



User Manual

MV-16 Multiviewer

Enables up to 16 channels of video to be viewed on a single display device

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1. Introduction

The compact MV-16 multi-viewer enables up to 16 channels of video to be viewed on a single display device. The inputs are auto-sensing composite, SDI, HD-SDI inputs. In addition there are two DVI-I video inputs. Up to 3G 1080p is supported.

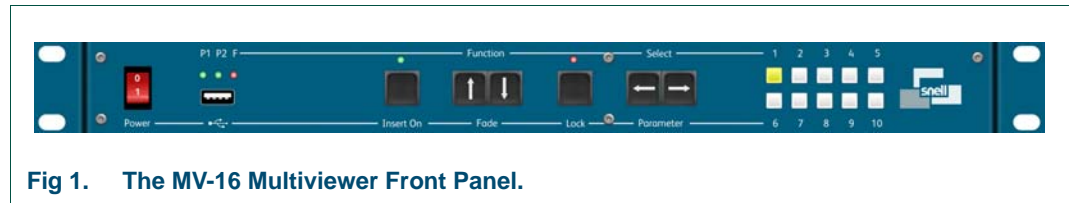


Fig 1. The MV-16 Multiviewer Front Panel.

The MV-16 is designed to optimize monitoring flexibility within the multi-channel video environment, whether used for video production, television broadcast or CCTV. It is supplied as a 1U rack mounting frame. It is easily controlled from a PC web browser hosted by the frame itself, either directly via an Ethernet cable or over a network.

1.1 System Concept

The modular architecture is designed for scalability. Each video input card handles four channels. Up to four cards may be fitted to the frame, providing a total of 16 inputs. Additionally, if external audio functionality is required, audio input or output cards may be fitted. The diagram below shows the overall concept.

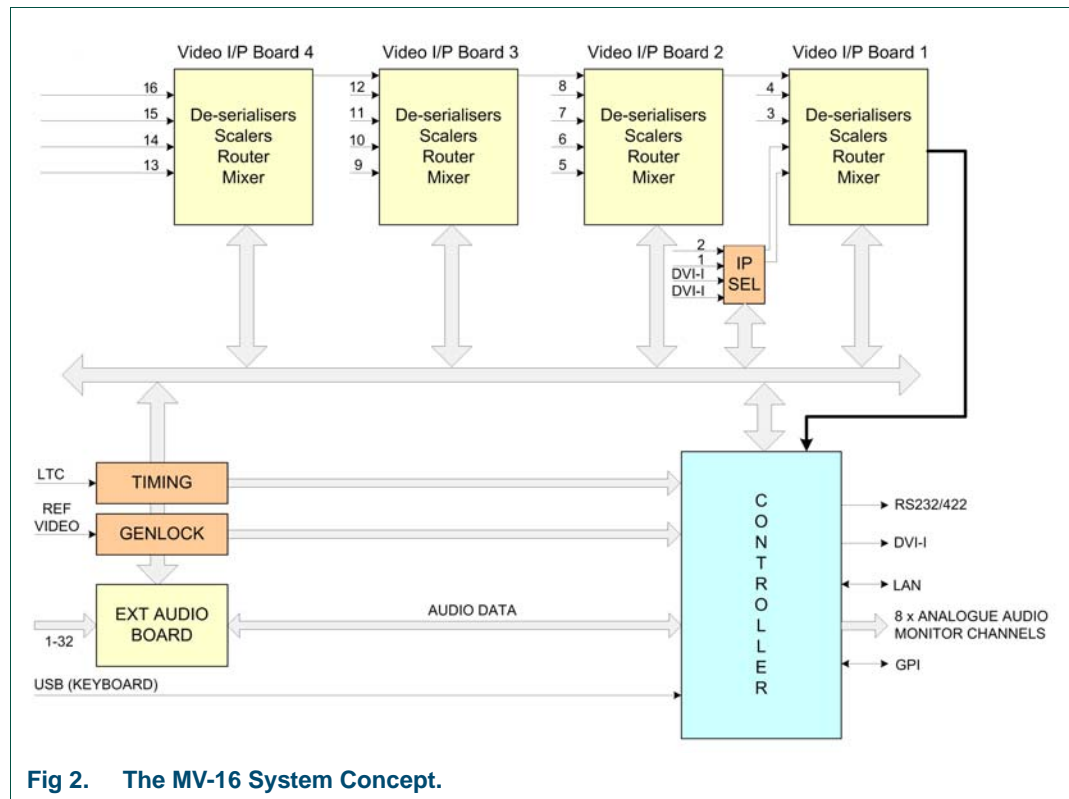


Fig 2. The MV-16 System Concept.

A scaler on each video card processes one of the possible inputs (CVBS, SDI/HD-SDI, DVI) and scales it to the desired tile size for the selected position on the output. A mixer on each video card combines all the video tiles and sends the resulting image to the next video card. The final display output comprises all of the tiles in a single picture.

Possible inputs are:

- Card MV-VIP1 - Composite, S-video, RGB, YUV, SDI, DVI-I
- Card MV-VIP2 - Composite, S-video, RGB, YUV, SDI, HD-SDI, 3G-SDI, DVI-I

Overlay of audio and graphics information is performed inside each scaler, which receives control data from the main CPU in real-time for analog/AES/EBU/ channels, or from the video card itself in the case of embedded SDI/HD-SDI audio.

To allow arbitrary layering of sources, each input board has information about all of the tile positions, allowing each tile to be displayed as required and enabling picture overlay with complex borders.

DVI-I inputs replace inputs on BNC 1 and 2. If DVI-I input 1 is enabled, any SDI input on BNC 1 is replaced by the DVI-I input. Similarly, DVD-I input 2 will replace any SDI input on BNC 2.

Note: If composite inputs are used on BNC 1 and 2, they may be routed inside the first video card to channels 3 and/or 4.

1.2 Features and Benefits

- Up to 16 auto-sensing monitored composite, SDI, HD-SDI S-Video, RGB and YUV inputs and two DVI-I video inputs (up to 3G 1080p)
- DVI-I output up to 1080p60 (1920x1080) in 16:9
- Genlocked inputs for flicker-free and full frame operation
- Teletext (analog), subtitles, AFD, WSS, VITC (SDI/HD-SDI only) decoding & monitoring
- Up to 256 channels of embedded audio may be displayed as industry standard bar-graphs with a choice of scales/ballistics
- Using the appropriate optional input card up to 32 external analog or digital audio channels (AES/EBU with SRC) can be displayed
- 4 pairs of assignable analog audio monitor outputs
- Outputs for up to 32 channels of demuxed audio; analog or AES/EBU
- Alarms for video, audio and metadata, with outputs to GPI outputs, LAN and/or SNMP traps
- Assignable tallies
- Under Monitor Displays (UMD) entered via keyboard, LAN or serial cable, supporting TSL and other protocols
- Clock display receiving time information via NTP network protocol or LTC
- 1 RU compact design, ideal for OB-vans and other space restricted installations
- Front panel control
- User-friendly set-up via system menu/browser software
- Standard internal dual redundant power supply fed from a single IEC input

1.2.1 Powerful Alarms

Alarms can be created for video sync loss, black (loss of luminance), freeze-frame, embedded audio loss, external audio loss, over level, out of phase (of chosen pairs), teletext loss, and closed caption loss. The colors used for on-screen alarms are as follows:

Alarm	Color	Position
Audio Loss	Yellow	Position (left or right indicates channel)
Audio Over	Red	Position (left or right indicates channel)
Anti-Phase	Cyan	Middle Alarm
Carrier Loss	White	Middle Alarm

Table 1. Alarms.

If carrier loss occurs, only that alarm will flash, unless audio loss had already been active for the same channel.

The decoding of closed caption is available on each scaler, together with an associated alarm. Analog teletext decoding is available in the scaler.

On-screen alarm indication can be a stationary or flashing colored tile border. External alarm indication may be via the GPI I/O or the LAN/software application, e.g. NGM-164.

Optional triggering of SNMP traps for each alarm function or group are also supported.

Tiles have an optional color coded border to provide status indication, such as tally or alarms.

VITC loss is indicated by the burnt in VITC display flashing. Burnt in VITC is available from SDI sources only.

1.2.2 Captions and UMD

Captions or Under Monitor Display (UMD) information can be generated manually from a keyboard connected to a front panel USB-2 port or automatically from remote sources via the LAN, using browser software operating on a remote PC, or via the RS232/422 port using TSL or other protocols. Up to two lines of UMD text can be left, center, or right justified and may be placed anywhere in the tile.

1.2.3 Using Bitmaps

There is storage capacity (about 200Mb) for bitmaps. These can be used as backgrounds, or to display station idents, etc. The bitmaps must be in bmp or png file format and can be uploaded to the frame via the LAN. Up to four bitmaps may be displayed at any one time.

1.2.4 Keeping Time

Clock/date display data can be derived from several sources; the system clock, NTP synchronisation, LTC, or VITC from a chosen SDI input.

Note: When LTC is present this source becomes the exclusive reference for clocks.

The input is balanced; to use an unbalanced LTC input, the signal must be properly converted with a Balun in-line transformer. Grounding either of the LTC input pins will not work.

If there is no LTC present, the frame searches the network for an NTP Server in the nearby region (pool.ntp.org). If a server is found, the time is taken from that.

In the absence of any clock, the system time is used. A battery on the CPU board insures that time data is retained if the unit be powered down.

For each input is possible to display either the Ancillary Timecode or the DVITC from the video source.

LTC is applied to the frame through a BNC on the rear of the frame.

See section 3.6 for more information.

If VBI data is present on a video input and the video is an SDI source then the data can be displayed on the relevant video tile (see sections 3.12.5.5 and 3.12.5.6 for setting details).

If multiple sources of timecode are present in a video source then the timecode selected for display, in order of priority is; Ancillary VITC, Ancillary LTC and D-VITC.

Note:

1. D-VITC is only available on SD sources as there is currently no standard for HD sources. Ancillary Timecode is available on both SD and HD sources.
2. The Timecode is displayed in a fixed position near the bottom center of the tile within the video.
3. The display will start to be cropped when the tile is 150 pixels or less wide.

1.2.5 Genlocking

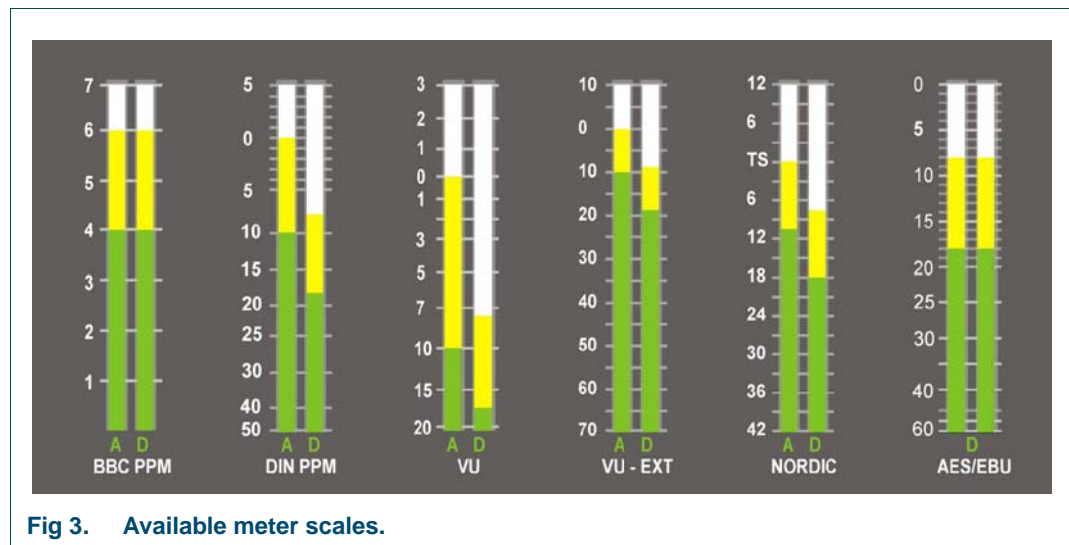
Genlocking of the MV-16 is via SD color black or HD tri-level sync, or may be taken from a chosen input on any input card.

1.2.6 Using GPI Input/Output Connections

Assignable GPI I/O with 16 inputs and 8 outputs for external alarm indication and tally functions.

1.2.7 Bargraph Scales

The following audio scales are supported:



Colors used for the upper and lower ranges of each bar type can be customized to satisfy any in-house monitoring style for each of the six scale types.

Note:

Each bar type can have different range colors.

2. Installation

The MV-16 1U frame may be installed in 19 inch bays with 426mm depth (~450mm including connectors). Ventilation is produced in each frame with exhaust fans on the left hand side (viewed from front) and intake grilles at the right. Frames should be installed into bays such that airflow through these apertures is not impeded.

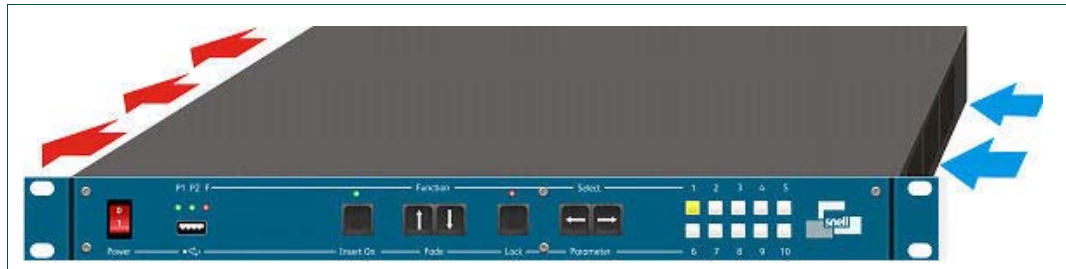


Fig 4. The 1U MV-16 frame showing main side to side ventilation.

The front rack ears are intended to provide a means of retaining the unit in the rack.

Important:

To ensure adequate support the unit **MUST** also be supported at the rear of the frame. Please ensure that ventilation is not impaired when selecting suitable supports.

2.1 Power and fuses

The mains voltage (240/100 Volts) will be auto detected provided it is in the range 90 - 264 V AC and 50/60 Hz. A 5 A fuse is fitted and a spare fuse should be located under the pull-out flap.

The IEC power inlet is the mains disconnection device for this unit.

2.2 Health and safety considerations



For your own protection, observe the following safety precautions when installing, operating and servicing your device:

The Installation and Maintenance of the MV-16 unit and any associated equipment must be carried out by PERSONS SUITABLY QUALIFIED to work with equipment which may be connected to the mains supply.

The unit **MUST BE DISCONNECTED & ISOLATED FROM THE MAINS INPUT** and from other product outputs before undertaking maintenance.

ELECTRIC SHOCK HAZARDS exist if conductive instruments, neck chains or fingers etc. are placed within the unit or in close proximity of the input/output terminals/connectors.

Incorrect installation can cause internal components to rupture and particles to be ejected from the product.

TOXIC FUME HAZARDS exist if the unit is subjected to direct flames or excessive temperature of above 100 Degrees Centigrade ambient.

The mounting and installation of the unit must be arranged by the user to comply with all safety regulations by the indigenous authority.

2.2.1 Disposal

Do not incinerate as explosive and toxic fume hazards exist. Disposal must be by dismantling the product to component level and disposing of each component by an approved method.

2.3 Connector I/O

The MV-16 uses coaxial BNCs for the video inputs, LTC and sync inputs. Micro cross connectors are fitted for the two DVI-I inputs and one output. The GPI I/O connector is a high density 26 way female 'D' connector. External audio connections (input or output) are via a pair of female 37 way 'D' connectors, with audio monitoring outputs on a male 25 way 'D' connector. The serial port comprises a 9 way female 'D' connector. A standard RJ45 connector is provided for LAN connection and a USB connector on the front panel is provided for connecting a keyboard. (A pack of mating 'D' type connectors is supplied with the unit).



Fig 5. MV-16 1U frame rear connector Input/Output.

2.4 Input card configurations

The MV-16 may be fitted with up to four MV-VIP1 or MV-VIP2 video input cards, or any combination of the two types. Additionally, an external analogue or digital audio I/O card may be fitted to a dedicated card slot as an option.

MV-VIP1 video cards support the following standards:

- Composite video PAL/NTSC, CVBS - 1Vpp
- SDI - SMPTE 259M
- DVI-I - digital or analogue component, 1920 x 1080
- S-Video (Y/C)
- Component video RGB/YUV

The MV-VIP2 video card supports HD-SDI up to SMPTE 292M 3G, in addition to the standards supported by the MV-VIP1 card.



Fig 6. MV-16 1U frame with front panel removed.

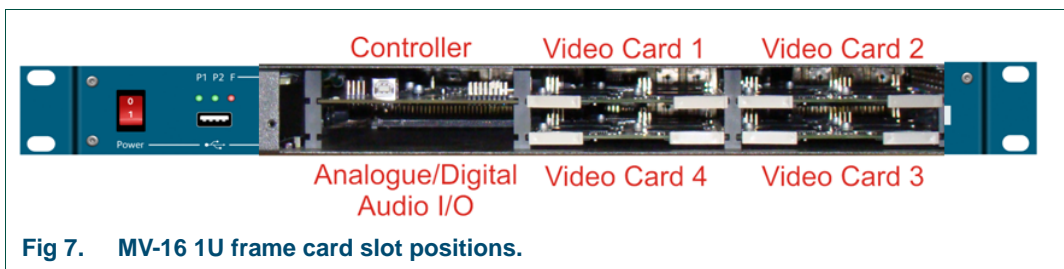


Fig 7. MV-16 1U frame card slot positions.

The controller card is always fitted in the top left slot and the Analogue/Digital audio card is always fitted in the bottom left slot. Video input cards are installed in the remaining slots as shown Fig 7.

Important:

The card retaining strip that is accessible behind the front panel of the unit must first be removed before cards can be fitted or extracted. The I/O cards are not hot-swappable and the multiviewer must be powered down when inserting and removing cards.

2.4.1 Video Inputs

All inputs (except DVI-I) are assigned to the 16 x BNC input connectors at the rear of the unit. Up to 16 inputs can be applied if the configured video format uses a single BNC (SDI, HD-SDI, composite). For S-Video, two connectors are required, for RGB/YUV three connectors are required.

There are two DVI-I input connectors, as this is the maximum number of DVI-I inputs supported per frame. All input types are assigned within the unit's system menu.

Component inputs such as YUV or RGB require three connections per channel and only one channel can be handled per input card. However, a further two channels can be fed via the analogue pins of the two DVI input connectors (and suitably assigned in the unit's menu) making a maximum total of six channels. Any unused BNCs can be used for other video formats.

For Y/C, two connections per channel are required. Therefore two channels can be handled per input card, giving eight channels per frame. Any unused BNCs can be used for other video formats.

2.4.2 Video Outputs

The main DVI-I output supports resolutions up to HD 1080p60, 16:9 (1920 x 1080). Both digital and analogue outputs are available on this connector. Images on the output screen can be varied continuously in size and position, cropped or displayed in pre-configured screen layouts on a chosen colored background.

The main output is also used to display the unit's system menu when screen configuration and set-up options are selected. This is not necessary when using external control via the LAN.

2.4.3 Audio I/O

Audio levels may be displayed using up to 16 bargraphs in each tile, either superimposed on each video image or outside active video. Audio is derived from the incoming embedded audio (when using SDI or HDSDI inputs), or from up to 32 channels from external analogue or AES/EBU sources, for which the appropriate audio input card option must be installed.

Additionally, external audio may be monitored using level data from the Snell NGM-164 via the LAN.

Note:

1. When external inputs are not required, an optional output card (32 channels analogue or 16 AES/EBU pairs) may be employed to provide demuxed outputs from embedded audio.
2. There is an 8 channel analogue audio monitor output, which may be assigned from any input channel of any format, excluding incoming external audio level data.
3. The number of audio channels described always refers to individual channels, not channel pairs. For example, eight monitor outputs relate to eight individual analogue channels or 4 pairs AES/EBU channels.
4. All bargraph scales and ballistics conform to international standards and include BBC PPM, DIN PPM, Nordic PPM, VU, extended VU, and AES/EBU digital.

2.5 Serial port assignments

There is a single serial data port that can be configured for either RS232 or RS422 operation. The mode of operation is set by means of jumpers (J13 and J14) on the CPU board. The pin assignment of the connector is given in section 4.1.1.

Jumpers J1, J13 and J14 are located on the Controller (CPU) card. Access requires the removal of the CPU card from the front of the unit with the power removed.

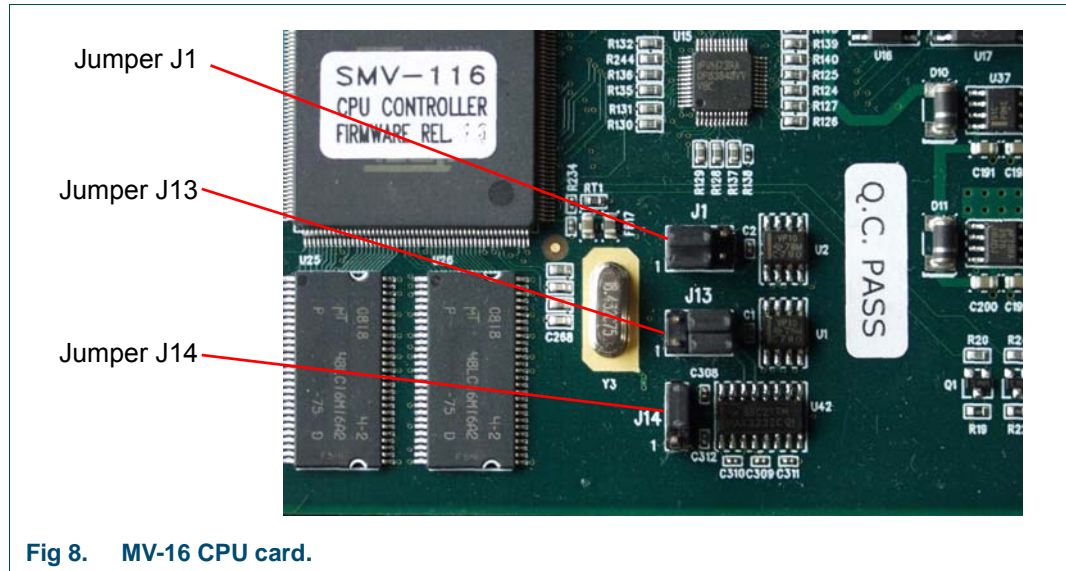


Fig 8. MV-16 CPU card.

