Hamlet Video International Ltd

Application Note

DS1

Remote operation of Hamlet Digiscope-601 from a Personal Computer using RS232.

Issue 1.1 **28/11/05**

Operation with a Personal Computer.

The Digiscope can be operated from a personal computer using the supplied software or by using the commands listed in Appendix B.
Using the supplied software enables the PC to control the unit and has the following features:

1) The unit may be remotely controlled fully from the PC by using the mouse to click on command buttons.

2) The unit's video display can be downloaded and displayed on the PC where it can be stored as a .BMP file to hard disk, recalled from disk or be sent to a printer etc.

3) It enables 'Real Time' error logging to take place where selected errors detected by the unit are sent to the PC and displayed in a table as they happen.

4) Selected errors detected by the unit and stored in its internal memory may be downloaded later and displayed as a table on the PC.

Required equipment

Hamlet Digi Scope DS601AX or DS601BX
Hamlet Digi Scope software
RS232 cable
PC running Microsoft Windows 98 or later

To install the supplied software.
PC requirement: An RS232 serial port, 1MB hard disk space, Win98 or later.

Insert Disk 1
Using 'My Computer' double click on the floppy icon then double click on the setup.exe icon. Follow the onscreen instructions to complete the installation.
The software will be installed in the C:\Program Files \ Digi6 folder.
For ease of operation go to this folder and drag the digi5.exe icon onto the desktop to create a shortcut, then just double click on this icon to run the application.

Or a zip file downloaded from the internet
Unzip the file into a location on your hard disc
Using 'My Computer' go to the directorythe unzipped Digi6 files are then double click on the setup.exe icon. Follow the onscreen instructions to complete the installation.
The software will be installed in the C:\Program Files \ Digi6 folder.
For ease of operation go to this folder and drag the digi5.exe icon onto the desktop to create a shortcut, then just double click on this icon to run the application.

Hardware Connection to the Digiscope.
Connect an RS232 cable from the serial port on the PC to the 9 way D connector on the unit.
A 3 wire implementation of the RS232 interface is used, i.e. only Tx, Rx & Ground are required.

Before the interface can be used by the PC, the baud rate of the unit must be set to be the same as the PC, to do this from the unit control panel select the Config menu then the Logger option, press the Baud button till the required rate appears, it is recommended that the highest rate is used (38.4kB).

Operation of the Software
Double click on the Digi6.exe icon to start the application, the first time this is done it may be necessary to select the PC's serial port being used by the unit, using the mouse click on Special on the task bar then select the Setup option and select the Port to be used (Ports1 to 4). When this is changed it is necessary to exit from the application and double click on the icon to run it again.

