adjust* function will be deselected after 3 minutes of panel activity, or when the another button is pressed.

4.6.3.2. Controlling the *Cursor* Position (*Objects* not centred, Aspect Ratio Off)

Press the **POS** button while the *cursor* button is blinking to control the position of the *cursor*. When *auto aspect ratio* mode is Off and the *Setup menu Force Centre* item is set to *no* the left shaft encoder is used to adjust the vertical position of the *cursor*, i.e. move the *cursor* up or down, and the right shaft encoder is used to adjust the horizontal position of the *cursor*, i.e. move the *cursor* left or right. The remote panel display will show the *cursor* position while the **POS** button is brightly illuminated. The *position adjust* function will be deselected after 3 minutes of panel activity, or when the another button is pressed.

4.7. CONTROLLING THE BOX OBJECTS

There are two *box* objects, called *box1* and *box2*. Each of the *box* objects can be controlled independently, and operate the same way. Often *box1* is used to mark the safe action area and *box2* is used to mark the safe title area. References throughout this section to the *box* object apply to either *box1* or *box2*.

4.7.1. Turning the Box Objects On and Off

To turn on the *box1* object press the ***BOX1*** button. The *box1* object will blink momentarily (if the *obj blink* item on the Setup menu is enabled), and the *box1* object will be turned on. The ***BOX1*** button will blink indicating that the *box1* object is selected. To turn off the *box1* object, press the ***BOX1*** button when it is blinking. To turn on the *box2* object press the ***BOX2*** button. The *box2* object will blink momentarily (if the *obj blink* item on the Setup menu is enabled), and the *box2* object will be turned on. The ***BOX2*** button will blink indicating that the *box2* object is selected. To turn off the *box2* object, press the ***BOX2*** button when it is blinking.

4.7.2. Controlling the Aspect Ratio of the *Box*

Auto Aspect ratio	Off	1:1	4:3	14:9	16:9	1.67	1.85	2.35

The **AUTO ASPECT** button is used to control the aspect ratio of the *mask,* the *boxes* and the *circle* objects, and whether they are centred or not. The auto aspect ratio mode forces the *box* objects to be centred and their size to follow one of the following fixed aspect ratios*: 1:1, 4:3(1.33), 14:9 (1.55), 16:9 (1.78), 1.67, 1.85, 2.35*. When the *auto aspect ratio* mode is set to *Off* the *box* dimensions are not constrained to follow a fixed aspect ratio and the *setup menu force centre* item determines whether they will be forced to the centre of the raster. See section 4.3.1 for more information about *auto aspect ratio* mode.

4.7.3. Centring the Box on the Raster

When *auto aspect ratio mode* is On the *boxes* will always be centred on the raster. When *auto aspect ratio* mode is Off the *SETUP* menu item *force centre* controls whether the boxes will be centred or not (see section 4.2.9.) When the *force centre* item is Off it is possible to independently position and size the whole *box*, using the **SIZE** and **POS** buttons and turning one of the shaft encoders as outlined in the following sections.

4.7.4. Controlling the *Box* White Level

Press the **LEVEL** button to adjust the *box* white level. The white level can be adjusted in the range of "0" through "14", in single digit increments, using either shaft encoder with "0" corresponding to "black" and "14" corresponding to "white".

4.7.5. Controlling the *Box* Size

Press the **SIZE** button, when the *box* its button is blinking, to adjust the *box* size. The size of the *box* can be adjusted in one of four modes, depending on the setting of the *Setup menu Force Centre* item and the *Auto aspect ratio* mode. The remote panel display will show the box size while the **SIZE** button is brightly illuminated. The *size adjust* function will be deselected after 3 minutes of panel activity, or when the another button is pressed.

4.7.5.1. Controlling the *Box* Size (*Objects* centred, Aspect Ratio Off)

Setup menu	Force centre	*Yes*
Auto Aspect ratio		*Off*

When *Force Centre* is On and *auto aspect ratio* is Off, the left shaft encoder is used to adjust the height and the right shaft encoder is used to adjust the width about the centre of the raster then the **SIZE** button is selected.

4.7.5.2. Controlling the *Box* Size(Aspect Ratio On)

Auto Aspect ratio	1:1	4:3	14:9	16:9	1.67	1.85	2.35

When *auto aspect ratio* mode is On, the shaft encoders are used to adjust the overall *size* of the *box* proportionately about the centre of the raster based upon the *aspect ratio* selected. The left knob adjusts the top right corner of the *box* and the right knob adjusts the bottom right corner of the *box*.

4.7.5.3. Controlling the *Box* Size and Position (*Objects* not centred, Aspect Ratio Off)

Setup menu	Force centre	*no*
Auto Aspect ratio		*off*

When *Force Centre* is Off and, and *auto aspect ratio* mode is Off the left shaft encoder is used to adjust the bottom side of the *box*, and the right shaft encoder is used to adjust the right side of the *box*.

4.7.6. Controlling the *Box* Position

Press the **POS** button while the *box* button is blinking to control the position of the *box*. When *auto aspect ratio* mode is Off and the *Setup menu Force Centre* item is set to *no* the left shaft encoder is used to adjust the vertical position of the *box*, i.e. move the *box* up or down, and the right shaft encoder is used to adjust the horizontal position of the *box*, i.e. move the *box* left or right. The remote panel display will show the box position while the **POS** button is brightly illuminated. The *position adjust* function will be deselected after 3 minutes of panel activity, or when the another button is pressed.