Jumper	Position 1/2	Position 2/3
J1 (pair)	used for debugging	normal
J13 (pair)	RS422 (set in conjunction with J14)	RS232 (set in conjunction with J14)
J14 (single)	RS422 (set in conjunction with J13)	RS232 (set in conjunction with J13)

Table 2. MV-16 CPU Jumper settings.

Fig 8. shows the CPU card jumpers and Table 2. shows the jumper settings.

Important:

Only pin 1 of each jumper is indicated on the PCB.

Other CPU card settings and controls are for factory use only.

2.6 Audio I/O connector pin assignments

AES/EBU inputs or outputs (depending on the card fitted) may be jumper selected per channel to be either balanced or unbalanced. These are set from the jumpers on each digital audio card.

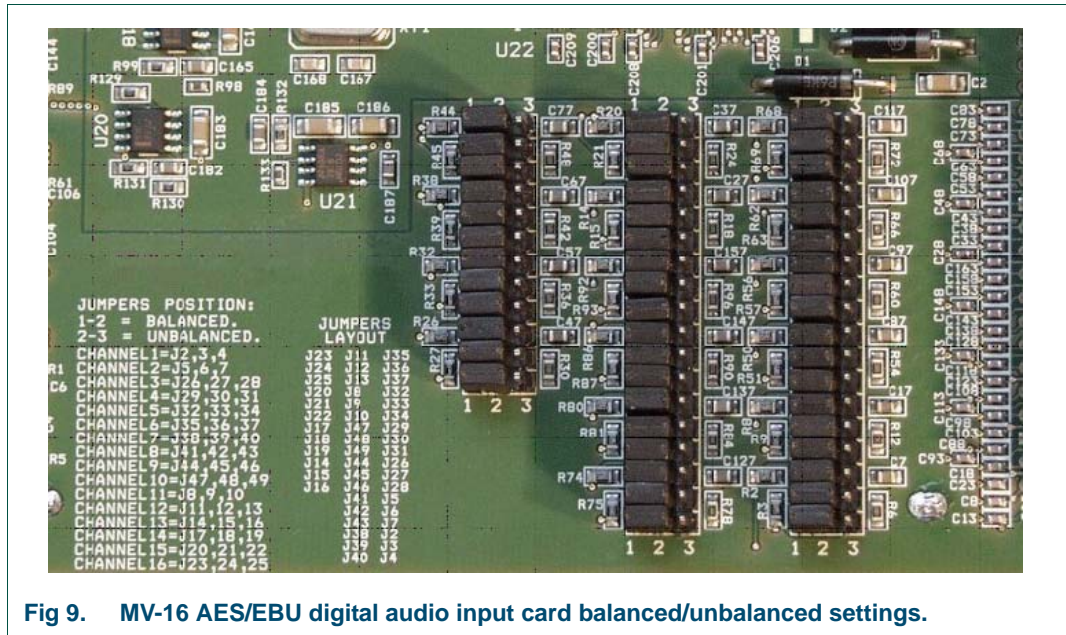


Fig 9. MV-16 AES/EBU digital audio input card balanced/unbalanced settings.

Jumper Position	Description
1/2	Balanced
2/3	Unbalanced

Table 3. Balanced/Unbalanced Jumper positions.

Channel	Jumpers	Channel	Jumpers
1	J2, J3, J4	9	J44, J45, J46
2	J5, J6, J7	10	J47, J48, J49
3	J26, J27, J28	11	J8, J9, J10
4	J29, J30, J31	12	J11, J12, J13
5	J32, J33, J34	13	J14, J15, J16
6	J35, J36, J37	14	J17, J18, J19
7	J38, J39, J40	15	J20, J21, J22
8	J41, J42, J43	16	J23, J24, J25

Table 4. Jumper numbers for each channel.

The pin assignment of the connector is given in section 4.1.3.

3. Operation

The front panel user interface comprises a power switch, 6 buttons for configuring the unit, 10 illuminated pre-set configuration buttons, a USB-2 interface and LED indicators for status reporting.

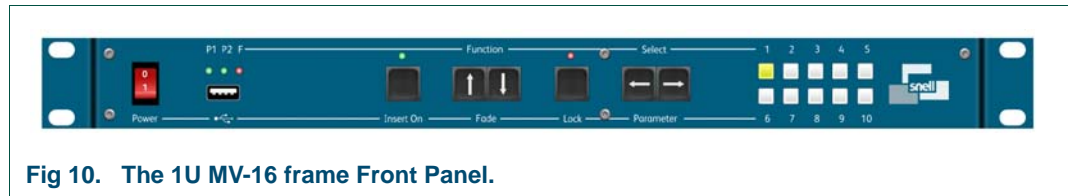


Fig 10. The 1U MV-16 frame Front Panel.

The P1 and P2 LED light green to indicate healthy power supplies. If the red F LED is lit after the unit has booted, failure of one or more ventilation fans has been detected. Under normal circumstances, the boot cycle takes about 70 seconds.

The MV-16 can be configured and controlled via the LAN, using browser software operating on a remote PC.

3.1 Local Operating Modes

At the front panel, normal or 'locked' is the normal operating mode. A special configuration or 'menu' mode is provided to allow initial IP address configuration for LAN control via a browser. The currently set IP address will appear to the top left of the display output during the boot cycle.

3.1.1 Normal Mode

In normal use, the configuration menu will be locked to prevent inadvertent operation and configuration menus are not available.

In this mode, the 10 illuminated pre-set configuration buttons are active. A currently displayed configuration can be stored by holding down the desired pre-set button for more than 3 seconds.

Stored presets are recalled by briefly pressing the desired pre-set button, which will illuminate.

Note: Should the frame lose power, it will restore the last known configuration settings on reboot and automatically reflect these in the browser.

3.1.2 Configuration Mode

To enter configuration mode from normal mode (with the red Lock LED off) hold the Lock button down for about three seconds. The configuration or 'menu' mode will be entered, an on-screen menu will appear and the red Lock LED will illuminate. If the Lock button is depressed again, any changed settings will be saved and the unit will return to normal.

The currently loaded firmware version will be indicated at the top of the on-screen menu.

The main 'menu' mode controls are as follows:

- Function keys (↑ ↓) scroll the menu cursor up and down to select the desired function.
- Select Parameter keys (← →) select settings to apply to the chosen parameter.
- Lock button exits 'menu' mode and saves settings.

←	Select submenu when menu name highlighted, or change Parameter value within menu
→	
↑ ↓	Select item in menus and sub-menus
LOCK	Press Lock to save changes and exit menu mode

Table 5. Main Menu controls.

System Configuration	Parameter(s)
Network Settings	Set Manually (using settings below)/Use DHCP
IP Address	Enter frame IP address byte at a time in the sub-menu
Netmask	Enter Subnet Mask byte at a time in the sub-menu
Gateway	If required, enter the Gateway address byte at a time in the sub menu
DNS Server 1	If required, enter the DNS server address byte at a time in the sub-menu
DNS Server 2	If required, enter the DNS server address byte at a time in the sub-menu

Table 6. MV-16 Network Settings.

3.1.2.1 Network settings

These settings only need to be manually entered if DHCP is not to be used. This would be required for a network that uses fixed IP addresses and does not rely on a DHCP server to allocate them automatically.

Note: The IP address must be unique on the network. Please see your system administrator if these details are required.

3.2 Keyboard Operation

Any HID compliant USB keyboard can be used for the entry and editing of UMD. The keyboard is connected to the USB port on the front panel of the MV-16.

The Tab key activates the cursor on the topmost UMD. Successive Tab key operation moves the cursor on to the next UMD in sequence. The Esc key deactivates the cursor.

3.3 Using the Web Interface

The MV-16 Multi-viewer is controlled via a browser using web pages hosted by the frame itself. Note that Java must first be installed on the PC or MAC that is to be used. This is available as a free download from:

<http://www.java.com/en/download/manual.jsp>

To access the web interface, type the IP Address configured for the frame into a browser. The Java application should launch immediately, but be aware that Windows security precautions may block the file download.

Note: The default IP address is 192.168.0.120.

The user interface (Fig 11.) is displayed.

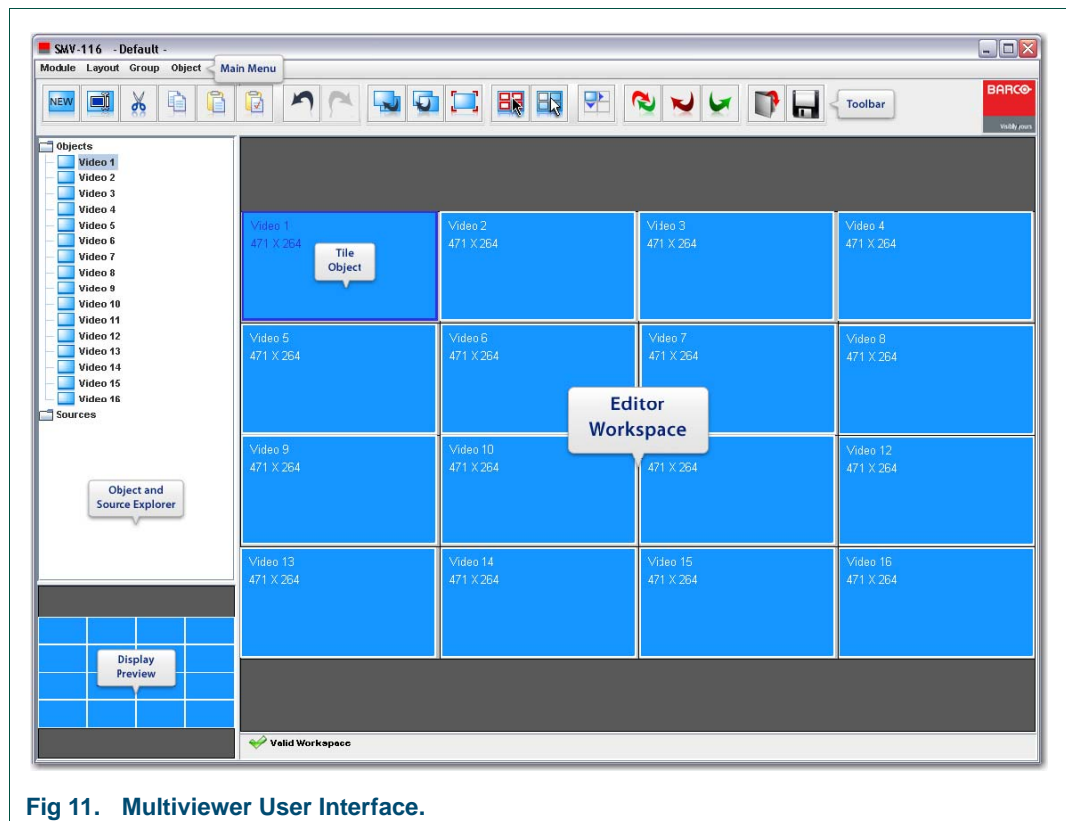


Fig 11. Multiviewer User Interface.

The interface comprises three main areas:

- the Object and Source Explorer
- the Editor Workspace
- the Display Preview

Tile objects can be one of six basic types:

The color of the tile as it appears in the Editor Workspace and Display Preview indicates the currently set object type, as listed in Table 7.

Object Type	Tile Color
None	Grey
Video	Blue
Audio	Green
Text	Brown
Logo	Red
Clock	-

Table 7. Object Colors

Operation is designed to be simple and intuitive. For example, object type can be selected by double clicking on a tile, selecting the Type tab from the Edit Object menu and choosing the desired tile type. Video and audio tiles can be assigned sources by double clicking on a tile, selecting the Properties tab from the Edit Object menu and selecting an available source.

Currently selected objects are highlighted with a blue border. Tiles can be moved and resized using conventional mouse operations. Tile borders may appear incomplete to indicate where they lie behind other objects.

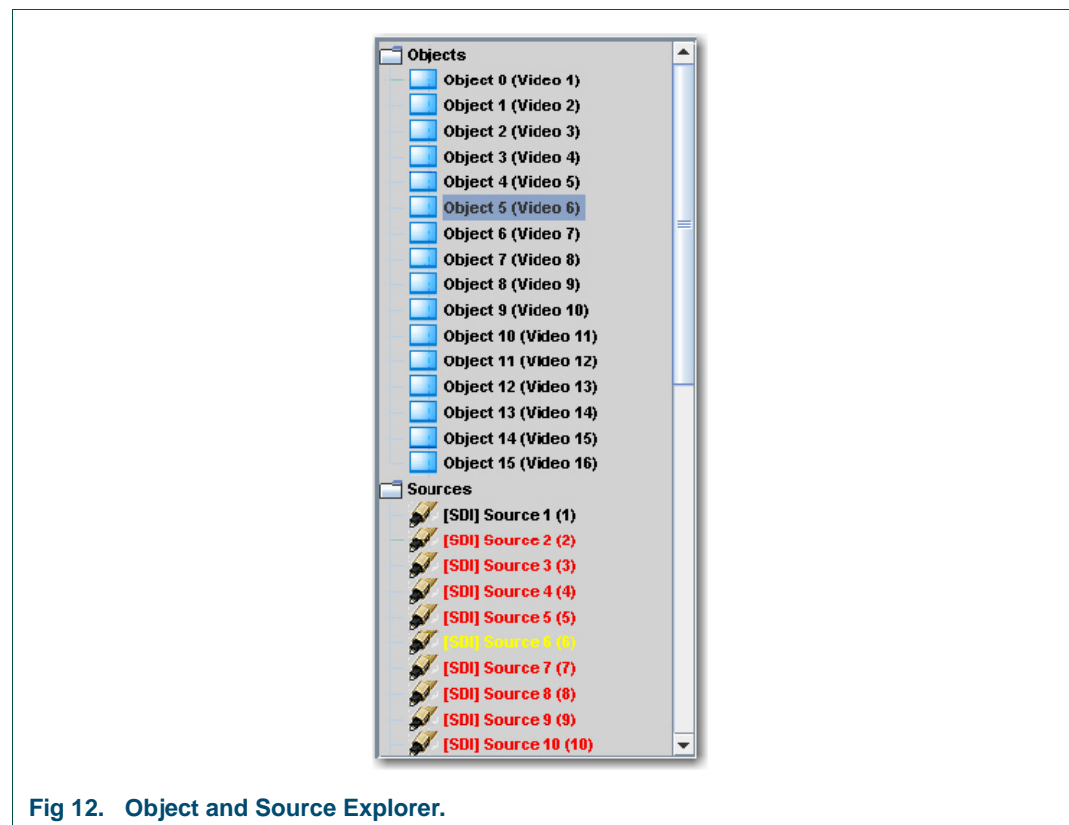


Fig 12. Object and Source Explorer.

3.3.1 Object and Source Explorer

The Object and Source Explorer (Fig 12.) displays the contents of the Objects folder and the Sources folder.

The Objects folder contains the list of current objects and each object's given name. The currently selected object is highlighted.

The Sources folder contains the list of video and audio sources, with an indication of the source type. Those sources that are currently assigned to an object appear in red, whereas those that are currently unassigned to an object appear in black. A source that is assigned to the currently selected tile/object appears in yellow.

The Edit Object menu can also be displayed for a tile by double clicking on its entry in the Object Folder in the Explorer view. Audio and Alarm settings can be configured for each source by double clicking on its entry in the Source Folder in the Explorer view.

Note: The 'Valid Workspace' icon below the Editor Workspace confirms the validity of the configuration currently displayed in the browser. This is replaced by an error message should there be a conflicting setting. The tile with which the conflict is associated will be outlined in red.

The Edit Object menu can also be displayed for a tile by double clicking on its entry in the Object Folder in the Explorer view. Audio and Alarm settings can be configured for each source by double clicking on its entry in the Source Folder in the Explorer view.

Right-click context menus provide quick access to tile object menus and commonly used functions are presented in the top tool bar for ease of use.

Note: The browser contains an initial 'factory default' layout. The number of tiles indicated will reflect the number of video sources supported by the current video input card configuration (e.g. sixteen tiles for four video input cards).

3.3.2 Navigating the User Interface

Settings for Multi-viewer objects can be accessed from the Module, Layout, Group and Object menus, or by using the buttons on the toolbar (Fig 13.).

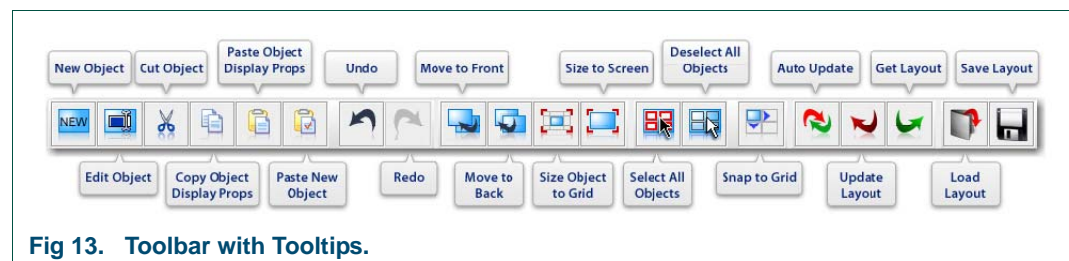


Fig 13. Toolbar with Tooltips.

Note: Some functions are only available from the toolbar.

3.3.2.1 Module Menu

The Module Menu (Fig 14.) allows a module's global settings to be configured.

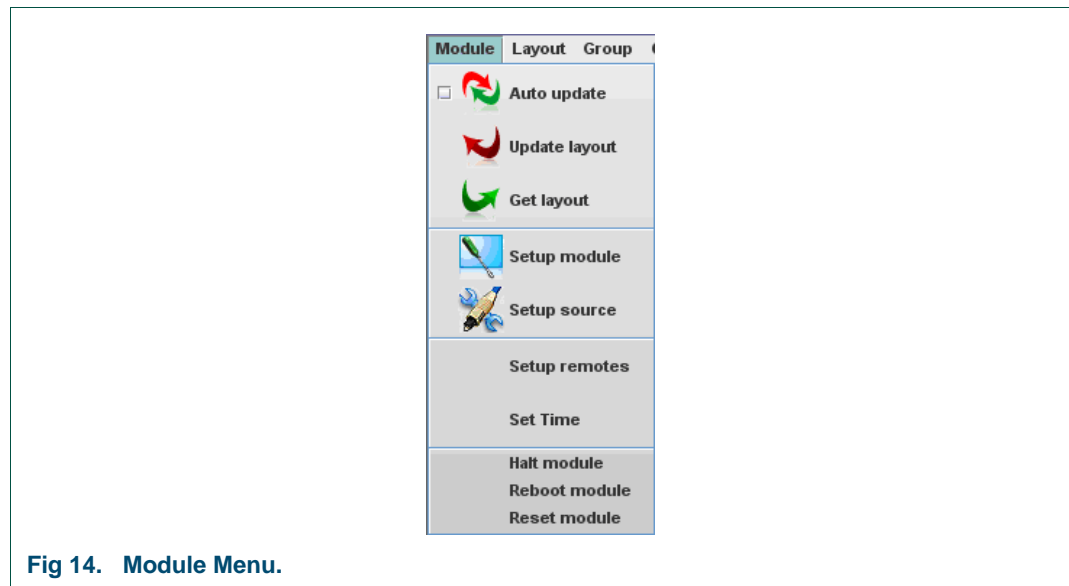


Fig 14. Module Menu.

Auto update	Automatically update tile layout to the display output and preview every time it is changed in the edit workspace.
Update Layout	Transfer edit workspace layout to display output and preview.
Get Layout	Transfer the current display layout to the edit workspace.
Setup Module	Opens the Module Properties dialog of the currently selected tile object.
Setup Source	Opens the Source Properties dialog of the currently selected tile object.
Setup Remotes	Not Used
Set Time	Opens the Set Time dialogue to adjust the clock and date settings. See section 3.6.
Halt, Reboot, Reset Module	Maintenance items for shutting down, rebooting the system, or resetting input/output cards. The task that each of these execute is: <ul style="list-style-type: none"> Halting the module guarantees that any files that have not been saved yet, such as layout ones, will get saved before powering off the frame. This stops the system from running. The only way to restart it is to power off - power on again. Rebooting the module will shut the system down and start it back up again. This can take up to 70 seconds. Resetting the module leaves the CPU running, but resets and reloads the firmware into all the input/output cards.

Table 8. Module Menu Items.

Note: The error message, Selected object has no source, will appear if the current object is not an audio or video object.

3.4 Module Properties

Module Properties are opened from the Module → Setup Module menu.

The Module Properties dialog covers parameters common to the whole MV rack such as IP address and GPIs. It also covers initial setup of the inputs and outputs of the unit.

3.4.1 Boards Tab

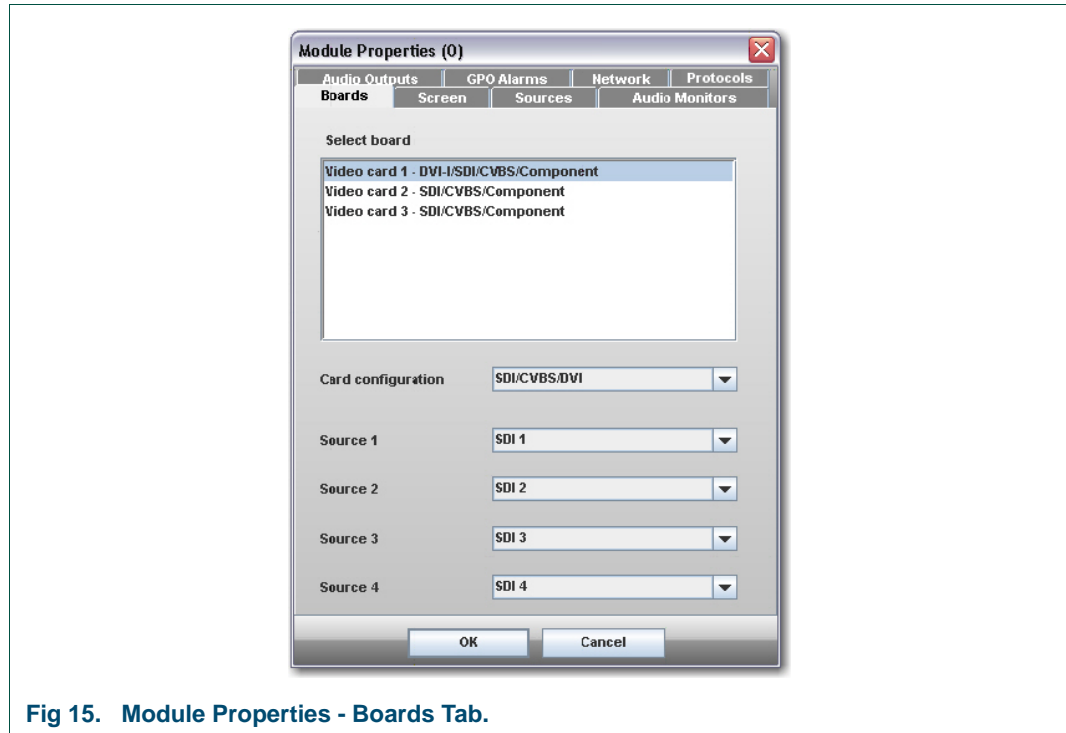


Fig 15. Module Properties - Boards Tab.