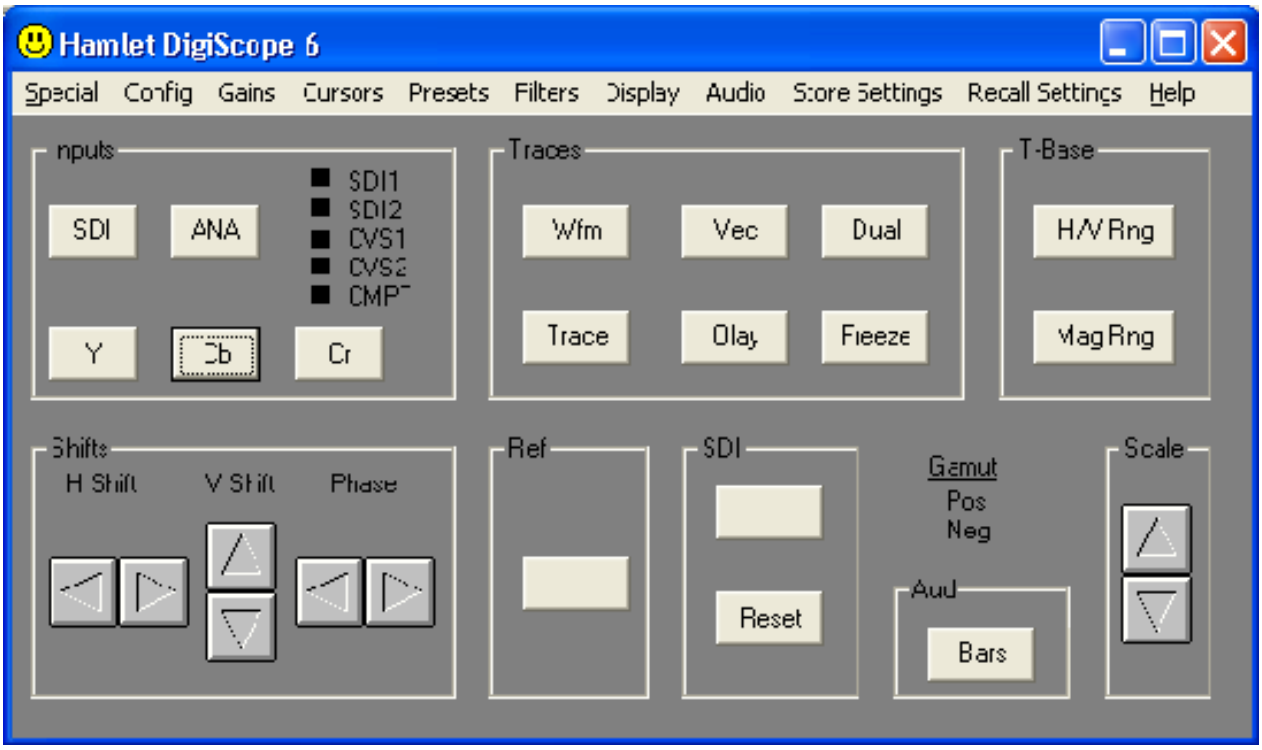

Fig 1 remote software main startup screen

Control of the unit's functions using the PC.
Control of the main functions is exactly the same as on the front panel of the unit.
The rotary controls are now the arrow buttons, using the mouse select an arrow key and hold down the left mouse button until the required action has occurred.
The main differences are in the selection of the menu options, these follow the Windows standard format instead of using the number buttons on the unit itself.
For example to change the audio scale to be EBU select the Audio caption on the toolbar then select Scale from the submenu then select EBU from the list displayed.
The currently set option will be indicated by a tick.

Downloading the Digiscope video display to the PC.
To download the display from the unit to the PC, click on the Special icon on the toolbar then on the Download option, this will open the Download control window, which has the following controls.

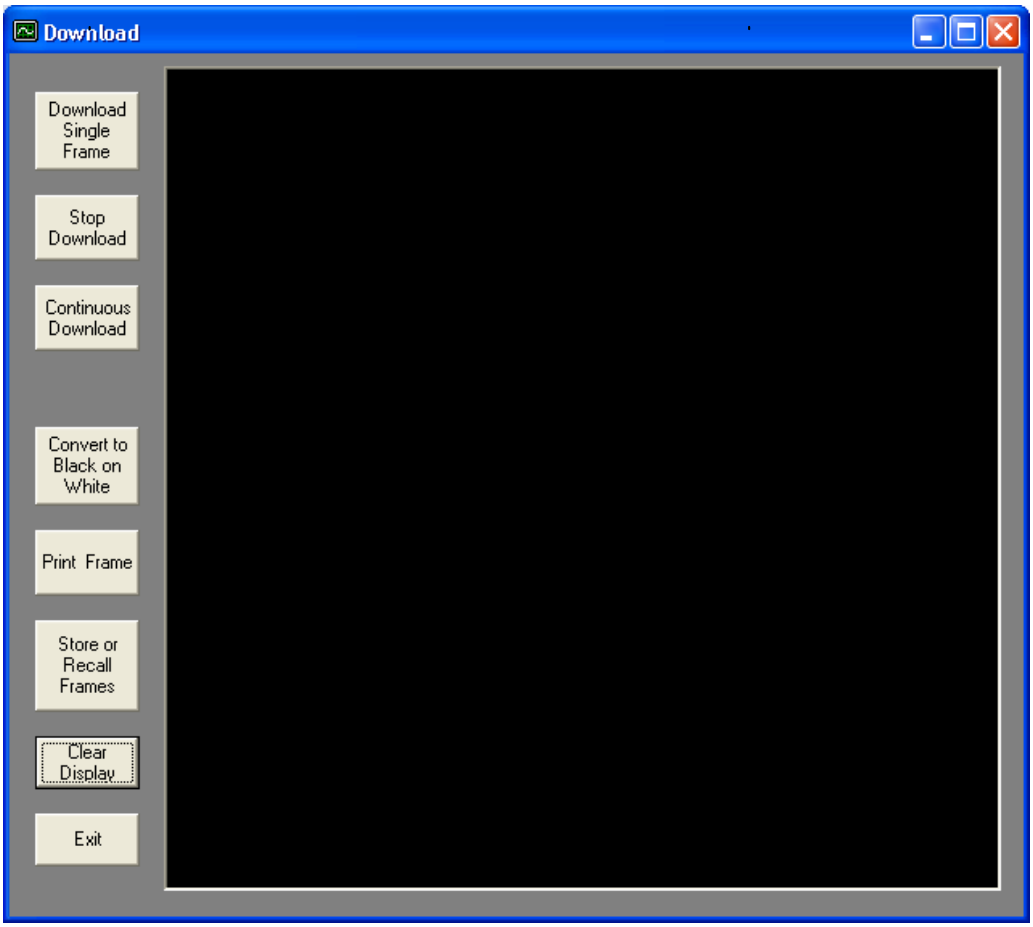

Fig 2 remote software download screen

Download Single.
This button will download to the PC the current display on the unit, the time taken will depend on the baud rate and the complexity of the image.
As well as the image being displayed the time, date, range and gain are appended to the bottom of the screen.