If one of the *auto aspect ratios* is selected or the *Setup menu Force Centre* item is set to *yes*, then the position of the *box* is fixed to the centre of the clean aperture. The display will show `Box centred`.

4.8. CONTROLLING THE CIRCLE OBJECT

4.8.1. Turning the *Circle* Object On and Off

To turn on the *circle* object press the **CIRCLE** button. The *circle* object will blink momentarily (if the *obj blink* item on the Setup menu is enabled), and the *circle* will be turned on. The **CIRCLE** button will blink indicating that the *circle* object is selected. To turn off the *circle* object, press the **CIRCLE** button when the **CIRCLE** button is blinking.

4.8.2. Controlling the Aspect Ratio of the *Circle*

Auto Aspect ratio	Off	1:1	4:3	14:9	16:9	1.67	1.85	2.35

The **AUTO ASPECT** button is used to control the aspect ratio of the *mask,* the *boxes* and the *circle* objects, and whether they are centred or not. The auto aspect ratio mode forces the *circle* object to be centred and its size to follow a *1:1* aspect ratio. When the *auto aspect ratio* mode is set to *Off* the *circle's* dimensions are not constrained to follow a fixed aspect ratio and the *setup menu force centre* item determines whether they will be forced to the centre of the raster. See section 4.3.1 for more information about *auto aspect ratio* mode.

4.8.2.1. Centring the *Circle* on the Raster

When *auto aspect ratio mode* is On the *circle* object will always be centred on the raster. When *auto aspect ratio* mode is Off the *SETUP* menu item *force centre* controls whether the *circle* will be centred or not (see section 4.2.9.) When the *force centre* item is Off it is possible to independently position and size the *circle*, using the **SIZE** and **POS** buttons and turning one of the shaft encoders as outlined in the following sections.

4.8.2.2. Controlling the *Circle* White Level

Press the **LEVEL** button to adjust the *circle* white level. The white level can be adjusted in the range of "0" through "14", in single digit increments, using either shaft encoder with "0" corresponding to "black" and "14" corresponding to "white".

4.8.3. Controlling the *Circle* Size

Press the **SIZE** button, when the *circle* its button is blinking, to adjust the *circle* size. The size of the *circle* can be adjusted in one of three modes, depending on the setting of the *Setup menu Force Centre* item and the *Auto aspect ratio* mode. The remote panel display will show the *circle* size while the **SIZE** button is brightly illuminated. The *size adjust* function will be deselected after 3 minutes of panel activity, or when the another button is pressed.

4.8.3.1. Controlling the *Circle* Size (*Objects* centred, Aspect Ratio Off)

Setup menu	Force centre	*Yes*
Auto Aspect ratio		*Off*

When *Force Centre* is On and *auto aspect ratio* is Off, the left shaft encoder is used to adjust the height and the right shaft encoder is used to adjust the width about the centre of the raster then the **SIZE** button is selected.

4.8.3.2. Controlling the *Circle* Size(Aspect Ratio On)

Auto Aspect ratio	1:1	4:3	14:9	16:9	1.67	1.85	2.35

When *auto aspect ratio* mode is On, the shaft encoders are used to adjust the overall *size* of the *circle* proportionately about the centre of the raster based upon the *aspect ratio* selected. The left knob adjusts the top right corner of the *circle* and the right knob adjusts the bottom right corner of the *circle*.

4.8.3.3. Controlling the *Circle* Size and Position (*Objects* not centred, Aspect Ratio Off)

Setup menu	Force centre	*no*
Auto Aspect ratio		*off*

When *Force Centre* is Off and, and *auto aspect ratio* mode is Off the left shaft encoder is used to adjust the bottom side of the *circle*, and the right shaft encoder is used to adjust the right side of the *circle*.

4.8.4. Controlling the *Circle* Position

Press the **POS** button while the *circle* button is blinking to control the position of the *circle*. When *auto aspect ratio* mode is Off and the *Setup menu Force Centre* item is set to *no* the left shaft encoder is used to adjust the vertical position of the *circle*, i.e. move the *circle* up or down, and the right shaft encoder is used to adjust the horizontal position of the *circle*, i.e. move the *circle* left or right. The remote panel display will show the *circle* position while the **POS** button is brightly illuminated. The *position adjust* function will be deselected after 3 minutes of panel activity, or when the another button is pressed.

If one of the *auto aspect ratios* is selected or the *Setup menu Force Centre* item is set to *yes*, then the position of the *circle* is fixed to the centre of the clean aperture. The display will show `Circle centred`.

4.9. LOADING FACTORY PRESETS

The **FACT PRESET** button is used to recall the most recently used *factory preset*. Turn one of the shaft encoder knobs to cycle through the available *factory presets*. The name of the selected preset will be shown on the front panel display, and the selected collection of object settings will be loaded into to the Graticule Generator. See Appendix B for definitions of the factory presets.