Select Board	Select a board to define sources.
Card Configuration	Show selected card configuration.
Source 1 to 4	Select source type from drop down list for each input.

Table 9. Module Properties - Boards Tab.

3.4.2 Screen Tab

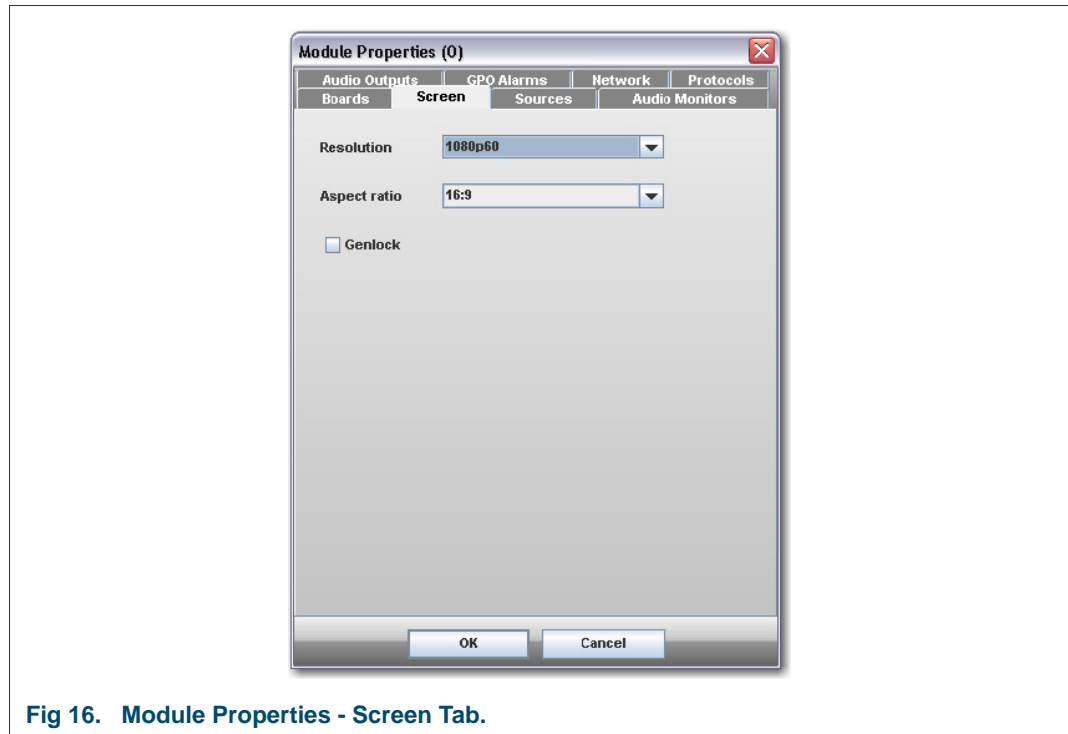


Fig 16. Module Properties - Screen Tab.

Resolution	Set the display output resolution.
Aspect Ratio	Set the display output aspect ratio to match the display device.
Genlock	Lock the display output to the MV-16 external reference.

Table 10. Module Properties - Screen Tab.

3.4.3 Sources Tab

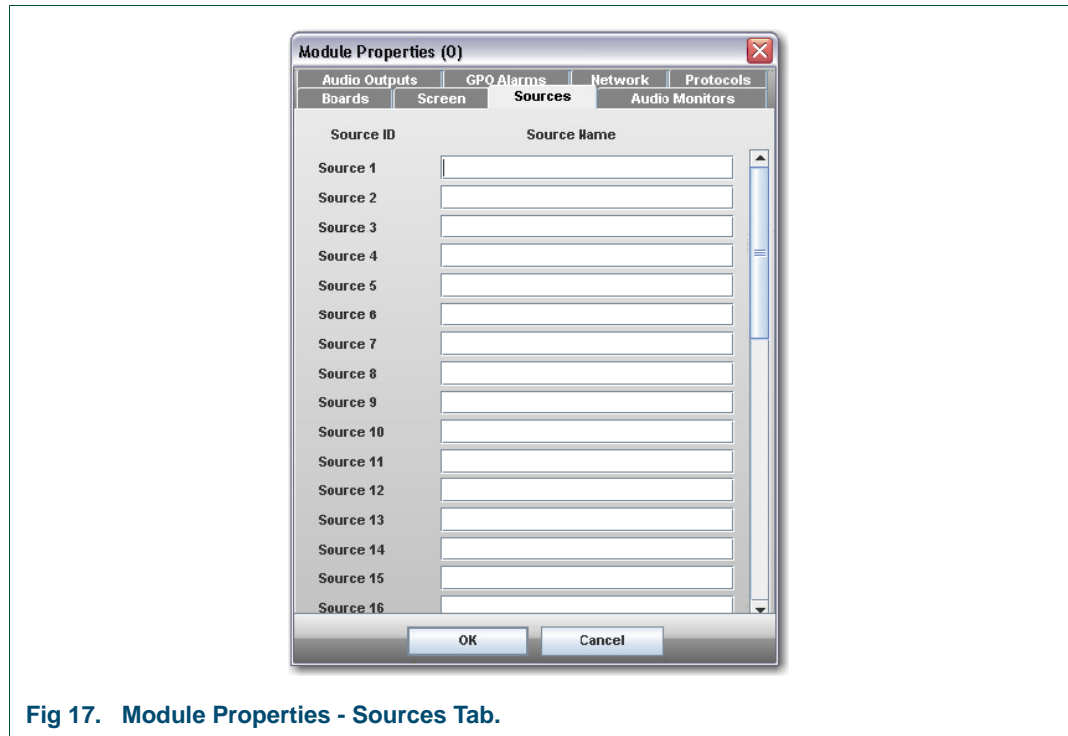


Fig 17. Module Properties - Sources Tab.

Source Name Enables the naming of each source. These are not the names that get transferred to UMDs they are simply user names to assist with identifying sources from within the Web interface.

Source names can be used to set the TSL Display Address when using the TSL protocol for controlling UMDs and Tallies. See the TSL Protocol Options on page 30 for details.

Table 11. Module Properties - Sources Tab.

3.4.4 Audio Monitor Tab

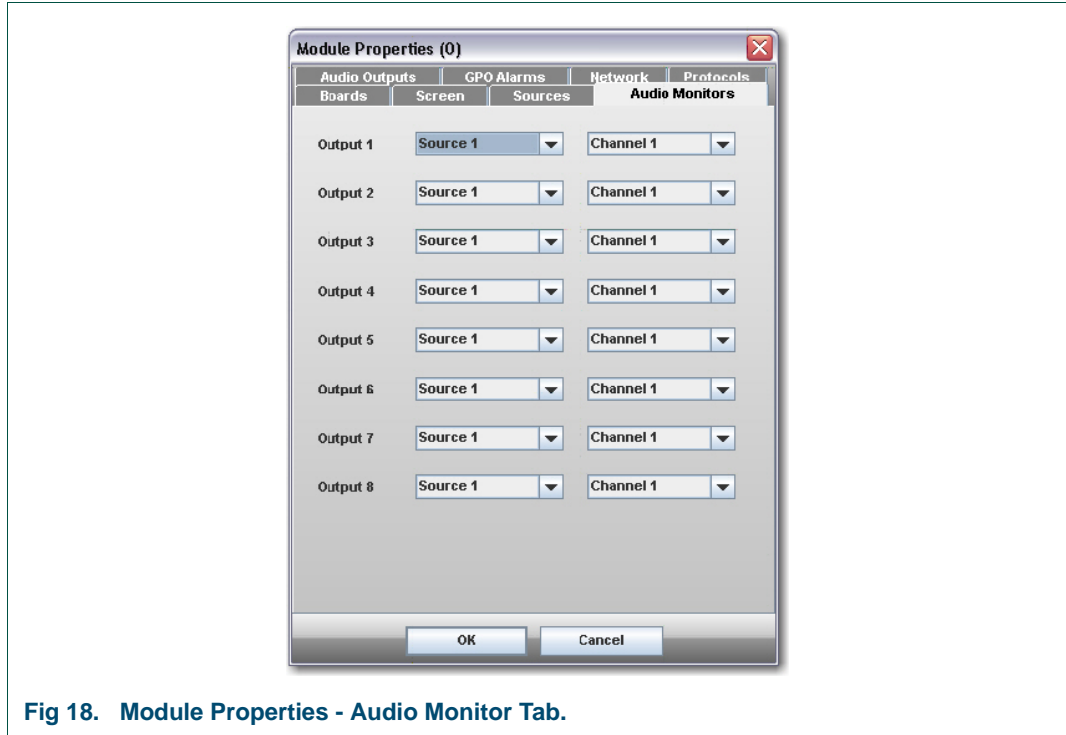


Fig 18. Module Properties - Audio Monitor Tab.

Output 1 to 8 Audio monitor output channel selection controls. Select the source and source channel number to be directed to the monitor output.

Table 12. Module Properties - Audio Monitor Tab.

3.4.5 Audio Outputs Tab

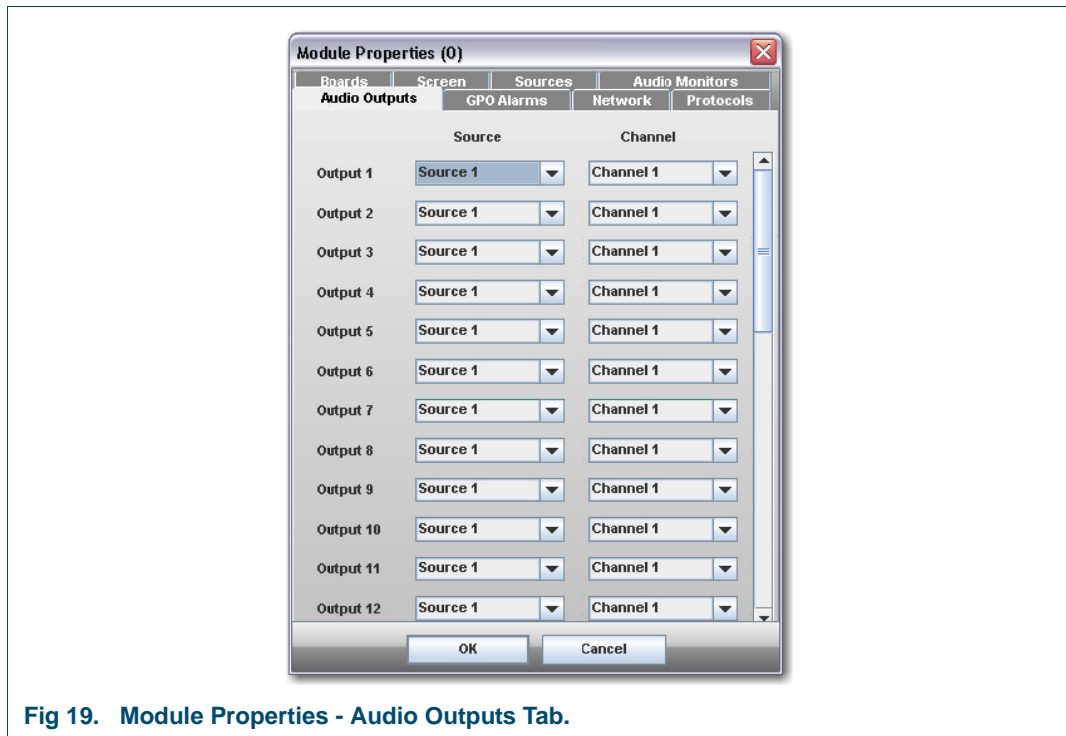


Fig 19. Module Properties - Audio Outputs Tab.

Output 1 to 32 Audio output channel selection controls. Select the source and source channel number to be directed to the output.

Table 13. Module Properties - Audio Outputs Tab.

3.4.6 GPO Alarms Tab

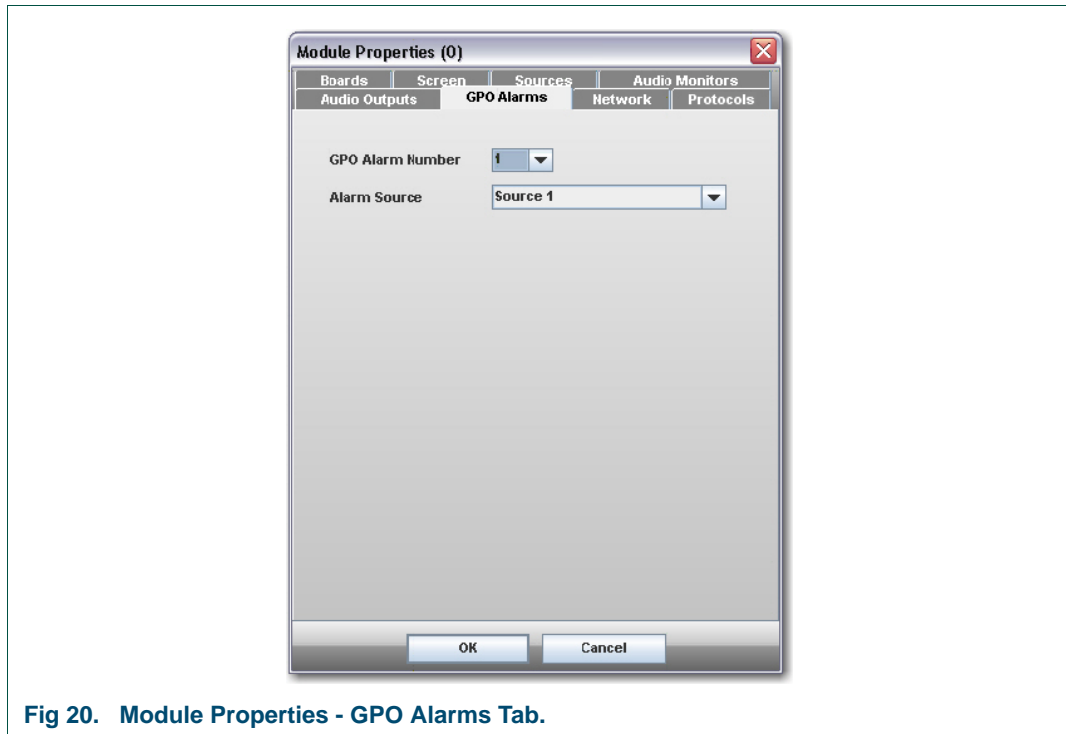


Fig 20. Module Properties - GPO Alarms Tab.

GPO Alarm Number Select GPO alarm output number 1 to 8.

Alarm Source Assign alarm source to the selected GPO alarm output number.

Table 14. Module Properties - GPO Alarms Tab.

3.4.7 Network tab

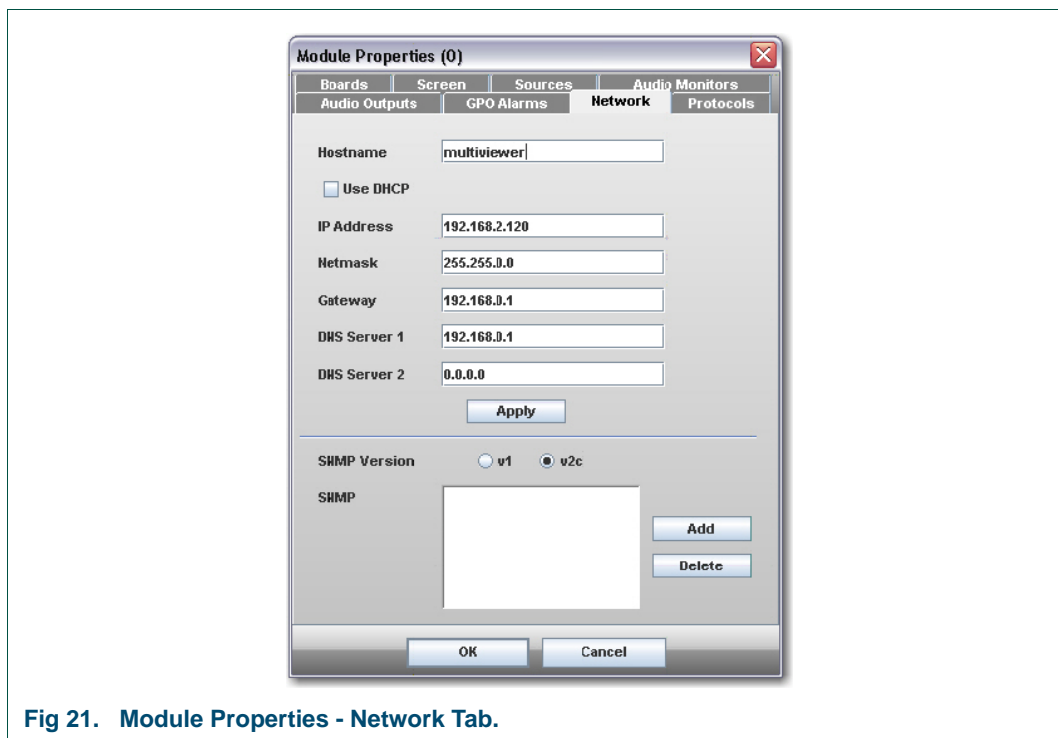


Fig 21. Module Properties - Network Tab.

Hostname	Enter friendly name for MV-16.
Use DHCP	Check to use DHCP for automatic acquisition of network settings. Uncheck for entry of fixed network settings.
IP Address	Enter fixed IP address, if required.
Netmask	Enter network mask, if required.
Gateway	Enter gateway address, if required.
DNS Server 1	Enter DNS server address, if required.
DNS Server 2	Enter DNS server address, if required.
Apply	Applies fixed network settings to the frame.
SNMP	
SNMP	Check required SNMP version.
Add	Reveals dialogue for entering SNMP IP address and adding to list.
Delete	Deletes selected SNMP IP address from the list.

Table 15. Module Properties - Network Tab.

3.4.8 Protocols - Serial Ports Tab

This shows the serial ports that are available and the current settings applied to the ports. To change these settings press the Configure button.

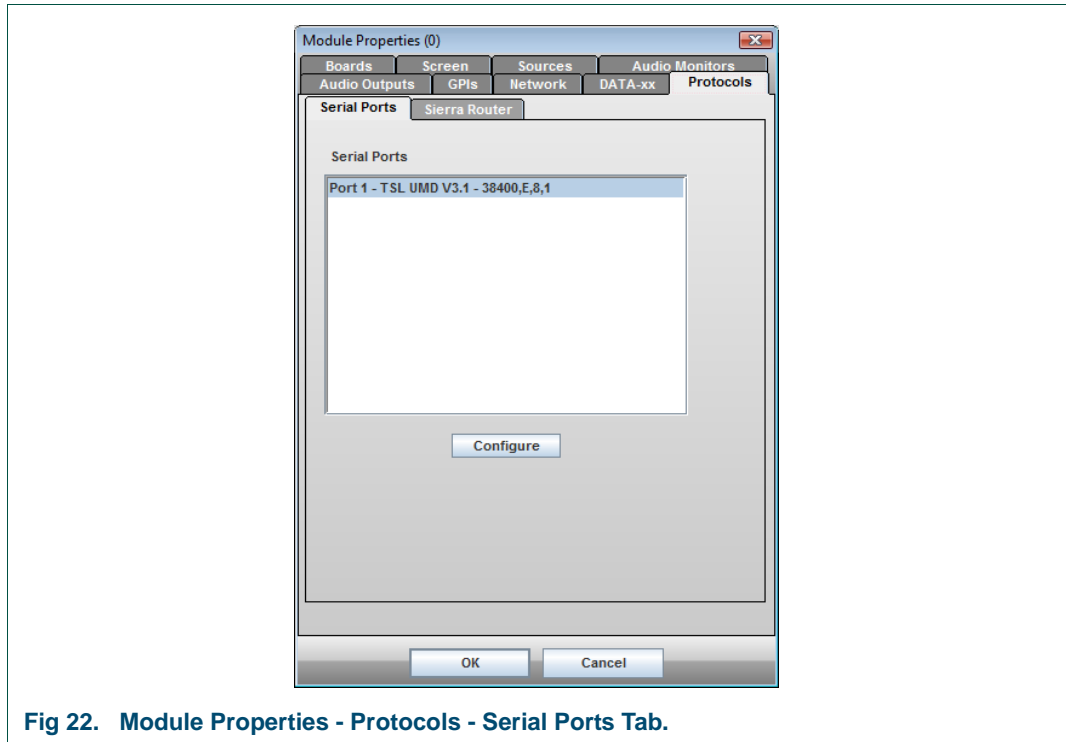
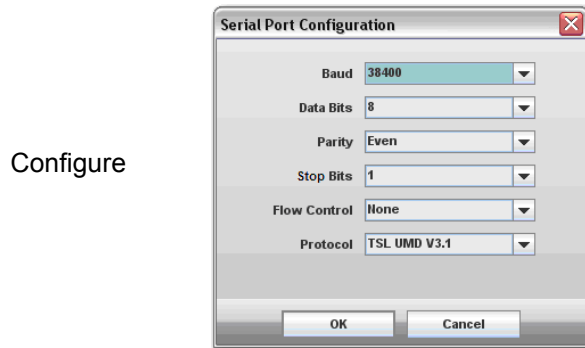


Fig 22. Module Properties - Protocols - Serial Ports Tab.

The Configure button is used to edit the serial port settings.



Configure

Fig 23. Serial Port Configuration.