Continuous Download.
This button will download to the PC the current display on the unit as the previous button, but will repeat continuously at a rate dependant on the baud rate until the
Stop Download button is pressed.

Print Frame.
This button will print the downloaded frame currently displayed by the PC to the default printer, as the image is usually a black background with white video it is often better to convert this to a white background with black video before printing, this is done using the Convert to Black on White button before printing.

Store or Recall Frames.
This button calls a window that allows downloaded images from the unit to be stored to your hard disk or to a floppy drive, also to recall stored images to be displayed or printed. To store an image as a .BMP file edit the destination directory and folder if necessary and the file name in the text area at the top of the download window the just click the **Store File button.**

To recall stored .BMP files, select the Drive and directory from the option boxes in the lower part of the download window then select the file required from the list and press the Display File button.

Clear Display
Clears the image from the download window.

Exit
Returns to the main window

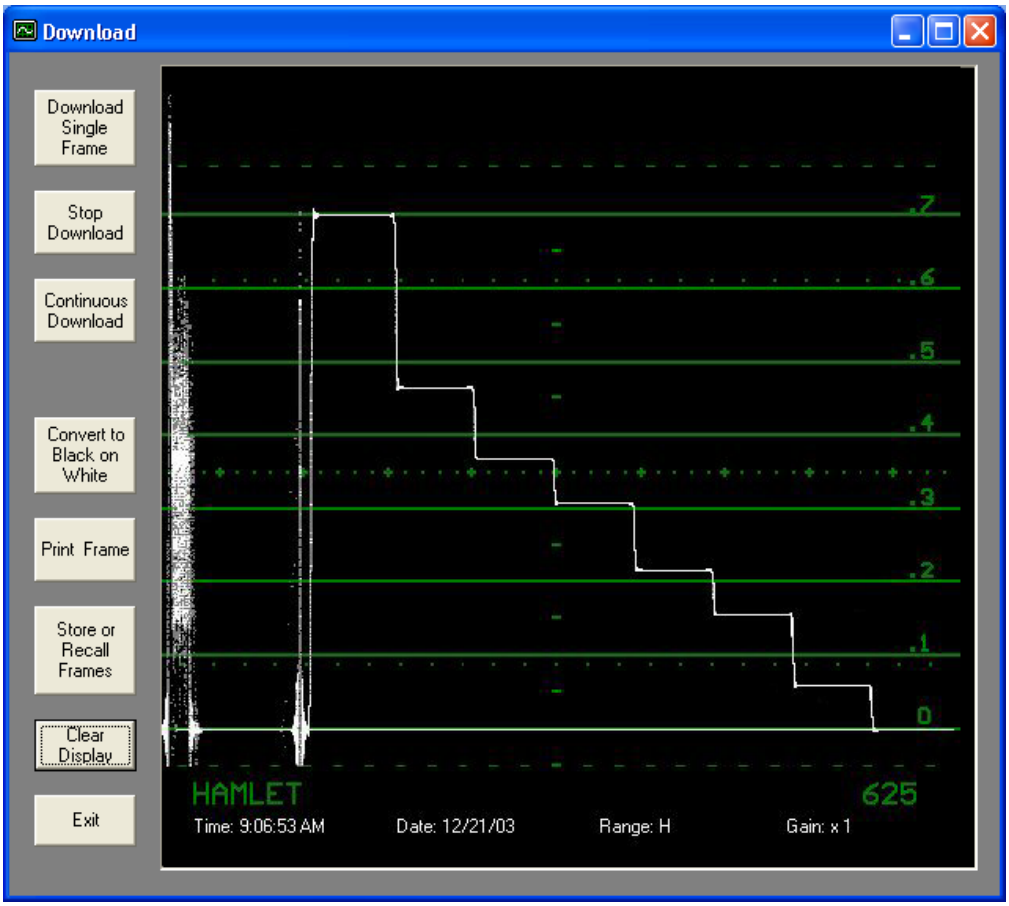

Fig 3 remote software download screen showing an example waveform

Monitoring selected errors in Real time.
From the main window select Config then Alarms to select the errors to be logged.
Use the mouse to place a tick against each error type required.
From the main window select Special from the toolbar then Logger to open the Logger Window.