4.10. WORKING WITH THE USER PRESETS

The Graticule Generator has ten memory locations to store user defined presets. Each preset contains a collection of object parameters that define what objects are on, and settings for the objects. There are ten *user-preset* locations for each video standard. Each of the *user preset* locations can be write-protected, or can left unlocked, so users can save their favourite settings. When the Graticule Generator is initialized at the factory, the ten *user preset* locations are filled with ten of the *factory presets*. The state of the **SHIFT LOCK** button determines whether *user preset* locations 0 to 4 or 5 to 9 will be selected with the **USER PRESET** buttons. Press the **SHIFT LOCK** button to toggle the *shift lock* function on or off. *Shift lock* is *On* when the **SHIFT LOCK** button is brightly illuminated.

4.10.1. Saving User Presets

To save the current object settings into one of the ten *user preset* memory locations, press the **PRESET SAVE** button. The Front panel display will show `Store Preset #`. Select the location you wish to store the settings to using the **SHIFT LOCK** and **USER PRESET** buttons. The Front panel display will show `SAVE to store n` where n is the number of the *user preset*. Press the **PRESET SAVE** button a second time to confirm the operation (The Front panel display will show `Preset n stored)` or press the **ESC** button to abort the store operation. If the user attempts to store a preset into a write protected location the front panel will display the message `Preset n locked`.

User Presets **cannot be deleted directly from memory they can only be overwritten by another configuration saved to the same memory location.**

4.10.2. Recalling User Presets

To load the current object settings from one of the ten *user preset* memory locations; select the location you wish to recall the settings from using the **SHIFT LOCK** and **USER PRESET** buttons.

Recalling one of the *user presets* will overwrite the current object settings and cannot be undone. Make sure you want to overwrite your current settings before you recall one of the *user presets*

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5. TECHNICAL DESCRIPTION

5.1. SPECIFICATIONS

5.1.1. HDTV Serial Digital Video Input (HD9590 Only)

Standard: 1.485 Gb/sec HDTV Serial component digital SMPTE 292M standards supported shown in Table 5-1, software selectable, or autodetect.

Common Name	Pixels / Active Lines	Frame Rate	Progressive /Interlace	SMPTE Standard
1080i/60	1920 x 1080	30	I	274M
1080i/59.94	1920 x 1080	29.97 (30/1.001)	I	274M
1080i/50	1920 x 1080	25	I	274M
1080p/30sF	1920 x 1080	30	P (sF)	RP211
1080p/29.97sF	1920 x 1080	29.97 (30/1.001)	P (sF)	RP211
1080p/25sF	1920 x 1080	25	P (sF)	RP211
1080p/24sF	1920 x 1080	24	P (sF)	RP211
1080p/23.98sF	1920 x 1080	23.98 (24/1.001)	P (sF)	RP211
1080p/30	1920 x 1080	30	P	274M
1080p/29.97	1920 x 1080	29.97 (30/1.001)	P	274M
1080p/25	1920 x 1080	25	P	274M
1080p/24	1920 x 1080	24	P	274M
1080p/23.98	1920 x 1080	23.98 (24/1.001)	P	274M
1035i/60	1920 x 1035	30	I	260M
1035i/59.94	1920 x 1035	29.97 (30/1.001)	I	260M
720p/60	1280 x 720	30	P	296M
720p/59.94	1280 x 720	29.97 (30/1.001)	P	296M

Table 5-1: High Definition Video Input Formats

Connector: 1 BNC per IEC 169-8
Equalization: Automatic to 130m @ 1.5Gb/s with Belden 1694 or equivalent cable

5.1.2. HDTV Serial Digital Video Outputs (HD9590 Only)

Standard: SMPTE 292M, Same as input
Connectors: 4 BNC per IEC 169-8
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time: 200ps nominal
Overshoot: <10% of amplitude
Wide Band Jitter: < 0.15 UI

5.1.3. SDTV Serial Digital Video Input (9590 Only)

Standard: Serial component 270 Mb/s (SMPTE 259M C) – 525i/59.94 or 625i/50, software selectable or autodetect.
Connector: 1 BNC per IEC 169-8
Equalization: Automatic 250m @ 270 Mb/s with Belden 8281 or equivalent cable
Return Loss: > 15 dB up to 270 Mb/s

5.1.4. SDTV Serial Digital Video Output (9590 Only)

Standard: Serial component 270 Mb/s (SMPTE 259M-C) same as Input
Connectors: 2 BNC per IEC 169-8
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time: 470ps nominal
Overshoot: <10% of amplitude
Return Loss: > 15 dB
Wide Band Jitter: < 0.15 UI

5.1.5. Serial Remote Ctl (COM1)

Standard: RS-232, 57600 baud
Connector: 9 pin female “D”
Control: Firmware upgrades

5.1.6. Remote Panel (RCP and DCP versions Only)

Standard: RS-422; 9600 baud
Connector: 9 pin female “D”

5.1.7. Physical

Dimensions: 19“ W x 1.75” H x 18.75” D.
(483mm W x 45mm H x 477mm D)
Weight: 8 lbs. (3.5Kg)

5.1.8. Electrical

Power: 115/230 V AC 50/60 Hz, 30 VA.
Safety: ETL listed.
Complies with EU safety directive
EMI/RFI: Complies with FCC Part 15 Class A,
EU EMC Directive

5.2. WRITE-PROTECTING THE USER PRESETS

Each of the ten *user preset* memory locations can be locked against accidental overwriting. If the user attempts to store a preset into a locked location the front panel will display the message `Preset n locked`, where n is the number of the *user preset*.