Baud	Enter baud Rate here, if required
Data Bits	Enter Data Bits here, if required
Parity	Enter Parity here, if required
Stop Bits	Enter Stop Bits here, if required
Flow Control	Select the Flow Control, if required
Protocol	For other protocols, determine what the serial port settings are for the device attached, and set them accordingly here.

For details of the TSL Protocol Options available see section 3.4.8.1.

Table 16. Serial Port Configuration.

The settings specified for the TSL protocol are shown in the screen shot in Table 16. These can be changed if non-standard settings are being used by the TSL control unit.

For other protocols the serial port settings can be set as required for the attached device.

3.4.8.1 TSL Protocol Options

The TSL protocol options for TSL UMDs provide a number of ways of configuring the TSL display address (see Table 17.).

TSL Protocol Option	TSL Protocol Option Description
TSL UMD address 0	Assigns display address 0 to source 1 (video input 1), display address 1 to source 2 (video input 2), etc.
TSL UMD address 16	Assigns display address 16 to source 1 (video input 1), display address 17 to source 2 (video input 2), etc.
TSL UMD address 32	Assigns display address 32 to source 1 (video input 1), display address 33 to source 2 (video input 2), etc.
TSL UMD address 48	Assigns display address 48 to source 1 (video input 1), display address 49 to source 2 (video input 2), etc.
TSL UMD address 64	Assigns display address 64 to source 1 (video input 1), display address 65 to source 2 (video input 2), etc.
TSL UMD address 80	Assigns display address 80 to source 1 (video input 1), display address 81 to source 2 (video input 2), etc.
TSL UMD address 96	Assigns display address 96 to source 1 (video input 1), display address 97 to source 2 (video input 2), etc.
TSL UMD address 112	Assigns display address 112 to source 1 (video input 1), display address 113 to source 2 (video input 2), etc.
TSL UMD in source name	<p>Assigns each TSL display address based on the name of the source set in the Sources tab (see section 3.4.3).</p> <p>The source name must contain either “UMD” or “umd” followed by a number indicating the display address.</p> <p>Syntax Examples</p> <p>For example to assign a source to TSL display address 14 any of the following will work:</p> <ul style="list-style-type: none"> • Source 2 UMD14 • Source 2 umd14 • umd14 • UMD14 <p>A source without UMD or umd followed by a number in its name will not respond to any TSL display address.</p>

Table 17. TSL Protocol Options

3.5 Source Properties

Source Properties for a selected tile can be opened from the Module → Setup Source menu, or by double-clicking on a selected source in the source folder.

3.5.1 Audio Tab

Use the Audio Tab to assign audio channels to sources, make global settings for phase bars and select reference levels for analogue audio and analogue scales.

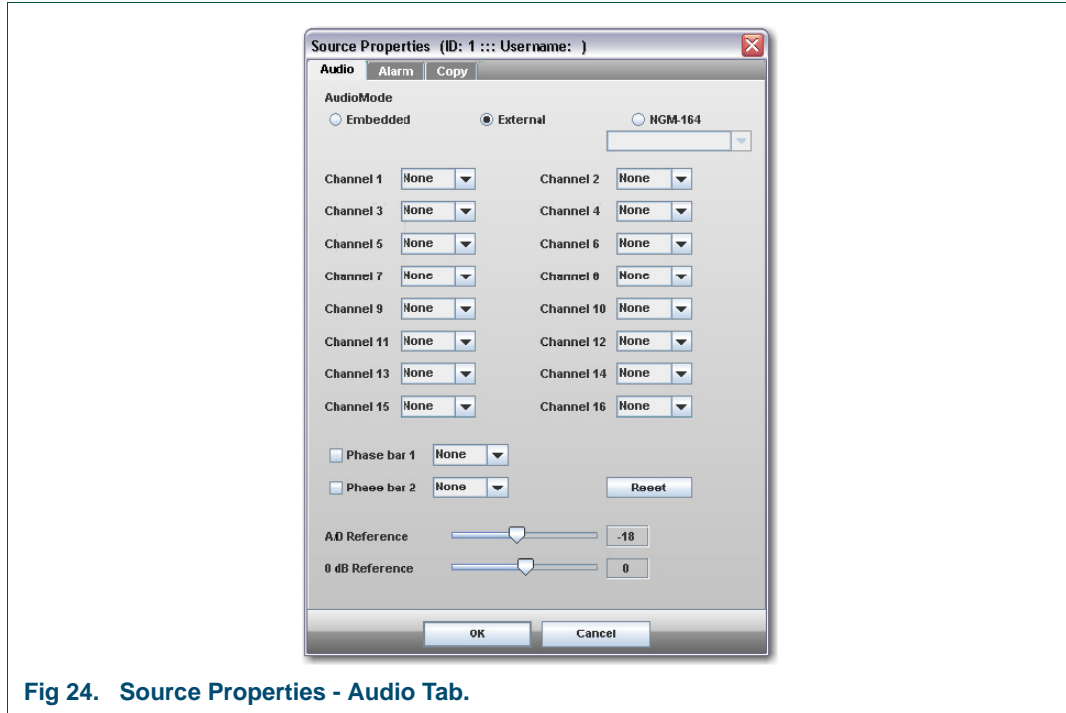


Fig 24. Source Properties - Audio Tab.

Audio Mode	Selects the audio source; Embedded (from SDI video), External (from optional external audio input card), or NGM-164 (audio over LAN). A list of available servers appears in the drop-down box below.
Channel 1 to 16 Controls	Select an audio input to display for the associated source bar.
Phase Bar 1 and 2	Enable either or both phase bars and select two channels from the appropriate drop down box.
Reset Button	Press this button to reset all items in Channel/Phase bar drop-down lists to the first available item (which will be "None" in the list given by the protocol).
A/D Reference	Set the analogue to digital reference level when applying an analogue meter scale to a digital source, or a digital meter scale to an analogue source. It can be set within the range of -30 to -3dBfs.
0 dB Reference	Set the 0dBu reference level with respect to analogue meter scales. It can be set within the range of -12 to +12dB.

Table 18. Source Properties - Audio Tab.

Note: Neither the A/D nor the 0dB reference adjustments have any effect when digital audio is used with a digital scale.

3.5.2 Alarm Tab

The Alarm Tab allows each video and audio alarm to be configured, enabled and displayed.

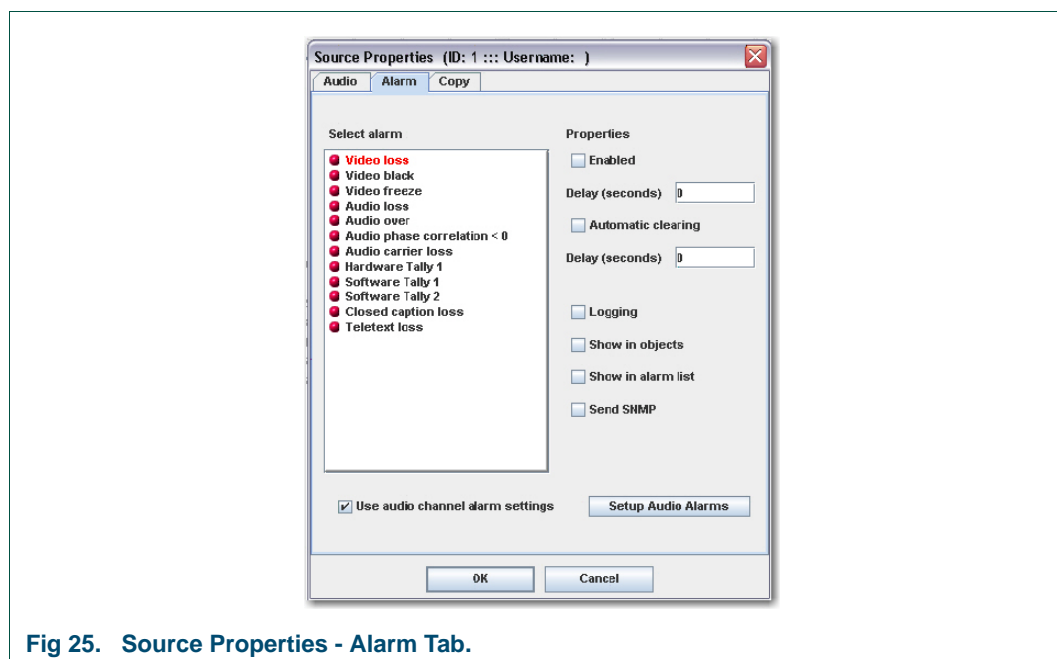


Fig 25. Source Properties - Alarm Tab.

Select Alarm	Click on one of the alarms listed to change the attributes of it using the controls listed under Properties.
Enabled	Tick this to enable the selected alarm.
Delay	Input a delay before the alarm starts.
Automatic Clearing	Check this for alarms to be automatically cleared after the Automatic clearing delay.
Automatic Clearing Delay	Input the automatic clearing delay in seconds.
Logging	Maintain a log of triggered alarms.
Show in Objects	Display alarms in objects.
Show in Alarm List	Display alarms in the alarm list.
Send SNMP	Check to send SNMP trap in response to alarm.
Use Audio Channel Alarm Settings	Check to apply specified audio alarm detection criteria, as configured in the Setup Audio Alarms menu.
Setup Audio Alarms	Enters the audio alarm setup dialogue.

Table 19. Source Properties - Alarm Tab.

The properties section of this window allows each alarm to be set individually for onset and auto-clear delay, logging status and visibility in objects and lists.

To select an alarm to configure, click on it in the Select Alarm list on the left on the window. The selected alarm will appear with its descriptive text highlighted in red. Choose the required properties from the right hand section of the window and check the Enabled box to activate the alarm.

An enabled alarm is shown with a green circle before the descriptive text.

Note: To setup audio alarms check the Use audio channel alarm settings box and click on Setup Audio Alarms.

3.5.3 Audio Alarms

To setup audio alarms check the Use audio channel alarm settings box and click on Setup Audio Alarms from the Alarm tab of the Source Properties dialog.

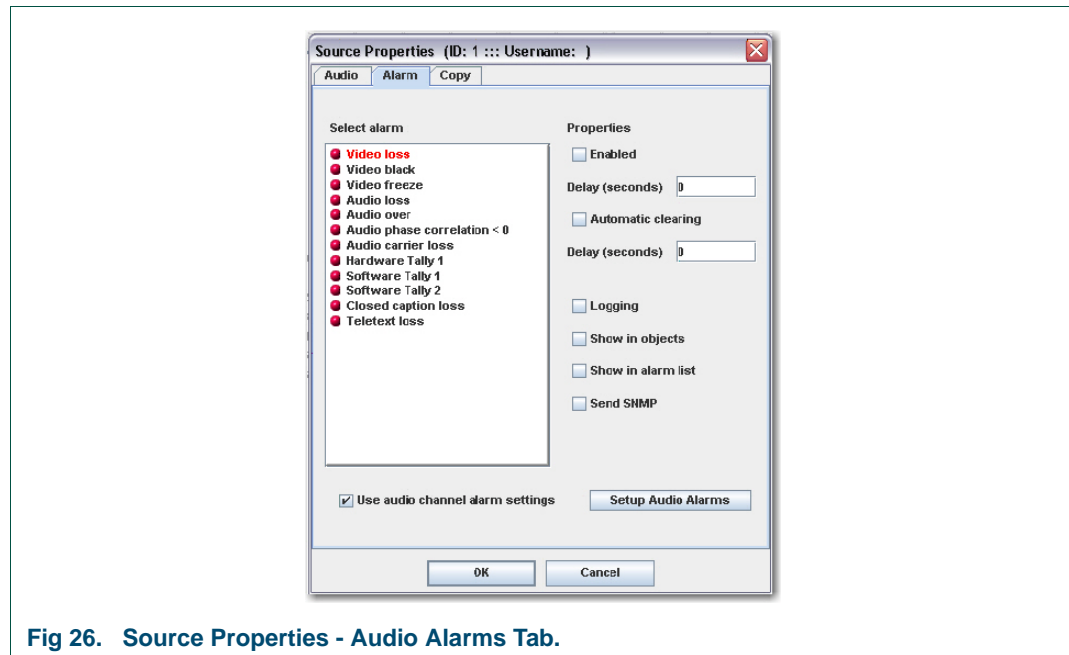


Fig 26. Source Properties - Audio Alarms Tab.

Check the boxes to activate individual audio alarms for channels or pairs of channels.

Select the loss and over thresholds for analog and digital sources. Choose an anti-phase threshold for channel pairs.

Select All to enable a specific alarm for all channels.

Unchecked alarms remain disabled even if Use Audio Channel Alarm Settings is checked in the Alarm tab. Nominal threshold settings apply if individual alarms are enabled but Use Audio Channel Alarm Settings is not checked.

Enable Alarms	To enable an individual audio loss or over alarm check the box in line with the audio channel. For phase or carrier loss alarms check the box in line with a pair of audio channels.
Audio Loss Threshold	The level at which audio is considered lost - select values from the analog and digital drop down boxes: The range is 0dB to -50dB for analog and -18dBfs to -70dBfs for digital.
Audio Over Threshold	The level at which audio is considered over level - select values from the analog and digital drop down boxes. The range is 0dB to 20dB for analog and 0dBfs to -20dBfs for digital.
Antiphase Threshold	The phase values in degrees before a pair of channels is considered to be out of phase. The range is 90° to -180°.

Table 20. Source Properties - Audio Alarms Tab.

Note: The effective Alarm State for individual alarms depends on the Use audio channel alarm settings box check state and the applicable audio alarm state in the Alarm tab as explained below.

If Use Audio Channel Alarm Settings is not ticked and audio loss alarm is enabled in the Alarm tab of the Source Properties dialog, then all the channels will have their audio loss alarms enabled with a nominal threshold set for the audio loss level.

If Use Audio Channel Alarm Settings is ticked and audio loss alarm is enabled in the Alarm tab of the Source Properties dialog, then the enabled state of each channel will depend on the settings in this Audio Alarms dialog, and the threshold set for the audio loss level will also be determined here.

If Use Audio Channel Alarm Settings is ticked but the audio loss alarm is disabled, then none of the audio loss alarms will be enabled.

The following table summarizes the various alarm status conditions.

Individual Alarm	Use Audio Channel Alarm Settings	Alarm State
Enabled	Enabled	Enabled and uses user threshold settings.
Enabled	Disabled	Enabled but uses nominal threshold settings.
Disabled	Enabled	Disabled
Disabled	Disabled	Disabled

Table 21. Audio Alarm Status Conditions.

3.5.4 Copy Tab

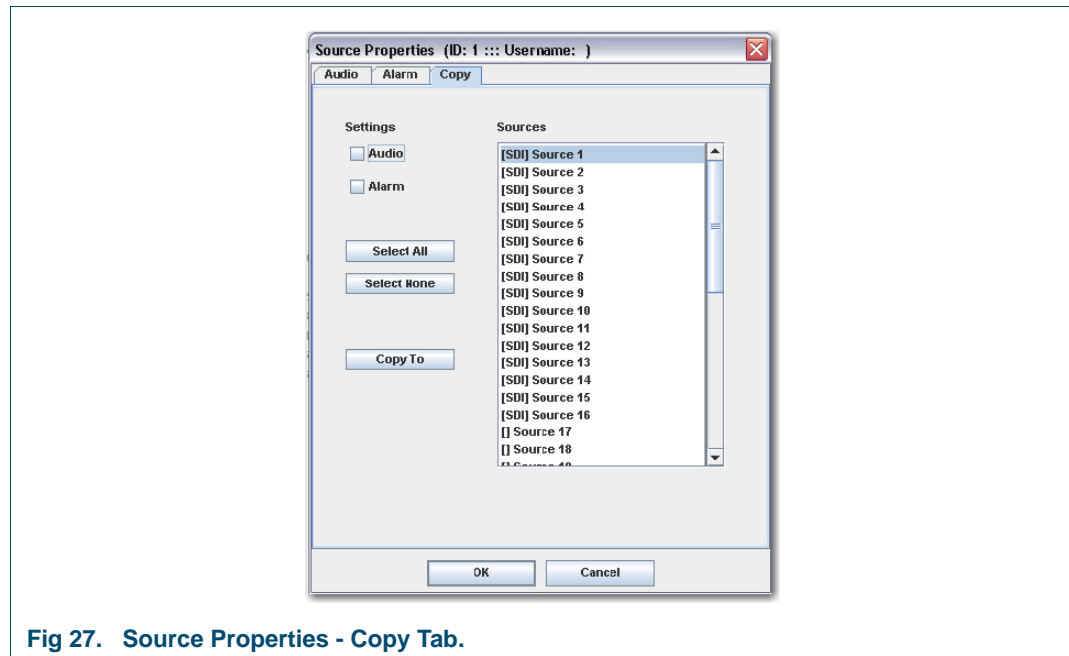


Fig 27. Source Properties - Copy Tab.

Audio	Check to copy audio settings from selected source/s 1 to 40.
Alarm	Check to copy alarm settings from selected source/s 1 to 40.
Select All	Select all sources.
Select None	Deselect currently selected sources.
Copy To	Copy settings to selected source/s.

Table 22. Source Properties - Copy Tab.

3.6 Set Time

Clock/date display data can be derived from several sources; the system clock, NTP synchronisation, LTC, or VITC from a chosen SDI input. The clock source is set by going to the Set Time item in the Module menu. Here there are two tabs, Timezone and Time. The timezone should be set to the appropriate region before adjusting the clock.



Fig 28. Set Time.

To set the clock source, go to the Time tab and select the desired source - Manual, NTP, LTC or VITC. The setup procedures for each mode are:

Manual	In this mode the time and date of the system clock will be shown and can be adjusted. Press the Get button to show the current time. To adjust the time enter the new time and date in the appropriate fields and then press the Set button. A battery on the CPU board ensures that time data is retained should the unit be powered down.
NTP	In this mode the time is sourced from an NTP server (or multiple NTP servers can be entered). Press the Add button to add a new server, and enter the host name or IP address of the new server.
LTC	In this mode the time is sourced from the LTC input on the rear of the frame. There is nothing to setup here; there just needs to be LTC present for this to work properly. If no LTC is present then the system clock will be used. (If LTC is present but later disappears then the clock will continue advancing without any discontinuity).
VITC	Here the time can come from VITC that is present on any SDI input. Select the chosen SDI source number that contains VITC. If no VITC is present then the system clock will be used. (If VITC is present but later disappears then the clock will continue advancing without any discontinuity).

Table 23. Set Time

3.7 Layout Menu

The layout menu allows layouts to be created, saved, deleted and for layout settings to be chosen for new layouts.

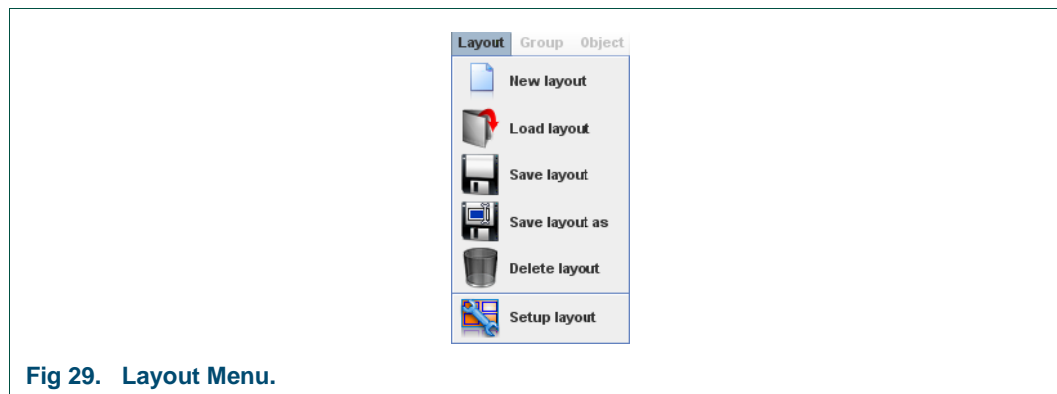


Fig 29. Layout Menu.

New Layout	Offers to save the current layout before removing all objects from the editor workspace ready to create a new layout.
Load Layout	Loads a previously saved layout.
Save Layout	Saves current layout. A name must be given if this is the first time the layout has been saved.
Save Layout As	Saves current layout with a different name.
Delete Layout	Delete a selected layout from the saved list.
Setup Layout	Opens the Layout Properties window Figure 3 19. Choose background type from transparent, color or bitmap. Also choose new layout style from center, Tile or Scale.

Table 24. Layout Menu.

3.7.1 Layout Properties

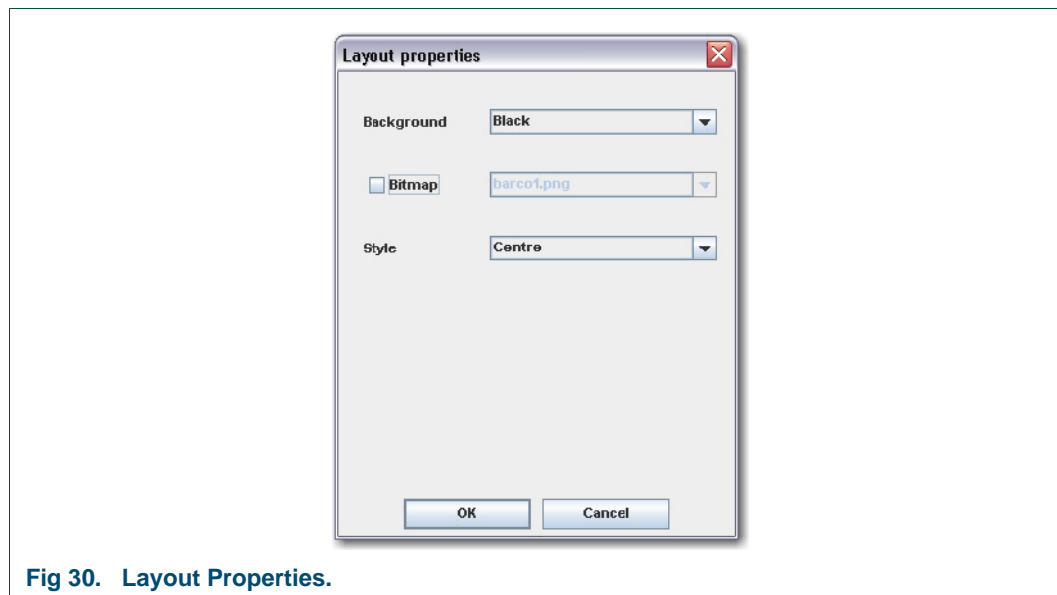


Fig 30. Layout Properties.