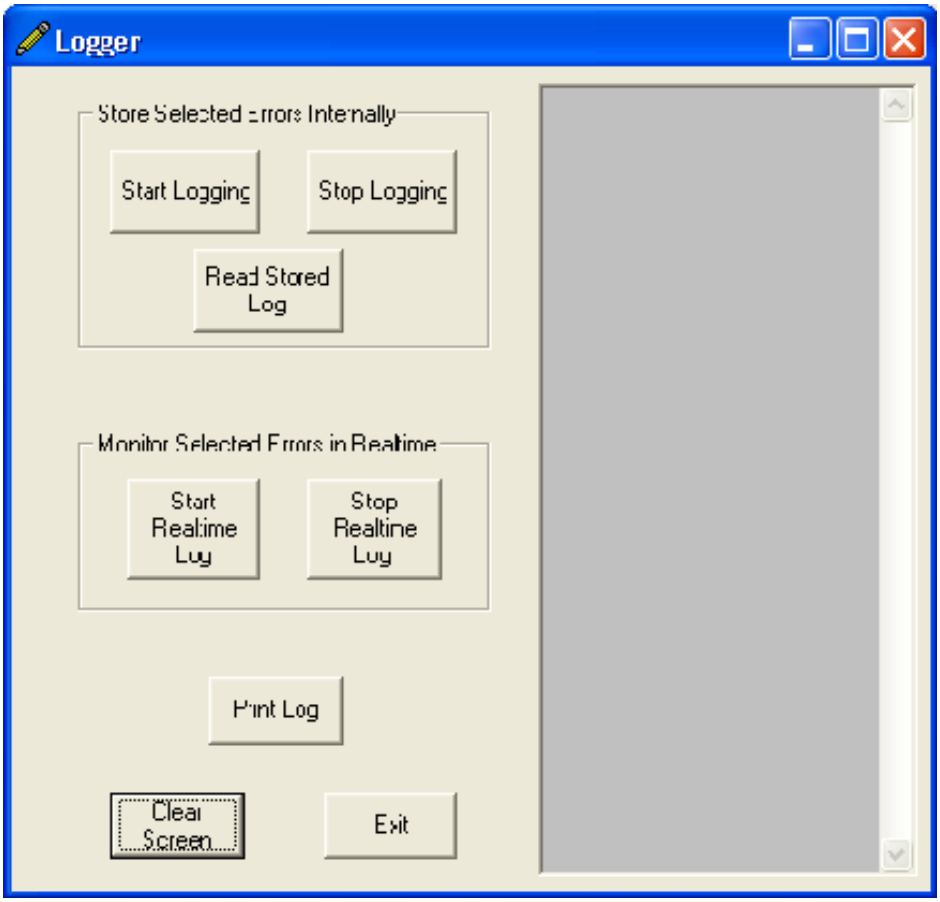

Fig 4 remote software logger screen

Click on the Start Real time Log button to start the logger.
Each time a selected error is detected it will appear on the list.
The type of error and the time it occurred will be displayed along with the source of the time code.
The 'VITC' caption means that the time code was extracted from the incoming video, if no VITC data was detected in the video stream or it had CRC errors then the time code from the units real time clock is used and the caption 'RTC' is displayed.

To stop real time logging click on the Stop Real time Log button.

Monitoring stored selected errors.
From the main window select Config then Alarms to select the errors to be logged.
Use the mouse to place a tick against each error type required.
From the main window select Special from the toolbar then Logger to open the Logger window.

Click on the Start Logging button to start the logger.

Each time a selected error is detected it will be stored in memory in the Monitorscope.

To stop real time logging click on the Stop Real time Log button.

After stopping the logger the contents of the unit's logger memory can be downloaded by clicking on the Read Stored Log button.
The type of error and the time it occurred will be displayed along with the source of the time code.
The 'VITC' caption means that the time code was extracted from the incoming video, if no VITC data was detected on the video or it had CRC errors then the time code from the unit's real time clock is used and the caption 'RTC' is displayed.

Clear Screen
Clears the logged error list.