To lock one of the presets using the integrated front panel or the rack mount remote panel press the **ESC** and **PRESET SAVE** buttons at the same time. The control panel will display `Protect preset #`. Press the **USER PRESET** button corresponding to the location you wish to lock. The control panel display will show `Confirm lock n`. To confirm the locking of this preset press the **PRESET SAVE** button. The control panel will show the message `Preset n locked`. To unlock one of the presets press the **ESC** and **PRESET SAVE** buttons at the same time. The control panel will display `Protect preset #`. Press the **USER PRESET** button corresponding to the location you wish to unlock. The control panel display will show `Confirm unlock n`. To confirm the unlocking of this preset press **PRESET SAVE** button. The control panel will show the message `Preset n unlocked`.

To lock one of the presets using the desktop remote panel, press the **ESC** and **PRESET SAVE** buttons at the same time. The control panel display will show `Protect preset #`. Select the location you wish to lock using the **SHIFT LOCK** and **USER PRESET** buttons. The control panel display will show `Confirm lock n`. To confirm the locking of this preset press the **PRESET SAVE** button. The control panel display will show the message `Preset n locked`. To unlock one of the presets press the **ESC** and **PRESET SAVE** buttons at the same time. The control panel display will show `Protect preset #`. Select the location you wish to unlock using the **SHIFT LOCK** and **USER PRESET** buttons. The control panel display will show `Confirm unlock n`. To confirm the unlocking of this preset press the **PRESET SAVE** button. The control panel display will show the message `Preset n unlocked`.

5.3. DISPLAYING THE FRIMWARE VERSION ON THE FRONT PANEL

On the 9590 you can only see the firmware version when the unit forst powers up and following a 2 minute timeout after any button has been pressed.

On the HD9590 you can display the firmware version on the front panel display using the following procedure.

If you are using the integrated control panel or the rack mount control panel, press the **ON/OFF**, **4** and **9** buttons simultaneously. If you are using the desktop remote control panel press the **ESC** and **GRID** buttons simultaneously. The control panel display should now show the current firmware version of the unit. Press any key to return to the main display.

5.4. UPDATING THE FIRMWARE IN THE GRATICULE GENERATOR

The firmware in the Graticule Generator is contained in a FLASH EPROM device. From time to time firmware updates will be provided to add additional features to the unit. The following procedure will allow you to upload new firmware from your computer.

5.4.1. Requirements

You will need the following equipment in order to update the Graticule Generator Firmware

- PC with available communications port. The communication speed is 57600 baud, therefore a 486 PC or better with a 16550 UART based communications port is recommended.
- "Straight-thru" serial extension cable (DB9 female to DB9 male) or (DB25 female to DB9 male)
- Terminal program such as Hyper Terminal, Telix, Procomm etc.
- New firmware supplied by Evertz.

5.4.2. Update Procedure

5.4.2.1. Part I – Terminal program Setup

1. Power-down the Graticule Generator.

2. Connect the "straight-thru" serial cable from the PCs' RS-232 communications port to the **COM1** RS-232 communications port on the back of the Graticule Generator. On older units where the Connector is located beside the poer connector, it is labelled **SERIAL REMOTE**.

3. Start the terminal program.

4. Configure the port settings of the terminal program as follows:

Baud	**57600**
Parity	**No**
Data bits	**8**
Stop bits	**2**
Flow Control	**None**

5. Power-up the Graticule Generator.

6. After you power up the Graticule Generator, a banner with the boot code version information should appear in the terminal window.

For example:

```
EVERTZ 9000DP MONITOR 1.0 BETA Aug 20 1998 16:25:33
COPYRIGHT 1997, 1998 EVERTZ MICROSYSTEMS LTD.
9000DP COLD BOOT> |
```

The cursor to the right of the word "**BOOT>**" should be spinning.

7. The following is a list of possible reasons for failed communications:

- Defective RS-232 "straight-thru" serial extension cable.
- Wrong communications port selected in the terminal program.
- Improper port settings in the terminal program. (Refer to step 4 for settings).
- Graticule Generator is off.

5.4.2.2. Part II – Invoke upload mode via the front panel

8. **HD9590:** If you are using the integrated control panel or the rack mount control panel, press the **ON/OFF, 4** and **9** buttons simultaneously. If you are using the desktop remote control panel press the **ESC** and **GRID** buttons simultaneously. The control panel display should now show the current firmware version of the unit. To proceed with the upgrade turn one of the shaft encoder knobs clockwise (to the right) and you will see the message `UPLOAD:Setup=yes`

   9590: If you are using the integrated control panel or the rack mount control panel, press the **ON/OFF, 4** and **9** buttons simultaneously. If you are using the desktop remote control panel press the **ESC** and **GRID** buttons simultaneously. The control panel display should now show the message `UPLOAD:Setup=yes`

9. Press the **SETUP** button to confirm the *Upgrade* operation.

10. You should now see a prompt on the terminal program screen asking you to upload the file.

For example:

```
UPLOAD FILE FOR $08000 NOW, CONTROL-X TO CANCEL
```

11. Skip to step17.

If you cannot invoke the upload mode via the front panel outlined in Part II then follow the steps in Part III.

5.4.2.3. Part III – Invoke upload mode via the terminal program

12. While the cursor is spinning press the <**CTRL**> and <**X**> keys on your computer keyboard at the same time, this should stop the cursor from spinning. If the Graticule Generator continues to boot-up, simply cycle the power on the Graticule Generator and repeat this step.