Background	Set the display background color.
Bitmap	Apply selected bitmap to the background.
Style	Select bitmap style: center (centers bitmap); Tile (display bitmap in multiple tiles); or Scale (scales bitmap to fit the display background)

Table 25. Layout Properties.

3.8 Group Menu

The group menu allows object to be selected as a group.

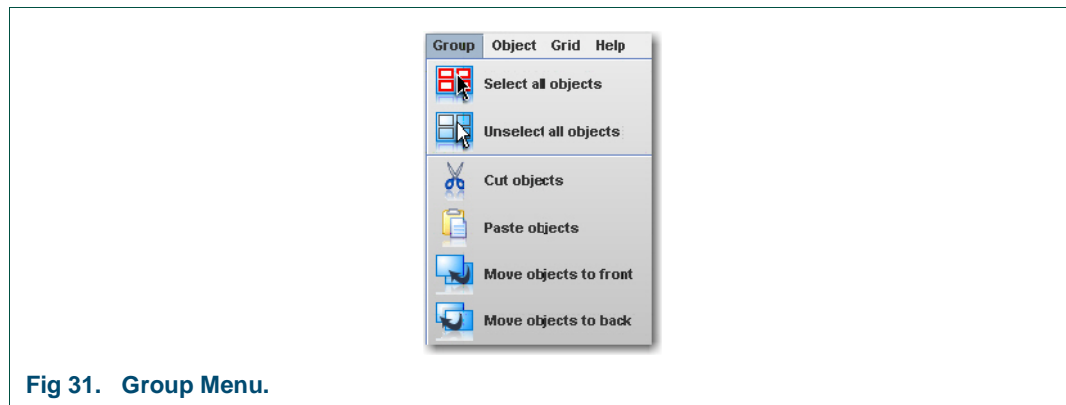


Fig 31. Group Menu.

Select All Objects	All objects in the layout will be selected and can be operated on as a group.
Un select All Objects	Cancels group all objects command.
Cut Objects	Deletes all the tile objects in the group.
Paste Objects	Pastes the object that is on the clipboard to all objects in the group.
Move Objects to Front/Back	Moves all tile objects in the group to the front/back.

Table 26. Group Menu.

Note: Objects can be selected individually to create a group by holding the Ctrl key down before clicking on them.

3.9 Objects Menu

The settings for the tiles can be manipulated from the object menu. This is accessed either via the main menu, or by a right-click on the tile to be edited.

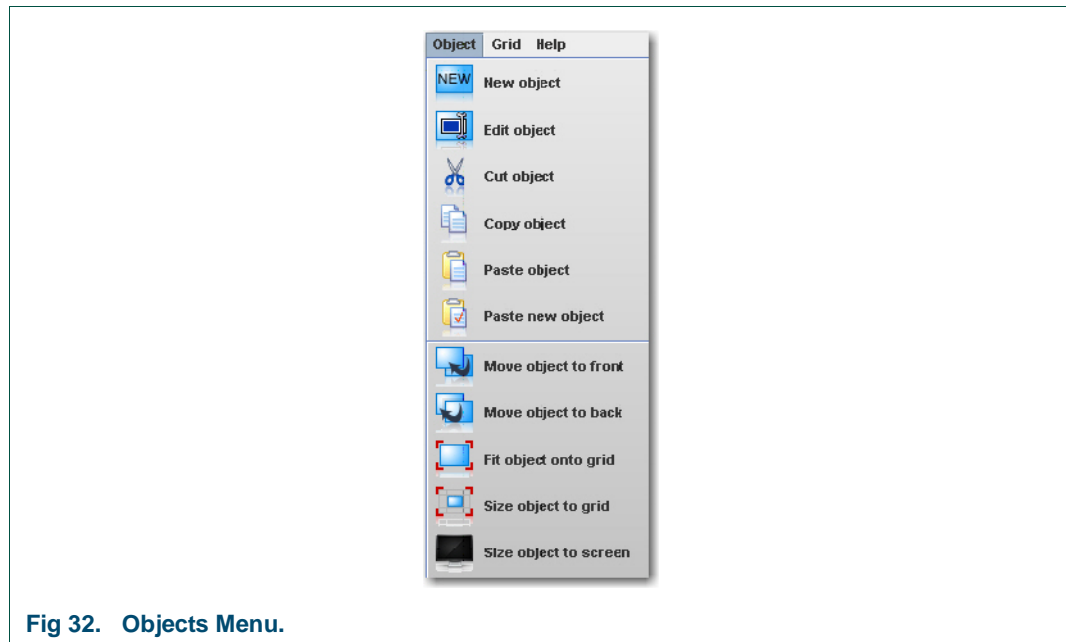


Fig 32. Objects Menu.

New Object	Creates a new object and open the Edit Object Dialog described in the Edit Object Dialog section.
Edit Object	Open the Edit Object Dialog for the tile object that is currently selected.
Cut Object	Delete the currently selected tile object.
Copy Object	Copy the display properties of the currently selected tile object (excludes source properties).
Paste Object	Paste the copied the display properties of the currently selected tile object.
Paste New Object	Create a new object and paste to it any previously copied display properties.
Move Object to Front	Send the currently selected tile object in front of all other objects.
Move Object to Back	Send the currently selected tile object behind all other objects.
Fit Object on to Grid	Expands all edges of the currently selected tile object to the nearest grid.
Size Object to Grid	Sets the size of the currently selected tile object to the chosen grid pitch.
Size Object to Screen	Set the selected tile object to full-screen size.

Table 27. Objects Menu.

3.10 Grid Menu

The grid menu enables the Editor Workspace to be defined by a grid for ease of aligning tiles in a regular arrangement. The Size Object to Grid function in the main toolbar works in conjunction with this feature and automatically sizes the currently selected tile to the cell size of the grid that has been set.

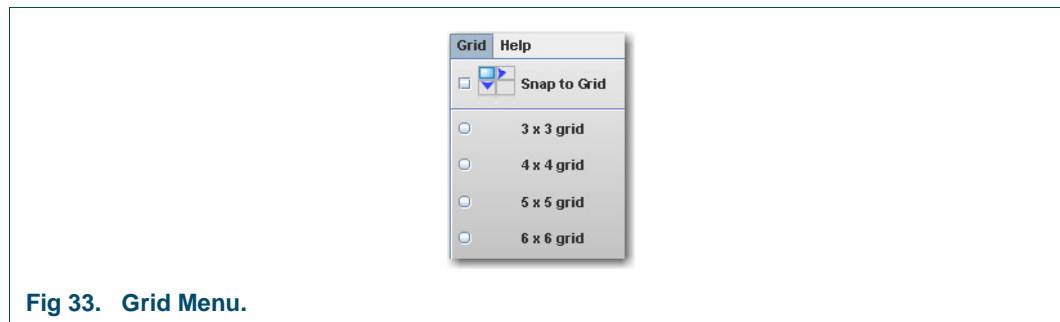


Fig 33. Grid Menu.

Snap to Grid	Check to enable tiles to be snapped to the nearest grid position when repositioning. The tip left corner of the tile is anchored to the top left corner of the grid position.
3x3 Grid	Check to define a 3x3 grid.
4x4 Grid	Check to define a 4x4 grid.
5x5 Grid	Check to define a 5x5 grid.
6x6 Grid	Check to define a 6x6 grid.

Table 28. Grid Menu.

3.11 Help Menu

3.11.1 About

This menu provides current status information on the Browser, CPU and scaler firmware versions.

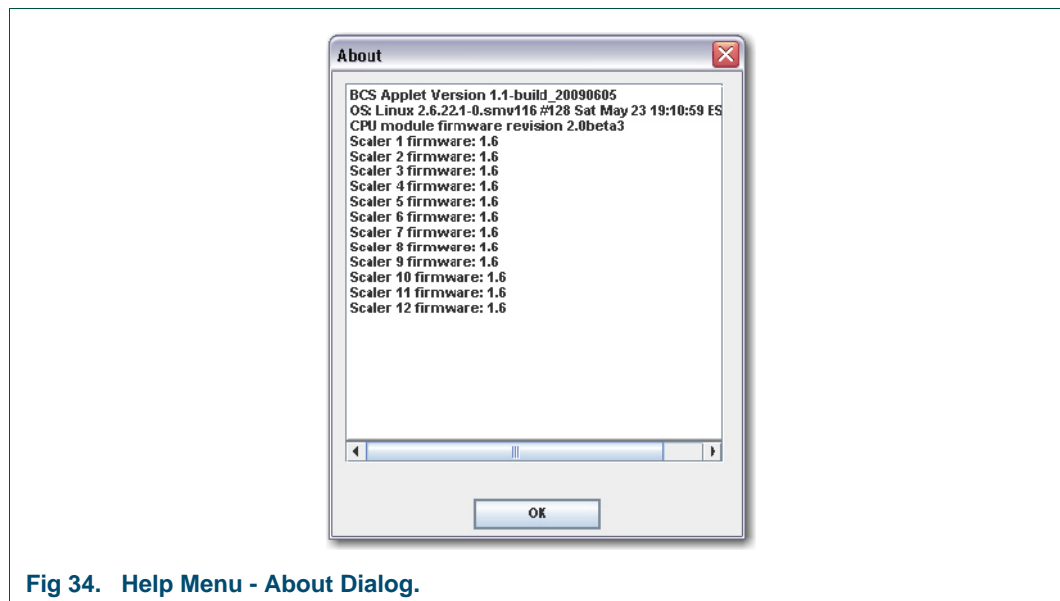


Fig 34. Help Menu - About Dialog.

3.12 Edit Object Window

The Edit Object menu is used to set up all the attributes of a tile. It can be opened using two methods:

1. Double-click on the object to edit or
2. Go to the Object menu and select Edit Object or New Object.

The Edit Object menu comprises four tabs:

- Type
- Border
- Properties
- UMD

Some controls, such as Properties, depend on the type of tile object.

3.12.1 Type Tab

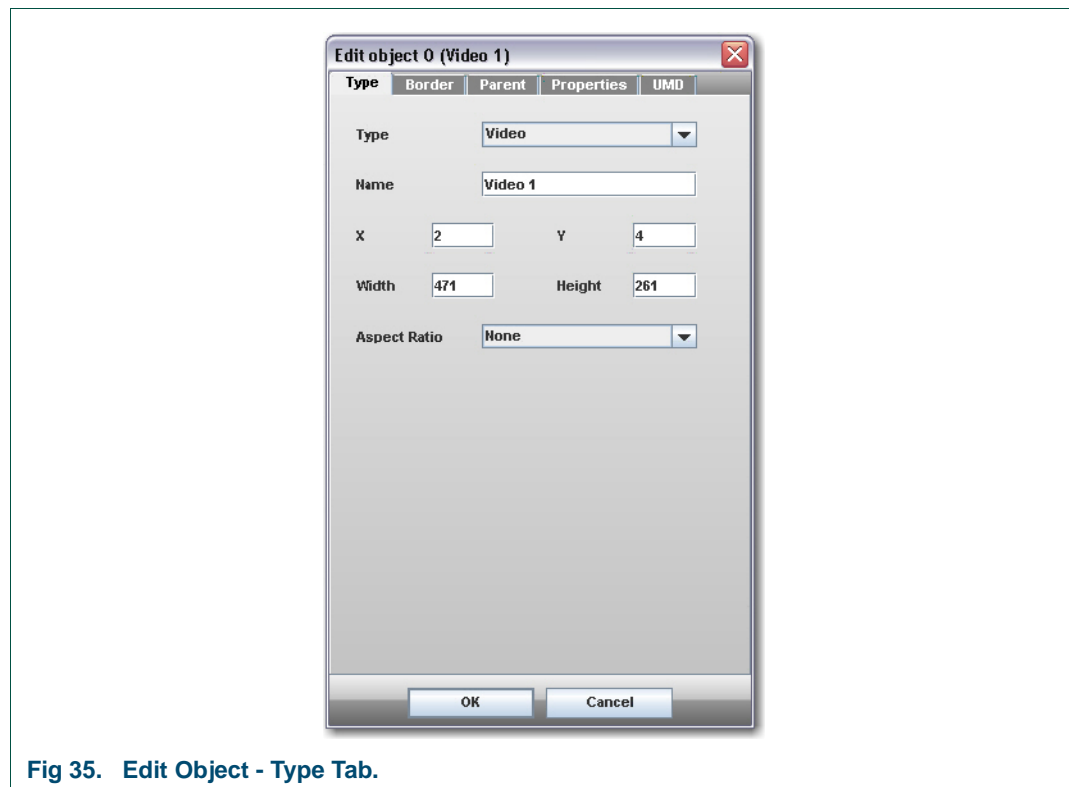


Fig 35. Edit Object - Type Tab.

Type	Defines object type. Choose from None, Video, Audio, Text, Logo, and Clock.
Name	Name of the tile, can be up to 40 characters long.
X, Y Width, Height	The size and position of the tile can be altered by entering figures here, and any adjustments will be reflected in the outline of the rectangles drawn to represent the tiles. Conversely, any resizing or repositioning of the tiles done graphically will be reflected in the figures presented here.
Aspect Ratio	The aspect ratio can be set to fixed so that as either width or height are changed, height or width, respectively, will be automatically adjusted to retain the ratio.

Table 29. Edit Object - Type Tab.

3.12.2 Border tab

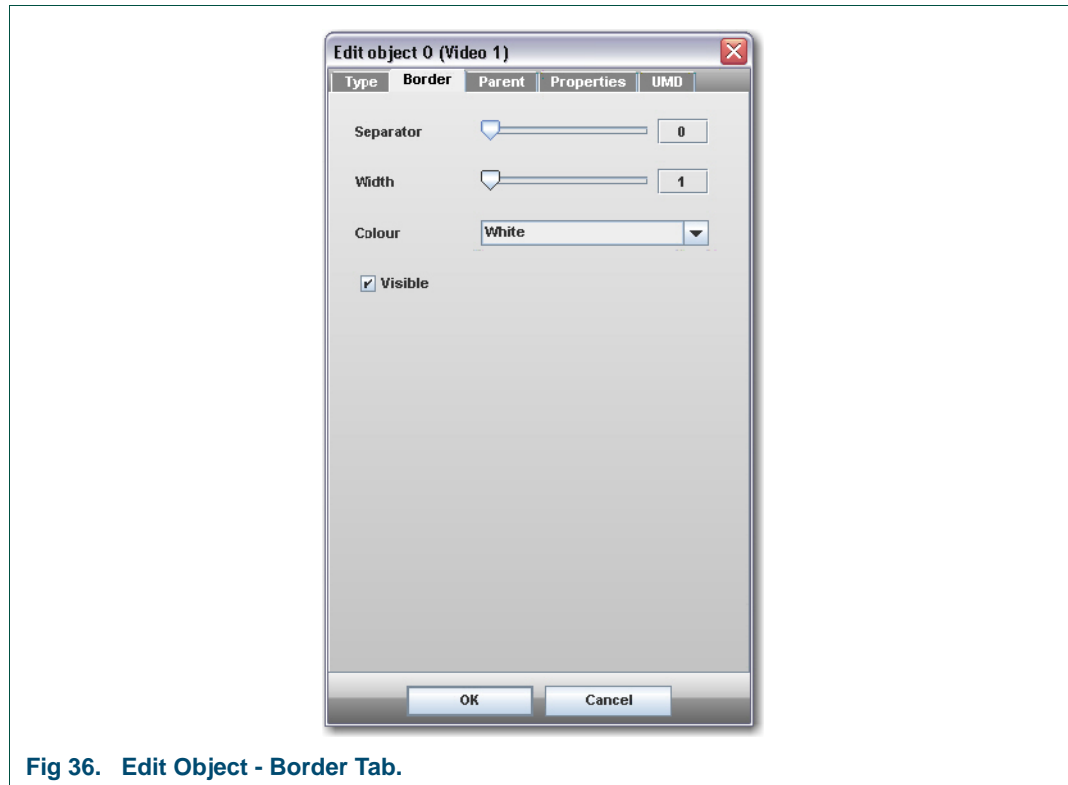


Fig 36. Edit Object - Border Tab.

Separator	Number of pixels separating the edge of the video content from the tile border.
Width	Pixel width of the border.
Colour	Color of the border.
Visible	Turns the border on and off.

Table 30. Edit Object - Border Tab.

3.12.3 Parent Tab

Assigning a parent object to one or more tiles enables collective positioning and resizing of grouped tiles, which eases the configuration of objects that have a fixed association.

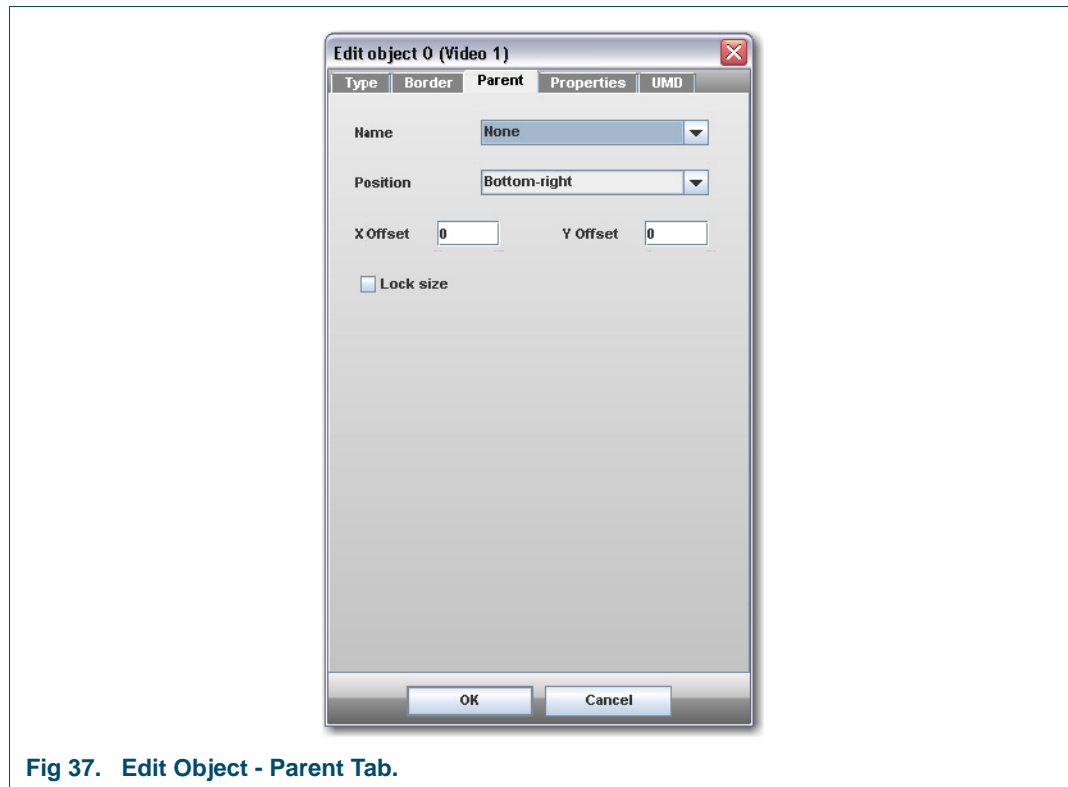


Fig 37. Edit Object - Parent Tab.

Name	For the currently selected tile, select the parent object
Position	Set the anchor point of the currently selected tile relative to the parent object.
X Offset/Y Offset	Offset of the anchor point of the currently selected tile relative to the parent object.
Lock Size	Check to lock the scaling of the currently selected tile to that of the parent object.

Table 31. Edit Object - Parent Tab.

3.12.4 UMD Tab

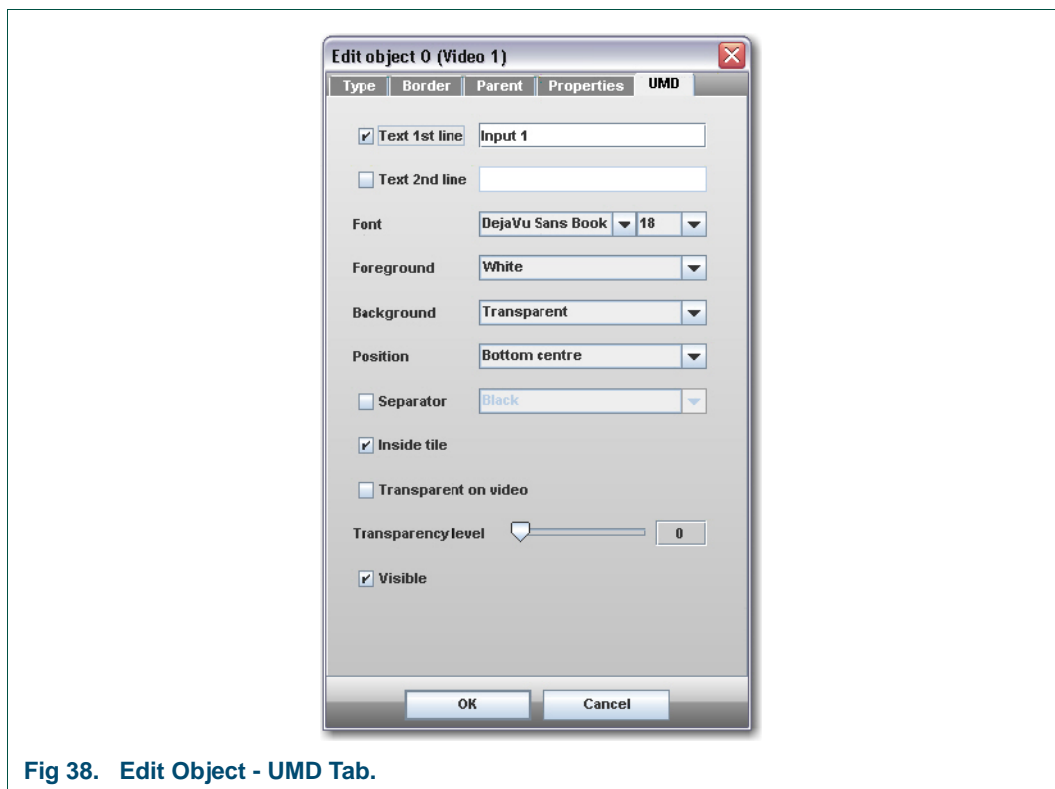


Fig 38. Edit Object - UMD Tab.