Exit
Returns to the main window

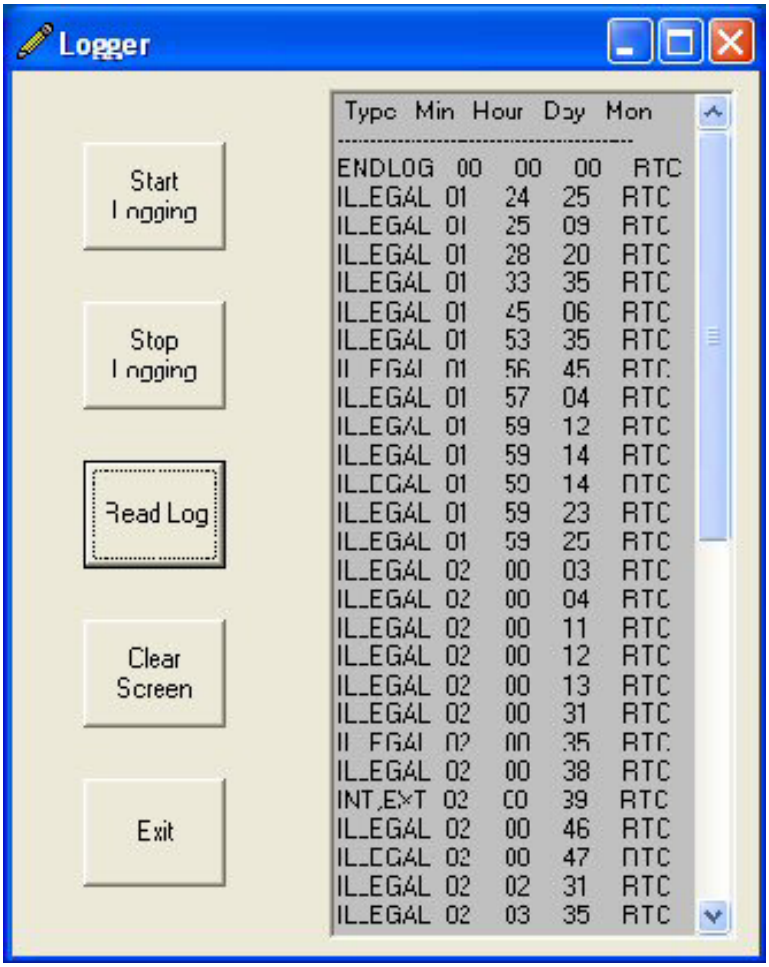

Fig 5 remote software logger screen showing an example error log

APPENDIX A

Trouble Shooting

If the PC can't communicate with the Digiscope an Error message will appear in the application window. It is necessary to check that RS232 link is correctly setup.

1) Is the serial port on the PC used by the unit specified by the application?

2) Is the baud rate used by the unit the same as specified by the application?

3) Is the RS232 cable connected and correctly wired?
Digiscope 9 Way D connector pin 2 is an output from the unit, for status & downloads.
Digiscope 9 Way D connector pin 3 is an input to the unit, for PC commands.
Digiscope 9 Way D connector pin 5 is ground.

4) Is the Digiscope powered up correctly?

APPENDIX B

REMOTE CONTROL COMMANDS

The unit can be controlled by sending single byte commands on the RS232 bus, the commands are of several types:

Key commands & Rotary commands:
These are the same as using the Keys or rotary controls on the actual unit.

Direct commands: these set the unit into certain states directly, without going through the menu system.
e.g. to select the audio input to be Embedded Group1 would require several key presses to navigate the menu structure, a direct command can do it in 1 command.

All commands are single bytes of 8 data bits, no parity & 1 stop bit.
Baud rate is selectable on the unit: 9.6K, 19.2K, 28.8K or 38.4K bauds
It is recommended to use the highest rate.

KEY COMMANDS

Note: All KEY commands cause 7 LED bytes to be sent back to the computer. See Table 1.

Command	HEXCODE	Decimal
Cr	1E	30
Cb	1D	29
CVS	1B	27
Y	17	23
SDI	0F	15
Both/dual	3E	62
Overlay	3D	61
Vec/gam	3B	59
Traces	37	55
Wfm/Bow	2F	47
Hmag/Lsel	5B	91
H/V/Par	57	87
Run/Frz	4F	79
FILTERS	7E	126
CONFIG	7D	125
CH1/2BARS	7B	123
REF	77	119
GEN/EDH	6F	111
PRESETS	9E	158
AUDIO	9D	157
CURSORS	9B	155
DISPLAY	97	151
GAINS	8F	143
KEY 4	BE	190
KEY 1	BD	189
KEY 6	BB	187
KEY 3	B7	183
RECALL	AF	175
STORE	DD	221
KEY 5	DB	219
KEY 2	D7	215
KEY 7	CF	207

DIRECT COMMANDS

Audio Commands	**Decimal**
Audio Source = Embedded group 1	16
Audio Source = Embedded group 2	17
Audio Source = Embedded group 3	18
Audio Source = Embedded group 4	19
Audio Source = Analog	20
Audio Source = AES	21
Audio Scale = BBC PPM	144
Audio Scale = Digital	145
Audio Scale = Nordic	146
Audio Scale = VU	147
Audio Scale = EBU	148
Audio Scale = DIN	149
Audio Scale = Exp	150
Audio De-emphasis = 32KHz	64
Audio De-emphasis = 44KHz	65
Audio De-emphasis = 48KHz	66
Audio De-emphasis = Off	67
Audio Peak Hold = Off	135
Audio Peak Hold = 1 Sec	136
Audio Peak Hold = 2 Sec	137
Audio Peak Hold = 4 Sec	138
Audio Peak Hold = Infinite	139
Audio Vectors On/Off toggle	140