13. Hit the <**ENTER**> key on your computer once.

14. Type the word "**upgrade**", without quotes, and hit the <**ENTER**> key once.

15. The boot code will ask for confirmation. Type "**y**", without quotes.

16. You should now see a prompt asking you to upload the file.

For example:

```
BOOT> upgrade
UPLOAD FLASH MAIN
ARE YOU SURE YOU WANT TO UPLOAD FLASH? [Y/N] Y

UPLOAD FILE FOR $08000 NOW, CONTROL-X TO CANCEL
```

5.4.2.4. Part IV – Uploading the new firmware

17. Upload the "***.bin**" file supplied using the **X-Modem** transfer protocol of your terminal program.

18. The boot code will indicate whether the operation was successful upon completion of the upload.

    For Example:

```
UPLOAD OKAY
BOOT>
```

19. The following is a list of possible reasons for a failed upload:

- If you get the message "transfer cancelled by remote" you must restart the terminal program and load the bin file using the method outlined in *Part III – Invoke upload mode via the terminal program*.
- The supplied "***.bin**" file is corrupt.
- Wrong file specified to be uploaded.
- The PCs' RS-232 communications port can't handle a port speed of **57600**.
- Noise induced into the RS-232 "straight-thru" serial extension cable.

5.4.2.5. Part V – Completing the Upgrade

20. If you invoked the upload mode from the front panel, the Graticule Generator will automatically reboot after a short timeout. If you invoked the upload mode from the terminal program, type the word "**boot**", without quotes, and hit the <**ENTER**> key once. The Graticule Generator should now reboot.

21. If the Graticule Generator fails to reboot after the upgrade, then cycle the power on Graticule Generator.

22. You can now close the terminal program and disconnect the RS-232 serial cable.

The update procedure is now completed

A. VIDEO STANDARD RASTER DEFINITIONS A-1

A.1. STANDARD DEFINITION VIDEO FORMAT SUMMARY A-1

A.2. HIGH DEFINITION VIDEO FORMAT SUMMARY A-2

A.2.1. Interlaced HD formats: 1080I, 1035I A-2
A.2.2. Progressive HD formats: 1080P, 720P A-3

A.3. PRODUCTION, CLEAN APERTURES AND ANALOG TRANSMISSION BLANKING A-3

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A. VIDEO STANDARD RASTER DEFINITIONS

A.1. STANDARD DEFINITION VIDEO FORMAT SUMMARY

The 9590 Graticule Generator supports CCIR601 format video in both 525 and 625 formats. SMPTE recommended practice RP 187-1995 defines the following video format characteristics:

		525 Line	625 Line
Total Raster:			
Lines	Field 1	1 to 263	1 to 312
	Field 2	264 to 525	313 to 625
Pixels		768 (0 to 767)	768 (0 to 767)
Production Aperture:			
Size (pixels x lines)		720 x 486	720 x 576
Vertical Extent	Field 1	21 to 263	23 to 310
	Field 2	283 to 525	336 to 623
Horizontal Extent		0 to 719	0 to 719
Clean Aperture			
Size (pixels x lines)		708 x 480	690 x 566
Vertical Extent	Field 1	22 to 261	25 to 308
	Field 2	285 to 524	338 to 621
Horizontal Extent		6 to 713	15 to 704
Center of Image			
Horizontal midway between pixels		359 and 360	359 and 360
Vertical midway between lines		404 field 2	479 field 2
		142 field 1	167 field 1
Horizontal position With respect to 0_H		approx 35.667 μS	approx 36.407 μS
Pixel Aspect Ratio			
Standard (4:3)		160/177 (approx. .90395)	1132/1035 (approx 1.094)
Anamorphic (16:9)		640/531 (approx. 1.20527)	4528/3105 (approx. 1.45829)
Transmission Blanking			
Narrow		pixel 717 to 1	pixel 711 to 6
Nominal		pixel 716 to 2	pixel 710 to 8
Wide		pixel 714 to 5	pixel 706 to 12
Safe Area Dimensions (Standard Practice)			
Safe Action		90 %	93 %
Safe Title		80 %	86 %

Figure A-1: Standard Definition Video Format Parameters

A.2. HIGH DEFINITION VIDEO FORMAT SUMMARY

A.2.1. Interlaced HD formats: 1080I, 1035I

The HD9590 Graticule Generator supports SMPTE 292M format video in the 1035i/60, 1080i/60, 1080i/50, 1080p/24, 1080p/24sF and 720p/60 formats.

SMPTE 260M and SMPTE 274M define the following interlaced video format characteristics:

		1035I	1080I
Total Raster:		Interlaced 2:1	Interlaced 2:1
Lines	Field 1	1 to 563	1 to 563
	Field 2	564 to 1125	564 to 1125
Pixels		2200 (0 to 2199)	2200 (0 to 2199)
Production Aperture:			
Size (pixels x lines)		1920 x 1035	1920 x 1080
Vertical Extent	Field 1	41 to 557	21 to 560
	Field 2	603 to 1120	584 to 1123
Horizontal Extent		0 to 1919	0 to 1919
Clean Aperture			
Size (pixels x lines)		1888 x 1017	1888 x 1062
Vertical Extent	Field 1	50 to 548	25 to 556
	Field 2	612 to 1111	588 to 1119
Horizontal Extent		16 to 1903	16 to 1903
Center of Image			
Horizontal midway between pixels		959 and 960	959 and 960
Vertical midway between lines		861 field 2	844 field 2
		299 field 1	270 field 1
Horizontal position With respect to 0_H			
Pixel Aspect Ratio			
Standard (16:9)		1:1	1:1
Safe Area Dimensions (standard Practice)			
Safe Action		90 %	90%
Safe Title		80 %	80 %