Text	Enter UMD text and set it to hidden or visible.
Font	Choose font and font-size of the text.
Foreground	Sets the color of the text.
Background	Sets the color of the UMD background.
Position	Position of UMD relative to the tile.
Separator	Places a separator between the UMD and the object's image and also between each line of text. The color of the separator can be chosen.
Inside	Places the UMD bar inside the tile (within the active picture).
Transparent on Video	Enables the transparency of the UMD when it is in the picture area.
Transparency Level	Sets the transparency of the UMD when it is in the picture area.
Visible	Enables/disables the UMD.

Table 32. Edit Object - UMD Tab.

3.12.5 Properties Tab

This tab will not be displayed if the Object Type is set to None under the Type tab.

For each of the other Object Type selections, a specific set of controls will appear on the Properties tab. The Object Type tabs available under Properties are:

- Source
- Audio
- Error
- Tally
- VBI
- WSS

3.12.5.1 Source Tab (Video or Audio Object)

This tab only exists within the Properties tab of Video and Audio type tiles.

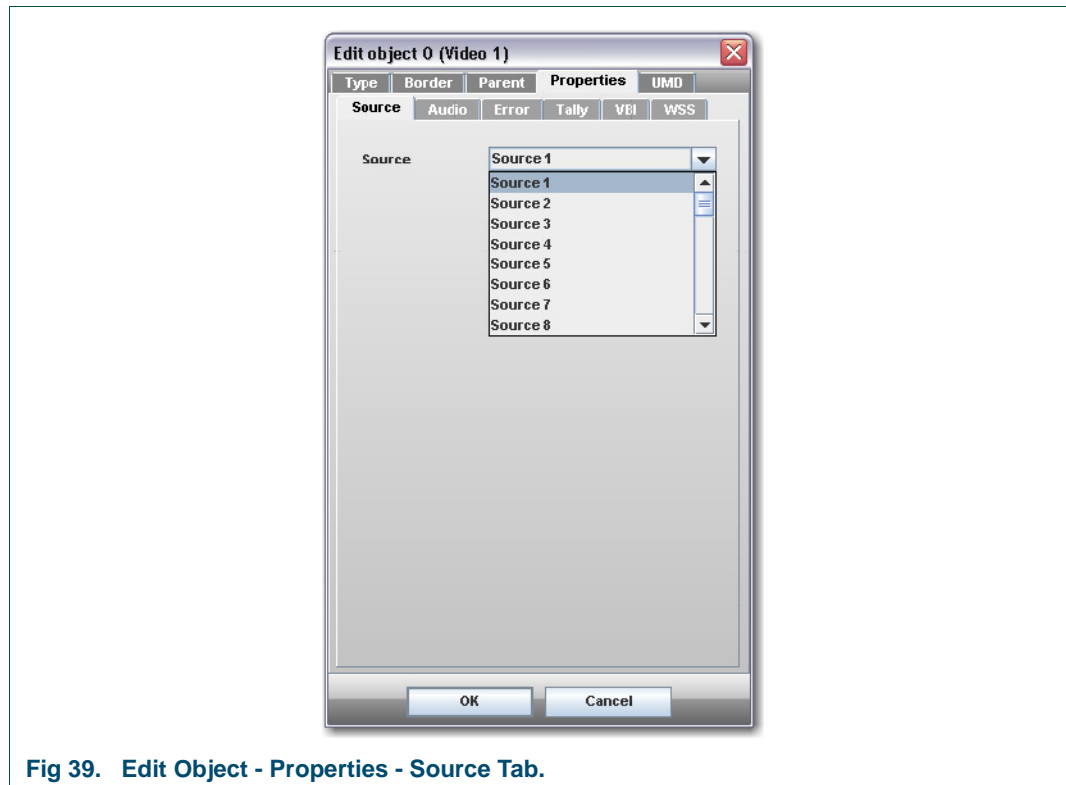


Fig 39. Edit Object - Properties - Source Tab.

Source	For a video tile, this selects the source of the video to display in the tile. For an audio tile, it selects the audio channels that have been set up to be associated with the chosen source.
--------	--

Table 33. Edit Object - Properties - Source Tab.

3.12.5.2 Audio Tab (Video or Audio Object)

This tab is only available within the Properties tab of Video and Audio type tiles.

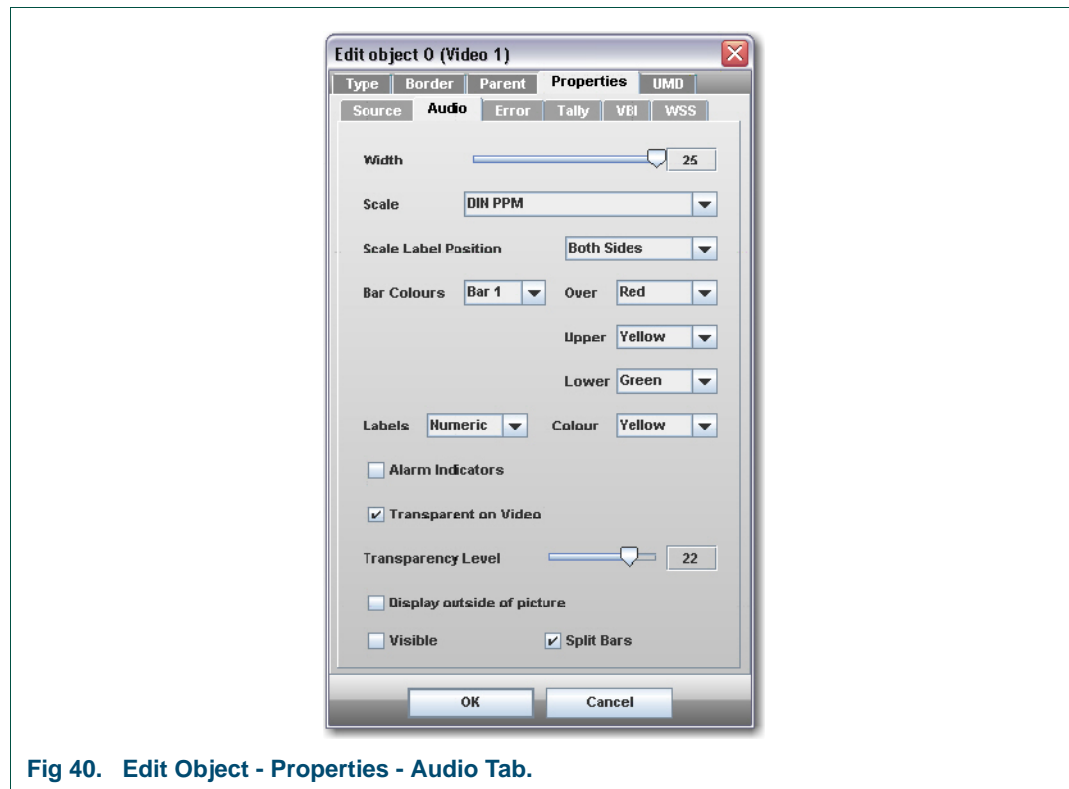


Fig 40. Edit Object - Properties - Audio Tab.

Width	Sets the width of the audio meter bars.
Scale	Sets the scale type of all the audio meter bars on display in this tile.
Scale Label position	Sets the positioning of the scale labeling on either side of the meter.
Bar Colours	Selects bar to which the color of the over, upper and lower range applies.
Over Colour	Sets the over range color for the bar selected in the Bar Colours control.
Upper Colour	Sets the upper range color for the bar selected in the Bar Colours control.
Lower Colour	Sets the lower range color for the bar selected in the Bar Colours control.
Labels	Sets the display of the bar labels to either an enumerated format, or the labels as entered for the respective channels, or off.
Labels Colour	Sets the color of the bar labels.
Alarm Indicators	Enables the alarm indicators at the top of the bars.
Transparent on Video	Enables the transparency of the meter bars when they are on the in-picture area.
Transparency Level	Sets the transparency of the audio bars when they are on the in-picture area.
Display Outside of Picture	Extends the width of the tile and displays the meters to the left and right of picture area.
Visible	Enables / disables the audio bars.
Split Bars	Equally divides the audio bars either side of the picture.

Table 34. Edit Object - Properties - Audio Tab.

3.12.5.3 Error Tab (Video or Audio Object)

This tab is only available within the Properties tab of Video and Audio type tiles. It determines the behavior of the tile when one of its enabled alarms gets triggered.

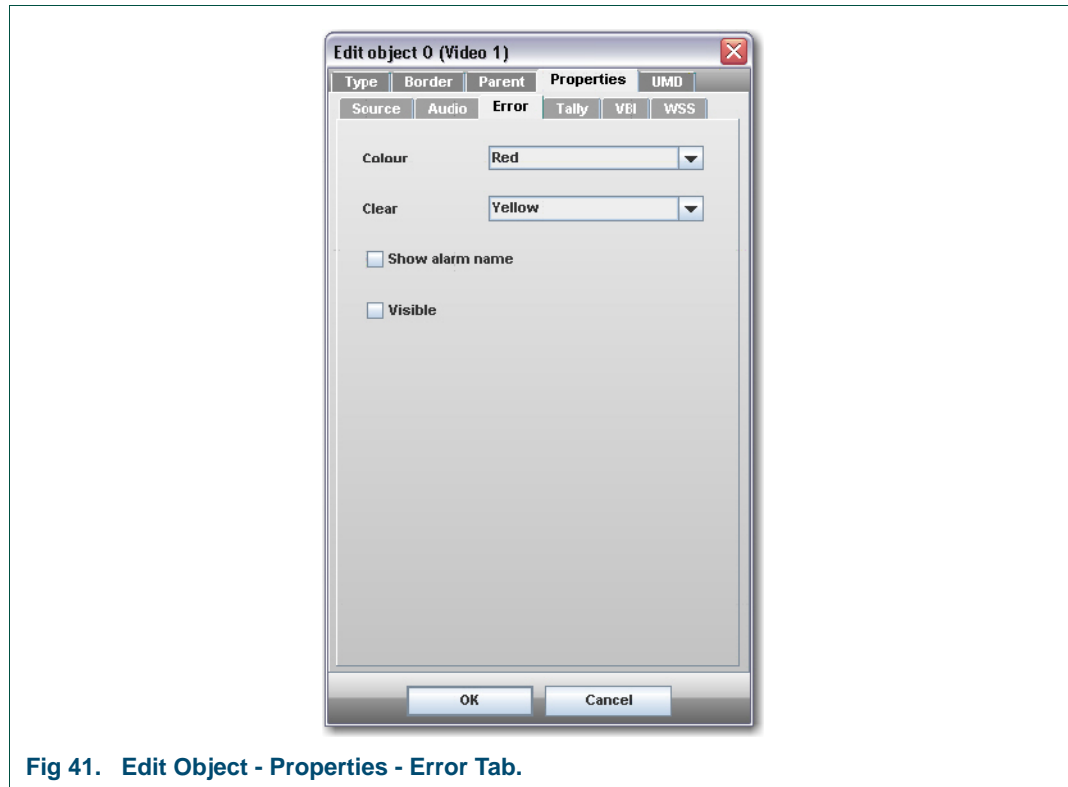


Fig 41. Edit Object - Properties - Error Tab.

Colour	Sets the border color of the tile when an alarm triggers.
Clear	Sets the border color of the tile when an alarm has been cleared by the user, but the conditions that caused the alarm to trigger still remain.
Show Alarm Name	When ticked, all the alarms that are currently triggered will be listed in the tile.
Visible	Must be ticked if any of the alarm indications are to be shown in the tile.

Table 35. Edit Object - Properties - Error Tab.

3.12.5.4 Tally Tab (Video Object)

This tab is only displayed in tiles that are of Video type.

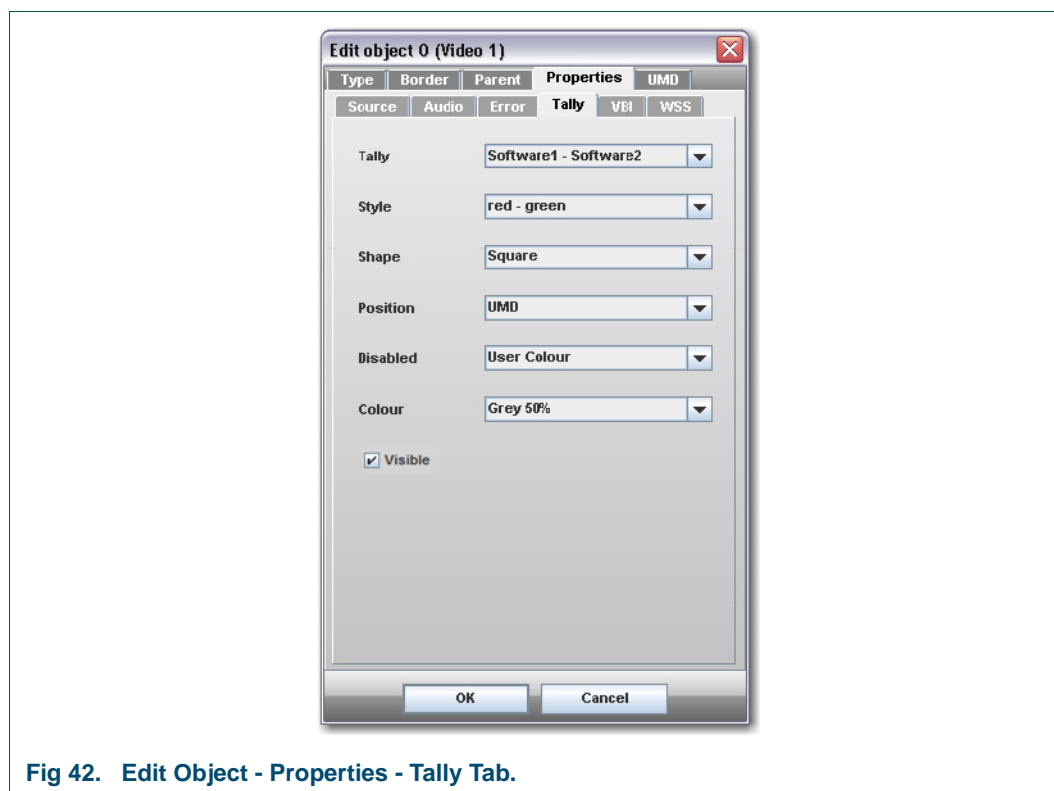


Fig 42. Edit Object - Properties - Tally Tab.

Select hardware or one of two software tallies.

The hardware tally is related to the source of the video window. There are 16 GPI inputs; one for each source.

Tally

The two software tallies operate in accordance with TSL protocol. This has up to 127 display addresses; each address comprising 4 tallies and a UMD. The address assigned to a source depends on how the TSL Protocol has been configured (see section 3.4.8.1 for details of the TSL Protocol Options).

Each video window can use the first 2 tallies of its display address to trigger the 2 tallies available in its UMD bar, or the border tally if set up appropriately.

Style	Select red-green, green-red, red-red and green-green.
Shape	Select fill, square or round.
Position	Select UMD, border or UMD and border.
Disabled	Sets the disabled color to either default disabled color, UMD color, border color, or the user selected color set in the box below this control.
Colour	Selects disabled color if disabled color is set to the user-selected source.
Visible	Turns the display of the tally on/off.

Table 36. Edit Object - Properties - Tally Tab.

3.12.5.5 VBI Tab (Video Object)

This tab is only available in tiles that are of Video type.

If VBI data is present on a video input and the video is an SDI source then the data can be displayed on the relevant video tile.

If multiple sources of timecode are present in a video source then the timecode selected for display, in order of priority is; Ancillary VITC, Ancillary LTC and D-VITC.

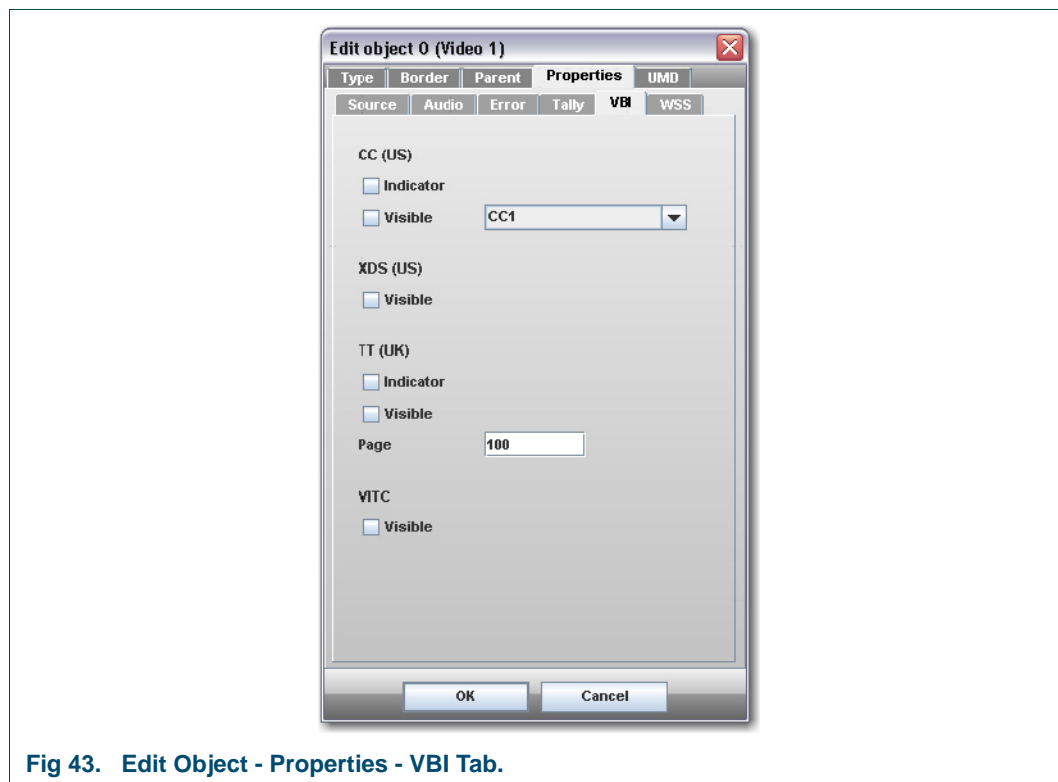


Fig 43. Edit Object - Properties - VBI Tab.

CC Indicator	Enables an indicator to be shown in the tile if the selected Closed Caption type is present.
CC Visible	Displays the Closed Caption text in the tile if ticked.
CC Channel	Selects the channel of the Closed Caption to encode.
XDS Visible	Shows the information contained in the Extended Data Services.
TT Indicator	Enables the indicator to be shown if Teletext is present in the video.
TT Visible	Displays the Teletext from the selected page in the tile if ticked.
TT Page	Selects which Teletext page is to be viewed.
VITC Visible	Enables the display of the Vertical Interval Timecode.

Table 37. Edit Object - Properties - VBI Tab.

Note:

1. D-VITC is only available on SD sources as there is currently no standard for HD sources. Ancillary Timecode is available on both SD and HD sources.
2. The Timecode is displayed in a fixed position near the bottom center of the tile within the video.
3. The display will start to be cropped when the tile is 150 pixels or less wide.
4. WST Teletext can only be decoded from Composite inputs.
5. Closed Caption pages of Teletext using the OP-47 standard can be displayed on SDI inputs.

3.12.5.6 WSS Tab (Video Object)

This tab is only available in tiles that are of Video type.

If VBI data is present on a video input and the video is an SDI source then the WSS/AFD data can be used to control Aspect Ratio.

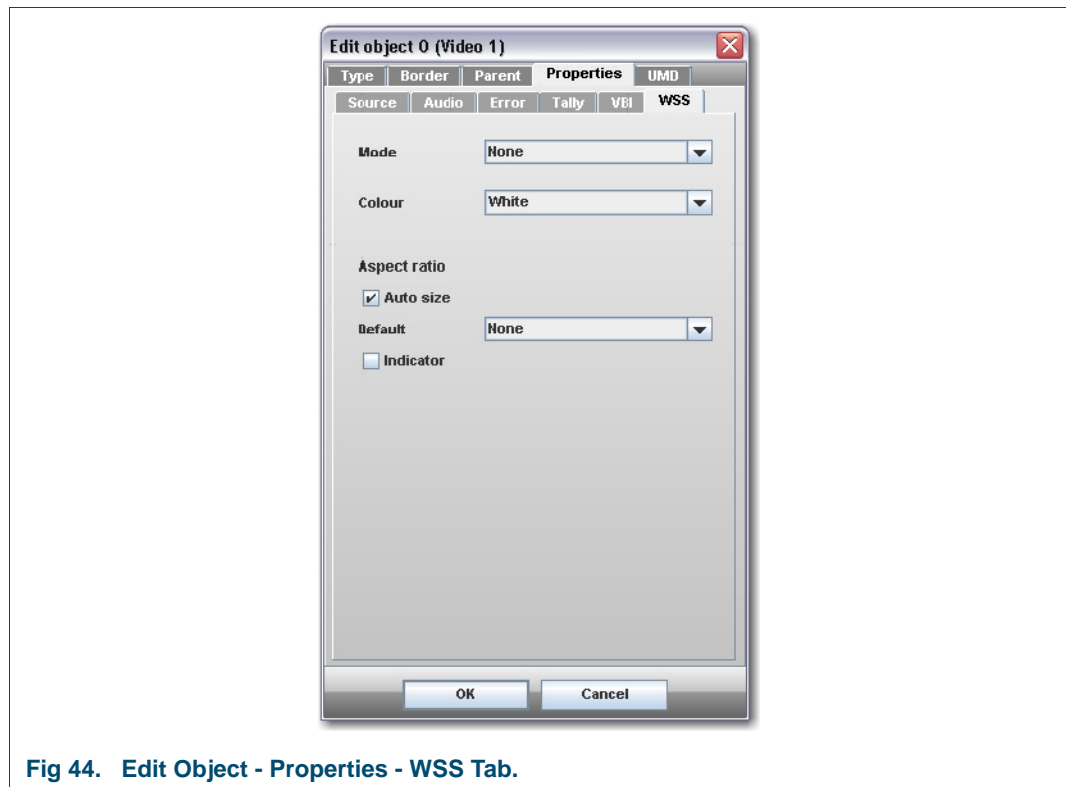


Fig 44. Edit Object - Properties - WSS Tab.