Factory Preset Commands	**Decimal**
Use Factory setting 0	43
Use Factory setting 1	44
Use Factory setting 2	45
Use Factory setting 3	46
Use Factory setting 4	47
Use Factory setting 5	48
Use Factory setting 6	49
Use Factory setting 7	50
Use Factory setting 8	51

Store Settings Commands	**Decimal**
Store panel settings as 0	101
Store panel settings as 1	102
Store panel settings as 2	103
Store panel settings as 3	104
Store panel settings as 4	105
Store panel settings as 5	106
Store panel settings as 6	107
Store panel settings as 7	108
Store panel settings as 8	109

Recall Settings Commands	**Decimal**
Recall panel settings as 0	110
Recall panel settings as 1	111
Recall panel settings as 2	112
Recall panel settings as 3	113
Recall panel settings as 4	114
Recall panel settings as 5	115
Recall panel settings as 6	116
Recall panel settings as 7	117
Recall panel settings as 8	118

Cursor Commands	**Decimal**
Set to Cursor Time Mode	24
Set to Cursor Amplitude Mode	25
Set to Cursor Phase Mode	26

Filter Commands	**Decimal**
Set to Video Filter to Flat	81
Set to Video Filter to Low pass	82
Set to Video Filter to Chroma pass	83

Gain Commands	**Decimal**
Set Waveform gain to 1	96
Set Waveform gain to Mag	97
Set Vector gain to 100%	98
Set Vector gain to 75%	99
Set Vector gain to Mag	100

Scale Brightness Commands	**Decimal**
Increment Scale brightness	84
Decrement Scale brightness	85

Set/Clear Alarms Commands	**Decimal**
Toggle Active Picture CRC error alarm	32
Toggle Full Field CRC error alarm	33
Toggle Audio error alarm	34
Toggle TRS error alarm	35
Toggle Illegal bits error alarm	36
Toggle Out of Gamut alarm	37
Toggle No Audio detected alarm	38
Toggle High Audio alarm	39
Toggle No Video alarm	40
Toggle Video Black alarm	41
Toggle Beep on KeyPress	42

Set Number of lines in VMag display	**Decimal**
Display 4 lines	53
Display 8 lines	54
Display 16 lines	55
Display 32lines	56

Set Component Format	**Decimal**
Toggle YRGB mode	31
Toggle YUV input mode	58
Toggle YUV output mode	60
Toggle YUV display mode	63

Display Commands	**Decimal**
Toggle Trace mode	68
Toggle Vertical resolution	76
Move Display Position Up	69
Move Display Position Down	70
Move Left Box Left	71
Move Left Box Right	72
Move Right Box Left	73
Move Right Box Right	74
Toggle Text Display Position	75
Set Safe Area to Action	92
Set Safe Area to Active	93
Set Safe Area to Title	94
Set Safe Area to Off	95
Toggle Top/Btm diplay	128
Toggle PALM/NTSC bit	129
Toggle View as Ana/Dig bit	130
Toggle Mono/Colour bit	131
Toggle Sync on Green bit	132
Toggle H Blank bit	133
Reset Error Counters	141

ROTARY CONTROL COMMANDS

Command	HEXCODE	Decimal
H SHIFT CW	**01**	**1**

Equivalent to turning the H Shift control by 1 increment clockwise.

H SHIFT ACW	**02**	**2**

Equivalent to turning the H Shift control by 1 increment anticlockwise.

V SHIFT CW	**03**	**3**

Equivalent to turning the V Shift control by 1 increment clockwise.

V SHIFT ACW	**04**	**4**

Equivalent to turning the V Shift control by 1 increment anticlockwise.

PHASE CW	**05**	**5**

Equivalent to turning the Phase control by 1 increment clockwise

PHASE ACW	**06**	**6**

Equivalent to turning the Phase control by 1 increment anticlockwise.

OTHER CONTROL COMMANDS

Command	HEXCODE	Decimal
Send log	**07**	**7**

Sends a text string of 37 bytes containing type & time of 1 logged error, each time the command is issued the next logged error is sent.

Use the 'Reset log' command first to start at the beginning of the log.
The first 7 bytes are the error type, then:
2 bytes containing the hour the error occurred followed by 5 spaces
2 bytes containing the minutes the error occurred followed by 5 spaces
2 bytes containing the seconds the error occurred followed by 5 spaces
7 bytes containing the type of time code i.e. VITC or Real Time Clock
Terminated by Carriage Return & Line Feed characters.