Figure A-2: High Definition Interlaced Video Format Parameters

A.2.2. Progressive HD formats: 1080P, 720P

SMPTE 274M and SMPTE 296M define the following progressive video format characteristics:

	1080P	720P
Total Raster:	Progressive	Progressive
Lines	1125	750
Pixels	2200 (0 to 2199)	1650 (0 to 1649)
Production Aperture:		
Size (pixels x lines)	1920 x 1080	1280 x 720
Vertical Extent	42 to 1121	26 to 745
Horizontal Extent	0 to 1919	0 to 1279
Clean Aperture		
Size (pixels x lines)	1888 x 1062	1248 x 702
Vertical Extent	51 to 1112	35 to 736
Horizontal Extent	16 to 1903	16 to 1263
Center of Image		
Horizontal midway between pixels	959 and 960	639 and 640
Vertical midway between lines	581 582	385 386
Pixel Aspect Ratio		
Standard (16:9)	1:1	1:1
Safe Area Dimensions (standard Practice)		
Safe Action	90 %	90%
Safe Title	80 %	80 %

Figure A-3: High Definition Progressive Video Format Parameters

A.3. PRODUCTION, CLEAN APERTURES AND ANALOG TRANSMISSION BLANKING

The production aperture as defined above is the maximum possible image area that can be supported by the video standard. The clean aperture is a slightly smaller image area of similar, but not necessarily exactly the same aspect ratio and is usually concentric with the production aperture.

In PAL and NTSC, the nominal transmission blanking (analog aperture), is smaller than the production aperture. Because the transmission blanking varies from location to location the calculations of aspect ratio and size are usually referenced to either the production aperture or the clean aperture, which are fixed for a given video standard.

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B. FACTORY PRESETS B-1

B.1. Factory Presets on the 9590 ..... B-1

B.1.1. Factory Presets for 525 Line Video B-1
B.1.2. Factory Presets for 625 Line Video B-4

B.2. Factory Presets on the HD9590 ..... B-6

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B. FACTORY PRESETS

The *factory presets* available at the time of printing are shown below. In the front panel descriptions of the *factory presets CA* refers to clean aperture, *PA* refers to production aperture and *AN* refers to analog aperture. Each video standard has its own set of factory presets.

B.1. Factory Presets on the 9590

All presets use the analog 4:3 pixel aspect ratio unless otherwise stated.

B.1.1. Factory Presets for 525 Line Video

All object reset
All objects are off. All object parameters are set to default values.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid		CA	CA		
Mask		CA	CA		
Box1		90 % of CA	90 % of CA		Safe Action
Box2		80 % of CA	80 % of CA		Safe Title
Cursor1		Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box2	Centre		

4:3 SA/ST CA
4:3 aspect ratio safe area and safe title boxes are set to 90% and 80% of clean aperture. Centre cursor is turned on.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid		CA	CA		
Mask		CA	CA	4:3	
Box1	√	90 % of CA	90 % of CA	4:3	Safe Action
Box2	√	80 % of CA	80 % of CA	4:3	Safe Title
Cursor1	√	Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box2	Centre	1:1	

16:9 SA/ST CA

16:9 aspect ratio safe area and safe title box widths are set to 90% and 80% of clean aperture. Centre cursor is turned on.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid		Same as Mask	4:3 from V Pos		
Mask		16:9 from CA	CA	16:9	
Box1	√		90 % of CA	16:9	Safe Action
Box2	√		80 % of CA	16:9	Safe Title
Cursor1	√	Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box2	Centre	1:1	

16:9 Letterbox CA

Mask forms a 16:9 letterbox, referenced to clean aperture. 16:9 aspect ratio safe area and safe title box widths are set to 90% and 80% of clean aperture. Centre cursor is turned on.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid		Same as Mask	4:3 from V Pos		
Mask	√	16:9 from CA	CA	16:9	
Box1	√		90 % of CA	16:9	Safe Action
Box2	√		80 % of CA	16:9	Safe Title
Cursor1	√	Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box2	Centre	1:1	

Anam 16:9

Analog 16:9 pixel aspect ratio. 16:9 aspect ratio safe area and safe title boxes set to 90% and 80% of clean aperture width. Also includes centre cursor.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid		Same as Mask	4:3 from V Pos		
Mask		16:9 from CA	CA	16:9	
Box1	√		90 % of CA	16:9	Safe Action
Box2	√		80 % of CA	16:9	Safe Title
Cursor1	√	Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box2	Centre	1:1	

4:3 SA/ST AN

4:3 aspect ratio safe area and safe title boxes are set to 90% and 80% of analog aperture. Centre cursor is turned on.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid		AN	AN		
Mask		AN	AN	4:3	
Box1	√	90 % of AN	90 % of AN	4:3	Safe Action
Box2	√	80 % of AN	80 % of AN	4:3	Safe Title
Cursor1	√	Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box2	Centre	1:1	