Mode	Selects the type of WSS/AFD to decode.
Colour	Sets the color of any cropping of the video that may be needed to display the correct aspect ratio.
Aspect Ratio, Auto Size	When ticked, the aspect ratio of the video will automatically respond to any changes in the selected WSS or AFD information.
Aspect Ratio, Default	Chooses the aspect ratio to use when the correct one is unknown (for example if WSS or AFD is not present).
Aspect Ratio, Indicator	When ticked, this will present an indicator in the tile if there is aspect ratio information available.

Table 38. Edit Object - Properties - WSS Tab.

3.12.5.7 Safe Area Generator (SAG) Tab (Video object)

This tab is only available in tiles that are of Video type.

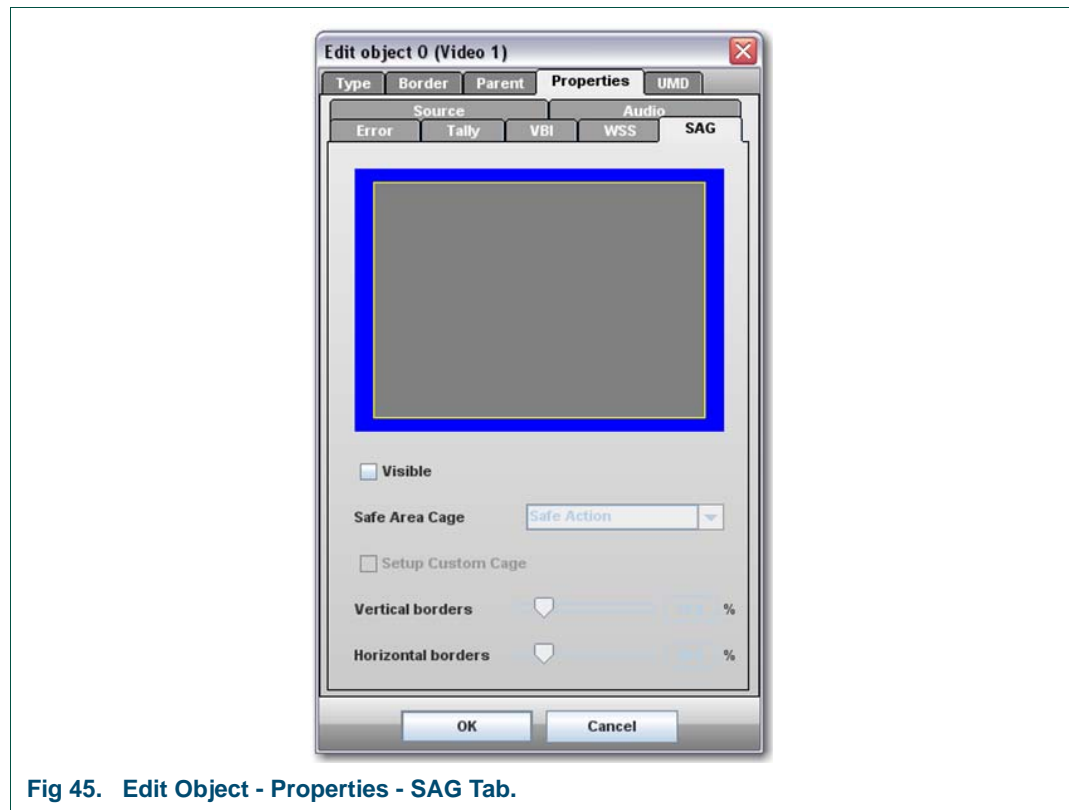


Fig 45. Edit Object - Properties - SAG Tab.

Visible	when ticked, this will show the safe area outline in the video.
Safe Area Cage	if a preset safe area cage is to be shown then choose the appropriate one from this list.
Setup Custom Cage	when ticked, a custom safe area cage can be drawn using the vertical and horizontal border controls.
Vertical Borders	adjust the vertical borders of the safe area. The slide bar can be used, or numbers manually entered.
Horizontal Borders	adjust the horizontal borders of the safe area. The slide bar can be used, or numbers manually entered.

Table 39. Edit Object - Properties - SAG Tab.

3.12.5.8 Text Tab (Text Object)

This tab is only available in tiles that are of Text type.

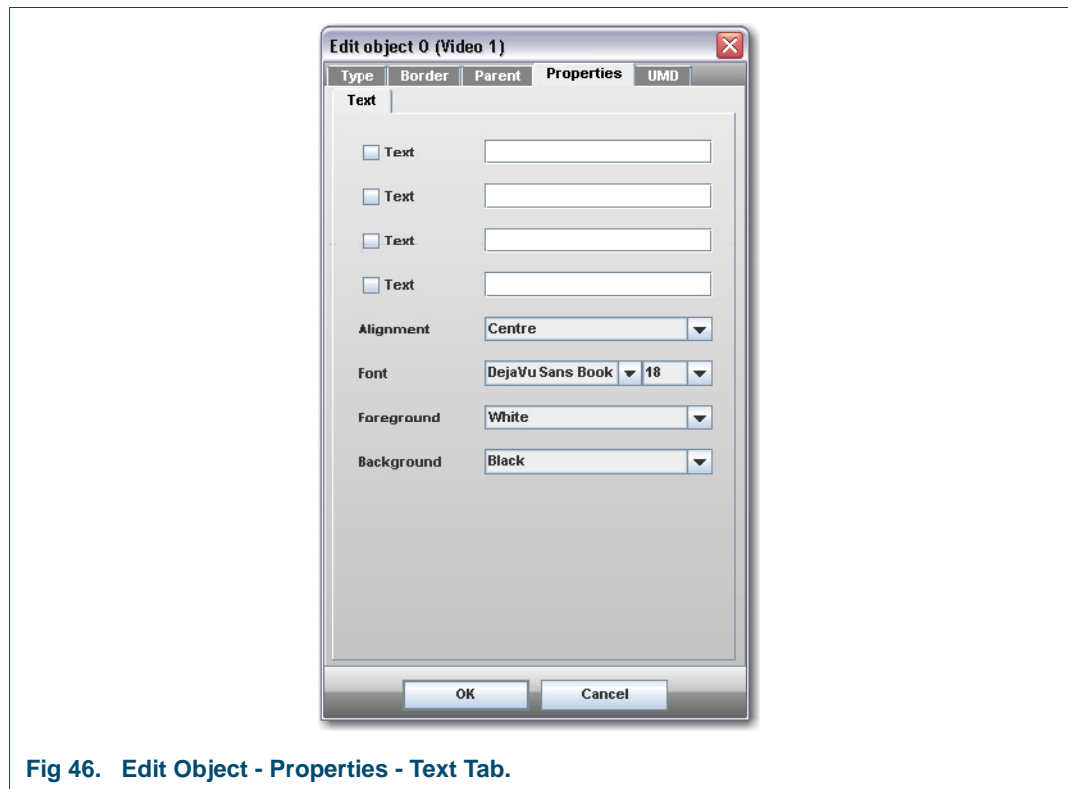


Fig 46. Edit Object - Properties - Text Tab.

Text	Enter up to four lines of text and set it to hidden or visible.
Alignment	Justify text within the tile.
Font	Select font and point size.
Foreground	Set text color.
Background	Set text background color.

Table 40. Edit Object - Properties - Text Tab.

3.12.5.9 Logo Tab (Logo Object)

This tab is only available in tiles that are of Logo type.



Fig 47. Edit Object - Properties - Logo Tab.

File Name	Select one of the stored logo files.
-----------	--------------------------------------

Table 41. Edit Object - Properties - Logo Tab.

3.12.5.10 Clock Tab (Clock Object)

This tab only exists in tiles that are of Clock type.

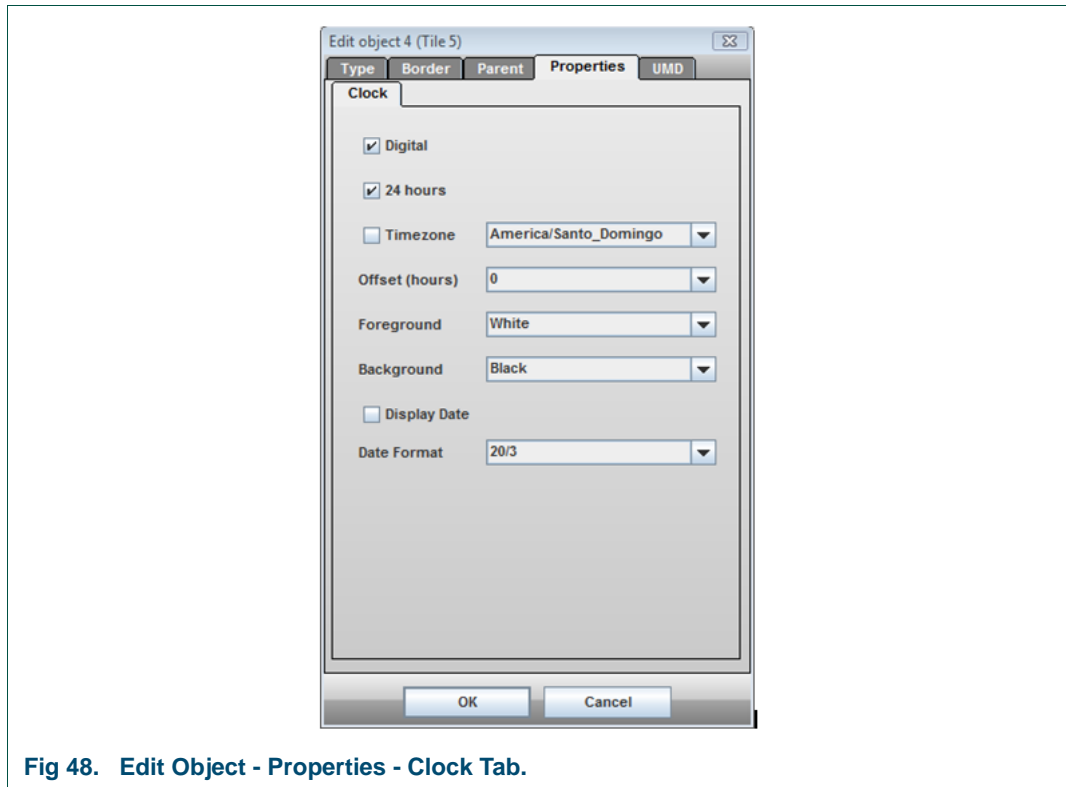


Fig 48. Edit Object - Properties - Clock Tab.

Digital	Check for digital clock type, un-check for analog type.
24 Hours	Check for 24 hour clock (applicable to digital clock type only).
Timezone	Check to set clock time to GMT, or within the range of GMT -1 to GMT +12.
Offset (Hours)	Applies offset from -12 to +12 hours (works in combination with Timezone setting, if checked).
Foreground	Set the clock color (digital clock only).
Background	Set the clock background color (digital clock only).
Display Date	Check to display today's date as well (applicable to digital clock type only)
Date Format	Sets the format of the date when displayed (applicable to digital clock type only)

Table 42. Edit Object - Properties - Clock Tab.

3.12.5.11 Timer Tab (Clock Object)

This tab only exists in tiles that are of Clock type.

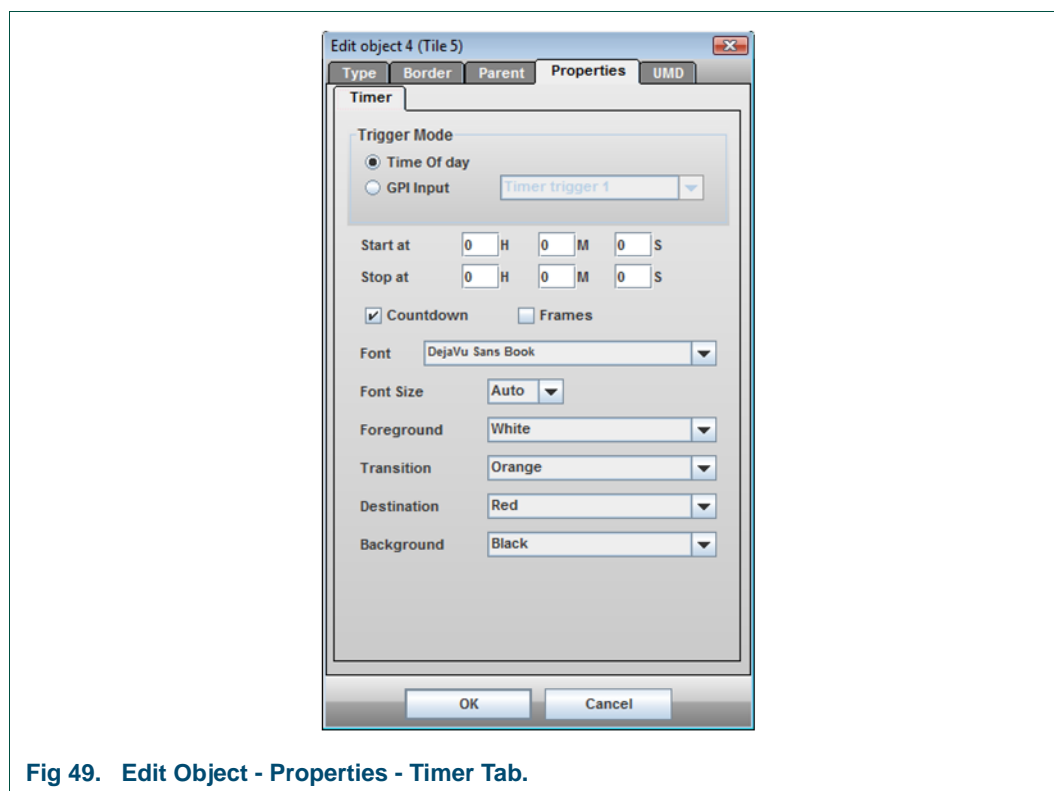


Fig 49. Edit Object - Properties - Timer Tab.

Trigger Mode	Time of day triggers the timer at a particular time of day. GPI Input allows the timer to be triggered by a GPI that has been setup as a Timer Trigger.
Start at/Stop at	If the trigger mode is Time of day then the start time determines the time of day that the timer will start counting upwards. The stop time determines the time of day that the timer will stop. If the trigger mode is GPI Input then when the timer is triggered by the GPI it will start counting up or down from the start time set. The stop time is not applicable when triggered by a GPI.
Countdown	If the trigger mode is Time of day then while the time of day is earlier than the start time, the timer will count down the time remaining before the start time if countdown is ticked. If not ticked then the timer will display 00:00:00 during this period preceding the start time. If the trigger mode is GPI Input then when the GPI is triggered the timer will start counting down from the start time if countdown is ticked. If not ticked then the timer will start counting up from the start time when the GPI triggers it.
Frames	Display the frames as well. If this is not ticked the display format is hh:mm:ss. If ticked then the display format is hh:mm:ss:ff. The frames per second count is determined by the video output frame rate.
Font, Font Size	The font to use for the digits. If the size is set to auto then the digits will be sized to fit in the window, up to a certain maximum font size.
Foreground	For time of day triggering this is the color of the timer digits before the start time is reached. For GPI triggering this is the color of the timer digits while the GPI has not triggered the timer.

Table 43. Edit Object - Properties - Timer Tab.

Transition	For time of day triggering this is the color of the timer digits for the 10 seconds before the start time is reached. For GPI triggering, if the timer is only set to count up then this is not applicable. If it is set to count down first then it will change to the transition color for the 10 seconds before it reaches 0.
Destination	For time of day triggering, this is the color of the timer digits while the time of day is in between the start time and stop time. For GPI triggering this is the color of the timer digits after it has finished counting down (or if not set to count down then it is the color that the timer changes to as soon as the GPI triggers it).
Background	Color of the filled background.

Table 43. Edit Object - Properties - Timer Tab.

Examples:

1. Trigger the timer to start at 10.00am, stop at 10.30am and countdown beforehand.
 - Set the mode to Time of day; start and stop times to 10:00:00 and 10:30:00 respectively.
 - Tick the countdown box. If the current time is 9:45am then the timer will now be displaying 00:15:00, and be counting down. It will currently be white, assuming the default colors are set.
 - When the time of day is 10 seconds before 10am the timer will change color to orange and be displaying 00:00:10.
 - When 10am is reached it will switch to red and start counting up from 00:00:00.
 - When 10:30am is reached it will be displaying 00:30:00. Immediately after that it will change back to white and start counting down from 23:30:00 - the amount of time remaining before 10am the next day.
2. Trigger the timer by a GPI. Initially it is to countdown from 00:00:30.
 - First, a GPI has to be assigned as timer trigger one. In the Module Menu | Setup Module, go to the GPIs tab, and then GPI Inputs sub-tab. On the GPI that is to be used click on the drop-down list and select the Timer 1 trigger item. (There are 10 timer trigger items available here - if multiple timers require triggering from different GPIs then up to 10 can be set up).
 - Press OK to close this GPI window. Open the Object Properties of the Timer tile, and in the Properties tab set the Trigger Mode to GPI Input. Next to this select Timer trigger 1 as the GPI source. Set the start time to 00:00:30 and tick the countdown box.
 - When this GPI is triggered, the timer will start counting down from 00:00:30, and be colored white.
 - When it reaches 00:00:10 it will change to orange. 10 seconds later it will reach 0, change to red, and start counting up.
 - The timer continues to count upwards indefinitely, wrapping back to 00:00:00 after 24 hours. Any further assertions on the GPI triggering this timer will reset it back to 00:00:30, counting down.

Note:

The GPI triggering of the timer is only sensitive to positive edges. In other words, a transition from 0V to 3V or greater on the relevant GPI pin will trigger the timer. It does not have to be held above this threshold indefinitely to remain counting. It must remain asserted for at least 200ms though to trigger the timer. Any further transitions from 0V to 3V or above will re-trigger it.

4. Connection to Other Equipment

4.1 Interfaces

Seen from the back of MV-16.

4.1.1 D-sub 9 serial interface, RS232/RS422



Fig 50. RS232 and RS422 Connector.

The following table gives the pin assignments for the RS 232, RS 422 D-sub 9 serial interface.

Pin Number	RS232	RS422
1	-	GND
2	TxD	RxD
3	RxD (inactive in half duplex mode)	TxD
4	DTR (jumper JP1 on 2 & 3)	-
5	GND	-
6	-	-
7	RTS	RxD+
8	-	TxD+
9	-	-

Table 44. RS232 and RS422 Connector.

4.1.2 GPI Input/Output Connector

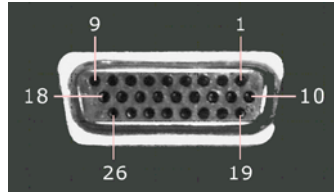


Fig 51. GPI Input/Output Connector.

The following table gives the pin assignments for the RS GPI Input/Output connector:

Pin Number	Signal	Pin Number	Signal
1	GPI-In 2	14	GPI-In 13
2	GPI-In 5	15	GPI-In 16
3	GPI-In 8	16	GPI-Out 2
4	GPI-In 11	17	GPI-Out 5
5	GPI-In 14	18	GPI-Out 8
6	GPI-Out 1	19	GPI-In 3
7	GPI-Out 4	20	GPI-In 6
8	GPI-Out 7	21	GPI-In 9
9	GND	22	GPI-In 12
10	GPI-In 1	23	GPI-In 15
11	GPI-In 4	24	GPI-Out 3
12	GPI-In 7	25	GPI-Out 6
13	GPI-In 10	26	5V (via 0.5A re-settable fuse)

Table 45. GPI I/O Connector.

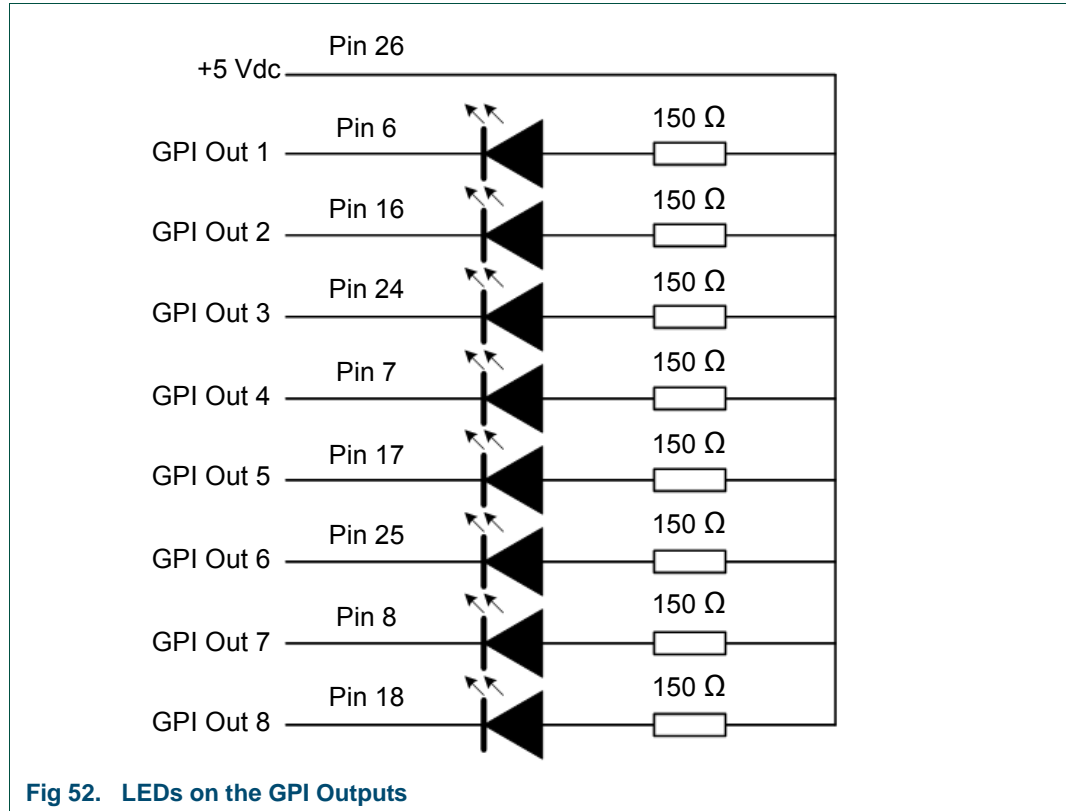
Note:

- The MV-16 GPI outputs are open collector outputs and require external pull-up resistors of between 10 k Ω and 100 k Ω and can sink up to 500 mA. A +5 Vdc out pin is provided on the GPI connector for this purpose.
 - For an example of how GPI outputs can be used to drive LEDs, see Appendix 4.1.2.1.
- The MV-16 GPI inputs have weak pull-downs on them and can be driven by inputs of up to 24 V. The inputs are triggered by inputs above 3 V.
 - For an example of how GPI inputs can be used to trigger on-screen tallies, see section 4.3.