Command	HEXCODE	Decimal
Reset log	**08**	**8**

Resets the error logger pointer to the start of the log

Command	HEXCODE	Decimal
Send LED bytes	**09**	**9**

Returns 7 bytes containing the state of the front panel LEDs See Table 1

Command	HEXCODE	Decimal
Upload Data	**0A**	**10**

Sends 1 horizontal line of video to PC i.e. 256 bytes then increments the line counter.
This command needs to sent 256 times to get a whole frame of video.

Command	HEXCODE	Decimal
Reset Upload Counter	**0B**	**11**

Set the unit to upload video mode, resets vertical counter to top of screen, needs to be sent before the Upload Data commands.

Command	HEXCODE	Decimal
Cancel Upload	**0C**	**12**

Cancels Video Upload mode, used at the end of a frame upload i.e. after the 256 Upload Data commands.

Command	HEXCODE	Decimal
Send Status Bytes	**0D**	**13**

Returns the 16 status bytes that control the state of the unit, see Table 2.

Note: The LED bytes are sent automatically after each 'remote key press'

Table 1

7 returned bytes containing the state of the front panel LEDs

Byte 1	Bit 0 &1**:**	00 = SDI led off
		01 = SDI led Green
		10 = SDI led Red
	Bit 2 &3:	00 = Cmp led off
		01 = CVS1Green
		10 = CVS2 Red
		11 = CMPT Orange
	Bit 4:	1 = Y led on
	Bit 5:	1 = Cb led on
	Bit 6:	1 = Cr led on
Byte 2	Bit 0:	1 = SDI 1 led on
	Bit 1:	1 = SDI2 led on
	Bit 2:	1 = CV1 led on
	Bit 3:	1 = CV2 led on
	Bit 4:	1 = CMPT led on
Byte 3	Bit 0 &1:	00 = Wfm/Bowtie led off
		01 = Wfm led Green
		10 = Bowtie led Red
	Bit 2 &3:	00 = Picture/Traces led off
		01 = Traces led Green
		10 = Picture led Red
	Bit 4 &5:	00 = Vec/Gam/Aud led off
		01 = Vect led Green
		10 = Gam led Red
		11 = Aud led Orange
	Bit 6 &7:	00 = Ovl/Mix/Blk led off
		01 = Ovl led Green
		10 = Mix led Red
		11 = Blk led Orange

Byte 4	Bit 0 &1:	00 = Both/Dual led off
		01 = Both led Green
		10 = Dual Large led Red
		11 = Dual Small led Orange
	Bit 2 &3:	00 = Run/Frz/Sto led off
		01 = Run led Green
		10 = Frz led Red
		11 = Sto led Orange
	Bit 4 &5:	00 = H/Par/V led off
		01 = H led Green
		10 = Par led Red
		11 = V led Orange
	Bit 6 &7:	00 = HMag/Linsel led off
		01 = HMag led Green
		10 = MagLS led Red
		11 = Line Sel led Orange
Byte 5	Bit 0 &1:	00 = Gen/EDH led off
		01 = Gen led Green
		10 = EDH led Red
	Bit 2 &3:	00 = Int/Ext/HFT led off
		01 = Int led Green
		10 = Ext led Red
		11 = HFT led Orange
	Bit 4 :	1 = Pos led on
	Bit 5:	1 = Neg led on
	Bit 6 &7:	00 = Ch1/Ch2/Both led off
		01 = Ch1 led Green
		10 = Ch2 led Red
		11 = Both led Orange
Byte 6	Bit 0:	1 = Config led on
	Bit 1:	1 = Filter led on
	Bit 2:	1 = Gains led on
	Bit 3:	1 = Display led on
	Bit 4:	1 = Cursors led on
	Bit 5:	1 = Audio led on
	Bit 6:	1 = Presets led on
Byte 7	Bit 0:	1 = H Shift led on
	Bit 1:	1 = Cur A led on
	Bit 2:	1 = V Shift led on
	Bit 3:	1 = Cur B led on
	Bit 4:	1 = Phase led on
	Bit 5:	1 = Line Sel led on

Table 2

16 returned bytes containing the status data that control the unit.