16:9 SA/ST AN

16:9 aspect ratio safe area and safe title box widths are set to 90% and 80% of analog aperture. Centre cursor is turned on.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid		Same as Mask	4:3 from V Pos		
Mask		16:9 from AN	AN	16:9	
Box1	√		90 % of AN	16:9	Safe Action
Box2	√		80 % of AN	16:9	Safe Title
Cursor1	√	Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box2	Centre	1:1	

16:9 Letterbox AN

Mask forms a 16:9 letterbox, referenced to analog aperture. 16:9 aspect ratio safe area and safe title box widths are set to 90% and 80% of analog aperture. Centre cursor is turned on.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid		Same as Mask	4:3 from V Pos		
Mask	√	16:9 from AN	AN	16:9	
Box1	√		90 % of AN	16:9	Safe Action
Box2	√		80 % of AN	16:9	Safe Title
Cursor1	√	Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box2	Centre	1:1	

B.1.2. Factory Presets for 625 Line Video

All object reset
All objects are off. All object parameters are set to default values.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid		CA	CA		
Mask		CA	CA		
Box1		93 % of CA	93 % of CA		Safe Action
Box2		86 % of CA	86 % of CA		Safe Title
Cursor1		Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box2	Centre		

4:3 SA/ST CA
4:3 aspect ratio safe area and safe title boxes are set to 93% and 86% of clean aperture. Centre cursor is turned on.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid		CA	CA		
Mask		CA	CA	4:3	
Box1	√	93 % of CA	93 % of CA	4:3	Safe Action
Box2	√	86 % of CA	86 % of CA	4:3	Safe Title
Cursor1	√	Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box2	Centre	1:1	

16:9 SA/ST CA
16:9 aspect ratio safe area and safe title box widths are set to 93% and 86% of clean aperture. Centre cursor is turned on.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid		Same as Mask	4:3 from V Pos		
Mask		16:9 from CA	CA	16:9	
Box1	√		93 % of CA	16:9	Safe Action
Box2	√		86 % of CA	16:9	Safe Title
Cursor1	√	Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box2	Centre	1:1	

16:9 Letterbox CA

Mask forms a 16:9 letterbox, referenced to clean aperture. 16:9 aspect ratio safe area and safe title box widths are set to 93% and 86% of clean aperture. Centre cursor is turned on.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid		Same as Mask	4:3 from V Pos		
Mask	√	16:9 from CA	CA	16:9	
Box1	√		93 % of CA	16:9	Safe Action
Box2	√		86 % of CA	16:9	Safe Title
Cursor1	√	Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box2	Centre	1:1	

Anam 16:9

Analog 16:9 pixel aspect ratio. 16:9 aspect ratio safe area and safe title boxes set to 93% and 86% of clean aperture width. Also includes centre cursor.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid		Same as Mask	4:3 from V Pos		
Mask		16:9 from CA	CA	16:9	
Box1	√		93 % of CA	16:9	Safe Action
Box2	√		86 % of CA	16:9	Safe Title
Cursor1	√	Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box2	Centre	1:1	

4:3 SA/ST AN

4:3 aspect ratio safe area and safe title boxes are set to 93% and 86% of analog aperture. Centre cursor is turned on.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid		AN	AN		
Mask		AN	AN	4:3	
Box1	√	93 % of AN	93 % of AN	4:3	Safe Action
Box2	√	86 % of AN	86 % of AN	4:3	Safe Title
Cursor1	√	Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box2	Centre	1:1	

16:9 SA/ST AN
16:9 aspect ratio safe area and safe title box widths are set to 93% and 86% of analog aperture. Centre cursor is turned on.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid		Same as Mask	4:3 from V Pos		
Mask		16:9 from AN	AN	16:9	
Box1	√		93 % of AN	16:9	Safe Action
Box2	√		86 % of AN	16:9	Safe Title
Cursor1	√	Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box2	Centre	1:1	

16:9 Letterbox AN
Mask forms a 16:9 letterbox, referenced to analog aperture. 16:9 aspect ratio safe area and safe title box widths are set to 93% and 86% of analog aperture. Centre cursor is turned on.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid		Same as Mask	4:3 from V Pos		
Mask	√	16:9 from AN	AN	16:9	
Box1	√		93 % of AN	16:9	Safe Action
Box2	√		86 % of AN	16:9	Safe Title
Cursor1	√	Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box2	Centre	1:1	

B.2. Factory Presets on the HD9590

The HD9590 uses the same set of factory presets with the same description for all video standards. The following preset names and descriptions are identical in each mode, only the vertical and horizontal positions of the clean and production apertures are different. See the charts in section A.2 for a complete description of the size of the clean and production apertures for each video format.

All object reset
All objects are off. Objects are positioned the same as 16x9 SA/ST CA preset.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid		CA	4:3 from CA		
Mask		CA	CA		
Box1		90 % of CA	90 % of CA		Safe Action
Box2		80 % of CA	80 % of CA		Safe Title
Cursor1		Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box 2	1:1 from V Pos		

16:9 SA/ST CA

16:9 aspect ratio safe area and safe title boxes are set to 90% and 80% of clean aperture. Centre cursor is turned on. Mask and grid set at clean aperture but mask turned off.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid	√	CA	4:3 from CA		
Mask		CA	CA	16:9	
Box1	√	90 % of CA	90 % of CA	16:9	Safe Action
Box2	√	80 % of CA	80 % of CA	16:9	Safe Title
Cursor1	√	Centre	Centre		
Cursor2		Centre	Centre		
Circle		80 % of CA		1:1	

4:3 SA/ST CA

4:3 aspect ratio safe area and safe title box heights are set to 90% and 80% of clean aperture. Centre cursor is turned on. 4:3 Mask set at clean aperture but turned Off. Grid set to show 4:3 width from clean aperture.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid	√	CA	4:3 from CA		
Mask		CA	4:3 from CA	4:3	
Box1	√	90 % of CA		4:3	Safe Action
Box2	√	80 % of CA		4:3	Safe Title
Cursor1	√	Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box 2		1:1	

14:9 SA/ST CA

14:9 aspect ratio safe area and safe title box heights are set to 90% and 80% of clean aperture. Centre cursor is turned on. 14:9 Mask set at production aperture but turned Off. Grid set to show 14:9 width from production aperture.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid	√	CA	14:9 from CA		
Mask		CA	14:9 from CA	14:9	
Box1	√	90 % of CA		14:9	Safe Action
Box2	√	80 % of CA		14:9	Safe Title
Cursor1	√	Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box 2		1:1	

1.66 Mask CA

1.66 mask calculated from clean aperture. 14:9 aspect ratio safe area and safe title box heights are set to 90% and 80% of clean aperture but turned off.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid		CA	1.66:1 from CA		
Mask	√	CA	1.66:1 from CA	1.66:1	
Box1		90 % of CA		1.66:1	Safe Action
Box2		80 % of CA		1.66:1	Safe Title
Cursor1		Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box 2		1:1	

1.85 Mask CA

1.85 mask calculated from clean aperture. 1.85 aspect ratio safe area and safe title box widths are set to 90% and 80% of clean aperture but turned off.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid		1.85:1 from CA	CA		
Mask	√	1.85:1 from CA	CA	1.85:1	
Box1			90 % of PA	1.85:1	Safe Action
Box2			80 % of PA	1.85:1	Safe Title
Cursor1		Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box 2		1:1	

2.35 Mask CA

2.35 mask calculated from clean aperture. 2.35 aspect ratio safe area and safe title box widths are set to 90% and 80% of clean aperture but turned off.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid		2.35:1 from CA	CA		
Mask	√	2.35:1 from CA	CA	2.35:1	
Box1			90 % of PA	2.35:1	Safe Action
Box2			80 % of PA	2.35:1	Safe Title
Cursor1		Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box 2		1:1	

16:9 SA/ST PA

16:9 aspect ratio safe area and safe title boxes are set to 90% and 80% of clean aperture. Centre cursor is turned on. Mask and grid set at production aperture but mask turned off.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid	√	PA	4:3 from PA		
Mask		PA	PA	16:9	
Box1	√	90 % of PA	90 % of PA	16:9	Safe Action
Box2	√	80 % of PA	80 % of PA	16:9	Safe Title
Cursor1	√	Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box 2		1:1	

4:3 SA/ST PA

4:3 aspect ratio safe area and safe title box heights are set to 90% and 80% of production aperture. Centre cursor is turned on. 4:3 Mask set at production aperture but turned Off. Grid set to show 4:3 width from production aperture.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid	√	PA	4:3 from PA		
Mask		PA	4:3 from PA	4:3	
Box1	√	90 % of PA		4:3	Safe Action
Box2	√	80 % of PA		4:3	Safe Title
Cursor1	√	Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box 2		1:1	

14:9 SA/ST PA

14:9 aspect ratio safe area and safe title box heights are set to 90% and 80% of production aperture. Centre cursor is turned on. 14:9 Mask set at production aperture but turned Off. Grid set to show 14:9 width from production aperture.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid	√	PA	14:9 from PA		
Mask		PA	14:9 from PA	14:9	
Box1	√	90 % of PA		14:9	Safe Action
Box2	√	80 % of PA		14:9	Safe Title
Cursor1	√	Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box 2		1:1	

1.66 Mask PA

1.66 mask calculated from production aperture. 14:9 aspect ratio safe area and safe title box heights are set to 90% and 80% of production aperture but turned off.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid		PA	1.66:1 from PA		
Mask	√	PA	1.66:1 from PA	1.66:1	
Box1		90 % of PA		1.66:1	Safe Action
Box2		80 % of PA		1.66:1	Safe Title
Cursor1		Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box 2		1:1	

1.85 Mask PA

1.85 mask calculated from production aperture. 1.85 aspect ratio safe area and safe title box widths are set to 90% and 80% of production aperture but turned off.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid		1.85:1 from PA	PA		
Mask	√	1.85:1 from PA	PA	1.85:1	
Box1			90 % of PA	1.85:1	Safe Action
Box2			80 % of PA	1.85:1	Safe Title
Cursor1		Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box 2		1:1	

2.35 Mask PA

2.35 mask calculated from production aperture. 2.35 aspect ratio safe area and safe title box widths are set to 90% and 80% of production aperture but turned off.

Object	On	V Pos	H Pos	Aspect Ratio	Comments
Grid		2.35:1 from PA	PA		
Mask	√	2.35:1 from PA	PA	2.35:1	
Box1			90 % of PA	2.35:1	Safe Action
Box2			80 % of PA	2.35:1	Safe Title
Cursor1		Centre	Centre		
Cursor2		Centre	Centre		
Circle		Same as Box 2		1:1	