Byte 1	Bit 0 &1:	00 = Safe Area = Action
		01 = Safe Area = Active
		10 = Safe Area = Title
		11 = Safe Area Off
	Bit 2:	1 = Gamut mode on
	Bit 3:	0 = Status Text at bottom of screen
		1 = Status Text at top of screen
	Bit 4:	1 = Freeze mode on
	Bit 5:	1 = Store mode on
	Bit 6:	0 = Quarter size display in Small mode
		1 = Half size display in Small mode
	Bit 7:	0 = Use Internal Video Reference
		1 = Use External Video Reference
Byte 2	Bit 0 &1:	00 = Small display mode
		01 = Waveform display mode
		10 = Vector display mode
		11 = Combo display mode
	Bit 2 & 3:	00 = VMag lines = 4
		01 = = VMag lines = 8
		10 = = VMag lines = 16
		11 = = VMag lines = 32
		Bit 4: 1 = On screen text on
	Bit 5,6,7:	000 = HMag range
		001 = H range
		010 = 2H range
		011 = Parade range
		100 = VMag range
		101 = V range
		110 = 2V range
		111 = Line Select range

Byte 3	Bit 0 &1:	00 = Cursor Mode off
		01 = Cursor mode: Amplitude
		10 = Cursor mode: Time
		11 = Cursor mode: Phase
	Bit 2:	0 = Waveform gain = 1
		1 = Waveform gain = Mag
	Bit 3:	0 = Display 525 line video as NTSC
		1 = Display 525 line video as PAL-M
	Bit 4 & 5:	00 = Vector Gain = 100%
		01 = Vector Gain = Mag
		10 = Vector Gain = 75%
	Bit 6:	1 = 'Hands Free Timing mode ON
	Bit 7:	0 = Use Internal Video Reference
		1 = Use External Video Reference
Byte 4	Bit 0:	1 = Full Field CRC Error monitoring ON
	Bit 1:	1 = Active Picture CRC Error monitoring ON
	Bit 2:	1 = Out of Gamut Error monitoring ON
	Bit 3:	1 = Illegal Error monitoring ON
	Bit 4:	1 = Audio Error monitoring ON
	Bit 5:	1 = TRS Error monitoring ON
	Bit 6:	1 = Beep on all key presses
Byte 5	Bit 0 &1:	00 = Bowtie mode off
		01 = Bowtie U mode
		10 = Bowtie V mode
	Bit 2:	1 = Display: Mix mode
	Bit 3:	1 = Display: Black background
	Bit 4 & 5:	00 = Video filter = Off
		01 = Video filter = Luma-Pass
		10 = Video filter = Chroma-Pass
Byte 6		**No user data**
Byte 7	Bit 0,1,2:	000 = Video input = SDI 1
		001 = Video input = SDI 2
		010 = Video input = Component
		011 = Video input = Composite 1
		100 = Video input = Composite 2
		Bit 3: 1 = PAL Switch ON
		Bit 4 & 5: 00 = Audio Input = Analog
		01 = Audio Input = AES
		10 = Audio Input = Embedded
		Bit 6: 1 = Audio Vector display on
		Bit 7: 1 = Blank waveform line ends.

Byte 8	Bit 4 & 5:	00 = Embedded Audio Group 1 01 = Embedded Audio Group 2 10 = Embedded Audio Group 3 11 = Embedded Audio Group 4 Bit 6 & 7: 00 = Baud Rate: 9.6K 01 = Baud Rate: 19.2K 10 = Baud Rate: 28.8K 11 = Baud Rate: 38.4K
Byte 9		**No user data**
Byte 10	Bits 2,3, 4:	000 = Audio Scale: BBC PPM 001 = Audio Scale: Digital 010 = Audio Scale: Nordic 011 = Audio Scale: VU 100 = Audio Scale: EBU 101 = Audio Scale: DIN 110 = Audio Scale: Expand
Byte 11		**No user data**
Byte 12		**No user data**
Byte 13		**No user data**
Byte 14		**No user data**
Byte 15		**No user data**
Byte 16		**No user data**

USEFUL WEBSITES

HAMLET	**www.hamlet.co.uk**	
HAMLET (USA)	**www.hamlet.us.com**	
SMPTE	**www.smpte.org**	**Society of Motion Picture Television Engineers**
DIN	**www.din.de**	**German Standards Institute**
EBU	**www.ebu.ch**	**European Broadcasting Union**
AES	**www.aes.org**	**Audio Engineering Society**
ITU	**www.itu.int**	**International Telecommunication Union**

CONTACT DETAILS AND CUSTOMER SUPPORT

For any form of assistance in maintaining your Digi Scope, please contact:

Hamlet Video International Limited
Maple House 11 Corinium Business Centre Raans Road Amersham Bucks HP6 6FB England
Main Line: +44 (0)1494 729 728
Fax Line: +44 (0)1494 723 237
Free phone (UK) 0500 625 525
E-mail: sales@hamlet.co.uk Web site: www.hamlet.co.uk

Hamlet Video International USA service center , Tecads Inc, 23 Del Padre St, Foothill Ranch, CA 92610, U.S.A.
Tel: +1 (949) 597 1053,
Fax: +1 (949) 597 1094.
Toll Free Tel number: (866) 4 HAMLET
E-mail: service@hamlet.us.com Web site: www.hamlet.us.com

In correspondence concerning this instrument, please quote the serial number, which you will find printed on the label at the back of the unit.