4.1.2.1 Example: Using LEDs on the GPI Outputs

The GPI outputs on the MV-16 are open collector drivers. There is a 5 Vdc pin to provide the power needed to drive LEDs or relays.

The following schematic is an example of the wiring needed when an LED is to be driven by each output. The numbers on the left are the GPI output numbers and pin-numbers for the outputs on the 26 way female D-Type connector on the rear of the MV-16.



4.1.3 Analog Audio in/out Connector D-sub 37 Female

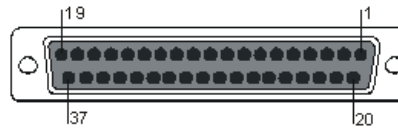


Fig 53. Analog Audio in/out Connector D-sub 37 female.

The following table gives the pin assignments for the 37 pole sub-D female connector.

Analog				Digital			
Pin Number	Signal	Pin Number	Signal	Pin Number	Signal	Pin Number	Signal
1	Common GND	20	16-	1	Common GND	20	
2	16+	21	15-	2		21	8-
3	15+	22	14-	3	8+	22	
4	14+	23	13-	4		23	7-
5	13+	24	Common GND	5	7+	24	Common GND
6	12+	25	12-	6		25	
7	11+	26	11-	7	6+	26	6-
8	10+	27	10-	8		27	
9	9+	28	9-	9	5+	28	5-
10	Common GND	29	8-	10	Common GND	29	
11	8+	30	7-	11		30	4-
12	7+	31	6-	12	4+	31	
13	6+	32	5-	13		32	3-
14	5+	33	Common GND	14	3+	33	Common GND
15	4+	34	4-	15		34	
16	3+	35	3-	16	2+	35	2-
17	2+	36	2-	17		36	
18	1+	37	1-	18	1+	37	1-
19	Common GND			19	Common GND		

Table 46. Analog Audio in/out Connector D-sub 37 female.

4.1.4 Analog Monitor Out Connector D-sub 25 Female

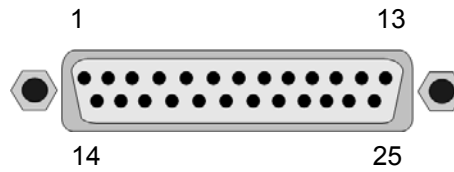


Fig 54. Analog Monitor Out Connector D-sub 25 Female.

The following table gives the pin assignments for the 25-pole sub-D female connector

Pin Number	Signal	Pin Number	Signal
1	In 8+	14	In 8-
2	In 8GND	15	In 7+
3	In 7-	16	In 7GND
4	In 6+	17	In 6-
5	In 6GND	18	In 5+
6	In 5-	19	In 5GND
7	In 4+	20	In 4-
8	In 4GND	21	In 3+
9	In 3-	22	In 3GND
10	In 2+	23	In 2-
11	In 2GND	24	In 1+
12	In 1-	25	In 1GND
13	-		

Table 47. Analog Monitor Out Connector D-sub 25 Female.

4.2 Configuring the MV-16 for TSL UMD Protocol

This section describes the procedure for configuring UMDs. The steps repeat some information that is in other sections of this manual.

The TSL protocol uses display addressing to select the UMD to update. In the MV a display address refers to an input number. TSL address 0 refers to MV input 1, TSL address 1 refers to MV input 2 etc.

The software settings that are essential for getting the UMD working are:

- Putting the serial port into TSL UMD mode and setting its baud rate
 - Ensuring that line 1 is turned on for the UMDs
1. Check that the MV-16 matches the TSL controller serial port type. Use the MV-16 jumpers to set the serial port to either RS232 or RS422 to match the TSL controller. Ensure the MV-16 serial port is set to normal mode rather than debug mode. See section 2.5 for information on the MV-16 jumper settings.
 2. Set up the serial port to use the TSL UMD protocol with the appropriate port settings in the Module > Setup Menu.

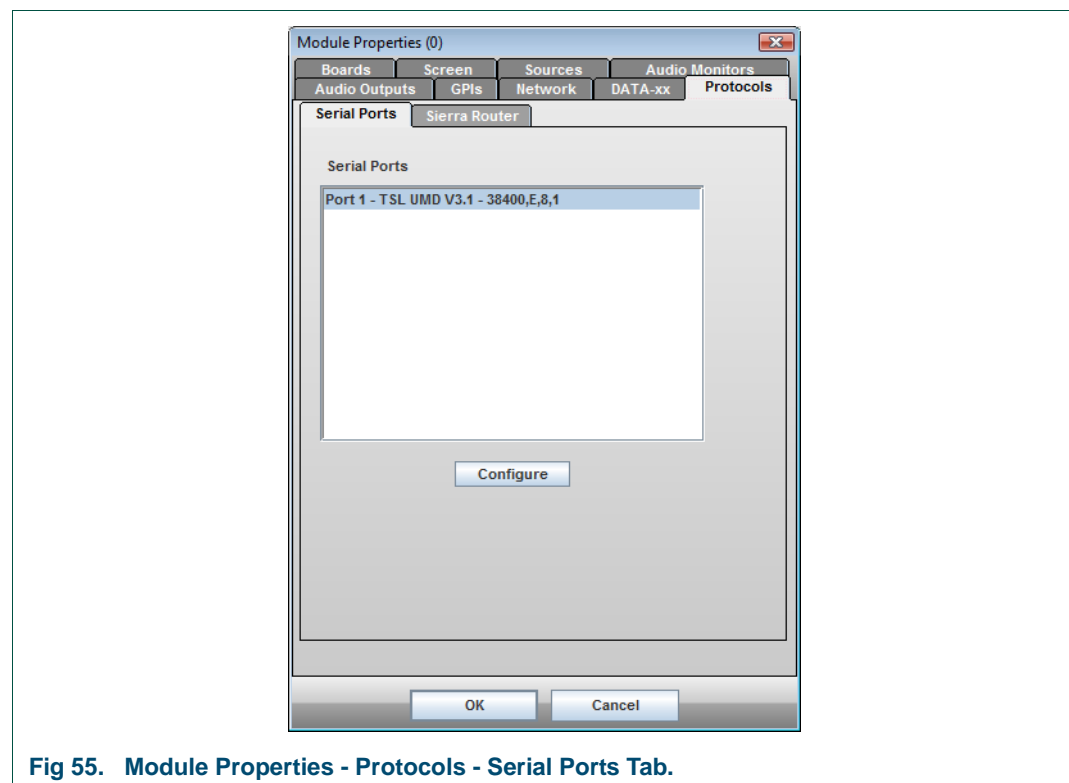


Fig 55. Module Properties - Protocols - Serial Ports Tab.

3. This step is not essential and is only required if you want the tallies in the UMDs to work as well.
 - a For each tile that you want the TSL to control the tallies in, double click on the tile to open the Edit Object dialog and go to the Properties > Tally tab (see section 3.12.5.4).
 - b Click the Visible box. In the Tally field select the Software1 - Software2 option. (Software X - Software Y refers to the left and right tallies on the UMD. e.g. If you select Software1 - Software1 then both the left and right tallies are turned on when the TSL sets the left tally flag).
 - c If you select Software1 - Software2 then the left tally is switched on when the TSL sets the left tally flag, and the right tally is switched on when the TSL sets the right tally flag).

4. Only the first line in the UMD gets updated by the TSL, so make sure it is the one switched on by ticking the "Text 1st line" in the UMD tab of the object properties (see section 3.12.4).
5. The TSL manager you are using needs to be set up to address the MV inputs by their input number (or input number minus 1, depending on how it is set up in the manager).

4.3 Example for setting up a GPI input to use as a Tally

In this example the first GPI input on the first rear video card is to be setup as the tally source for Source 2. It is assumed that Source 2 is the source for the second tile.

Step 1 - Setup the second tile to get its tally from the hardware input:

1. Double click on the second tile to open the Object Properties.
2. Go to the Properties tab, within this go to the Tally sub-tab.
3. Tick the Visible checkbox.
4. Set the Tally to Hardware1-Hardware1.
5. The setup should now appear as shown in Fig 56.

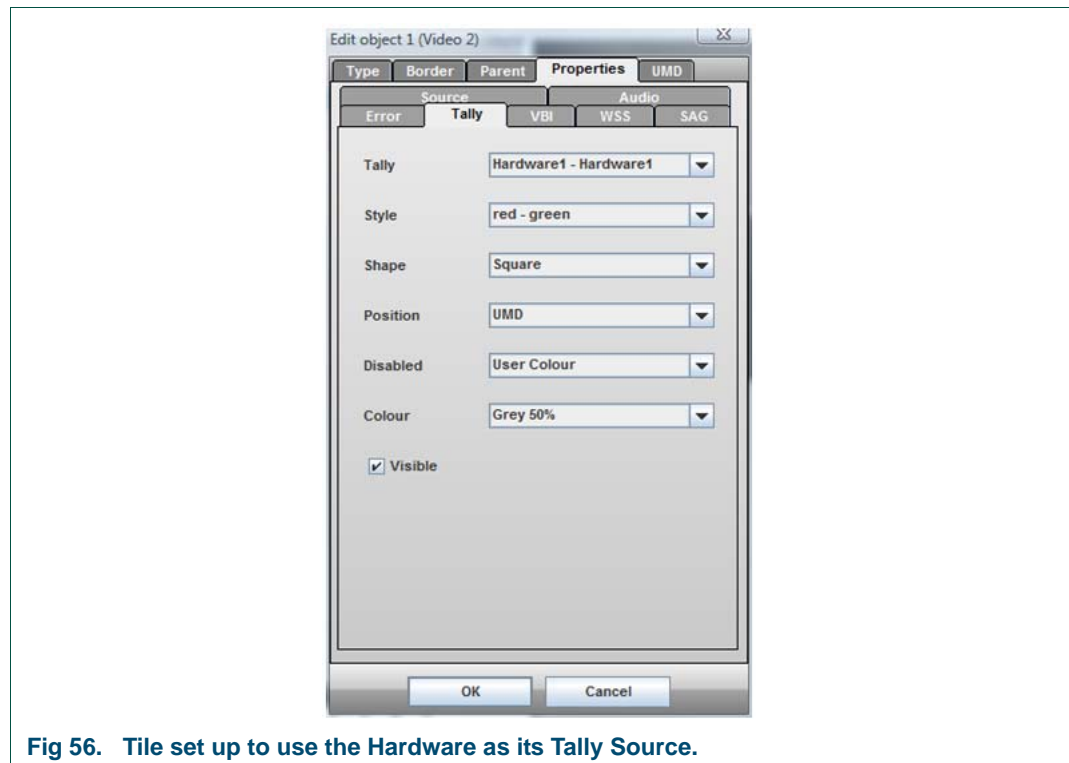


Fig 56. Tile set up to use the Hardware as its Tally Source.

Step 2 - Select the GPI to use as the tally source

1. Go to the module properties (Module > Setup Module menu).
2. Select the GPIs tab, followed by the GPI Inputs sub tab.
3. Scroll down to the Video 1 GPI In 1 item and select Src 2 Hard Tally here.
4. This should now appear as shown in Fig 57.
5. Press OK, and upload the changes to the MV-16 (Press the red arrow - update layout - in the toolbar).

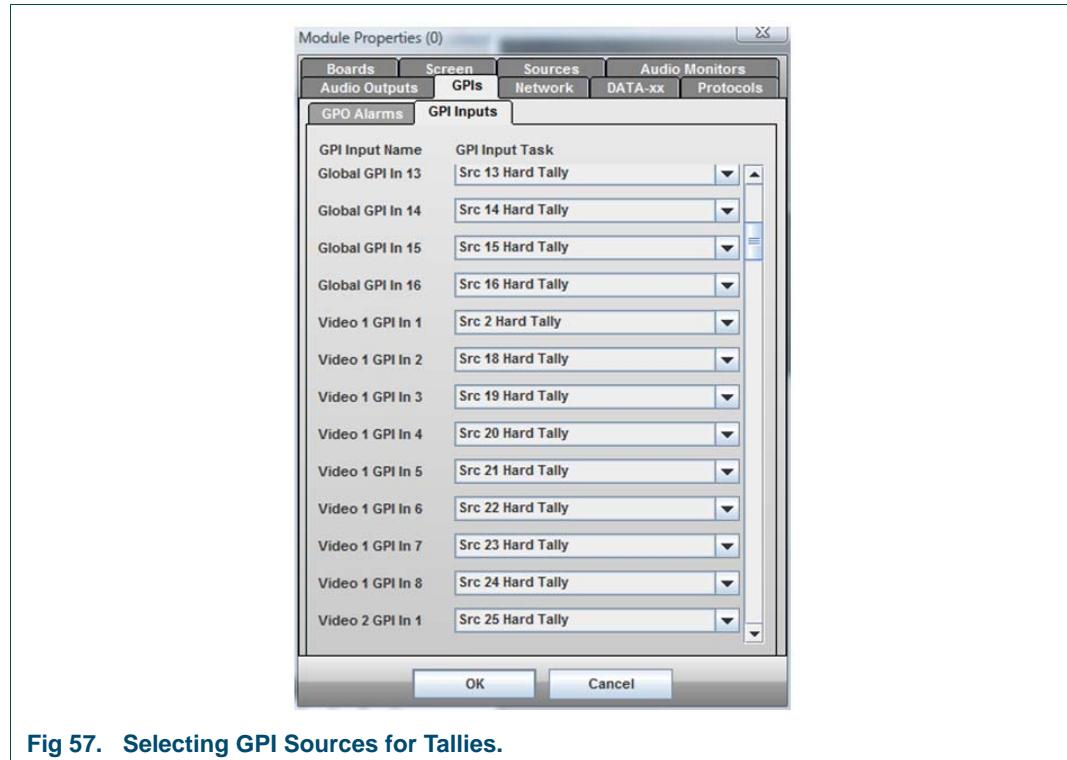


Fig 57. Selecting GPI Sources for Tallies.

Step 3 - Hardware configuration

The tally that has been setup will now activate when approximately 3 Vdc or more is applied to the relevant GPI input pin. 5 Vdc can be sourced from the global GPI connector to go through a switch or relay (see section 4.1.2 for pinout).

Alternatively an external remote voltage source can be used, however in this case it will also need a ground reference from the ground pin on the GPI connector.

4.4 Example Interfacing with a Kahuna 360 or Kahuna 360 Compact

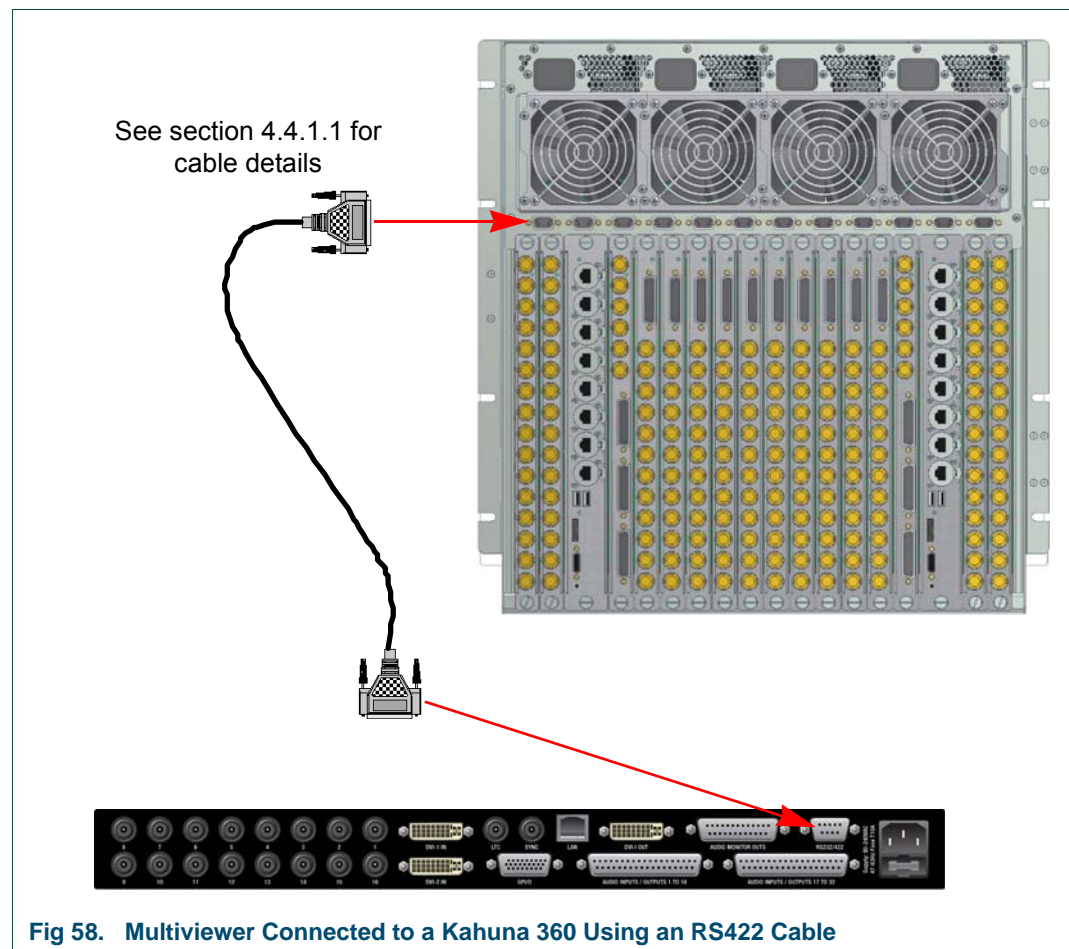
This example describes how Kahuna 360 and Kahuna 360 Compact use the TSL UMD (Output Only) Tally protocol to connect to and communicate with the MV-16 Multiviewer.

The TSL UMD protocol allows Kahuna 360 to tally the PGM and PVW outputs which place a Red or Green border around the selected output source when viewed on a monitor via the multiviewer. Red indicates a PGM output and Green indicates a PVW output and source information in the MV displays.

This example assumes that you are familiar with operating the Kahuna 360 and Kahuna 360 Compact switchers.

4.4.1 Connect the Kahuna 360 Mainframe to the Multiviewer

The Multiviewer is connected to the Kahuna 360 mainframe using an RS 422 lead, see Fig 58.



4.4.1.1 RS422 Multiviewer to Kahuna 360 Connection Cable



Fig 59. RS422 Connector as seen from the rear of the Multiviewer and Kahuna 360

Use a pin to pin RS422 cable, with a DE-9 male connector at each end, to connect the Multiviewer to the Kahuna 360.

Note:

The pin outs shown in Table 48. are the default pin outs for the Kahuna 360. The Kahuna 360 operates as a controlling device when the TSL UMD protocol is selected. When operating in this mode the Kahuna 360 controls the actual pins used to receive and transmit data.

The following table details the pin assignments for the RS422 D-sub DE-9 connectors.

Multiviewer		Kahuna 360	
Pin Number	RS422	Pin Number	RS422
1	GND	1	GND
2	Rx-	2	RxA
3	Tx-	3	TxB
4	-	4	GND
5	-	5	-
6	-	6	GND
7	Rx+	7	RxB
8	Tx+	8	TxA
9	-	9	GND

Table 48. RS422 Connector Pin Outs

4.4.2 Setup the Kahuna 360 Protocol

The Kahuna 360 TSL UMD (output only) protocol is setup in the **Engineering Configuration – Protocols** menu.

1. Use the **Loaded Protocols** parameter to select a free slot in the table, then use the **Protocol Type** parameter to select "Tally & UMD". Use the **Available Protocols** parameter to select **TSL UMD (Output Only)** and then touch the {Load} button (Fig 60.).

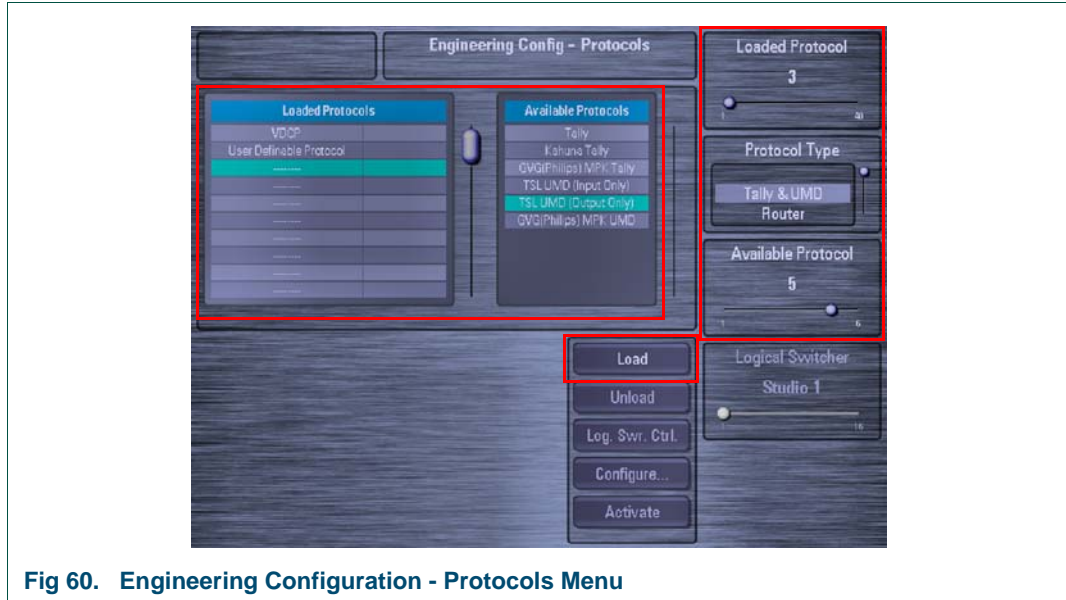


Fig 60. Engineering Configuration - Protocols Menu

2. To select an RS422 port on the Kahuna 360 mainframe, touch the {Configure...} button on the **Engineering Config - Protocols** menu (Fig 60.).
3. The **Engineering Config - Protocol Config** menu is displayed (Fig 61.). Touch the **Serial Port** attacher and then select which port you wish to use on the mainframe and touch the {Apply} button.

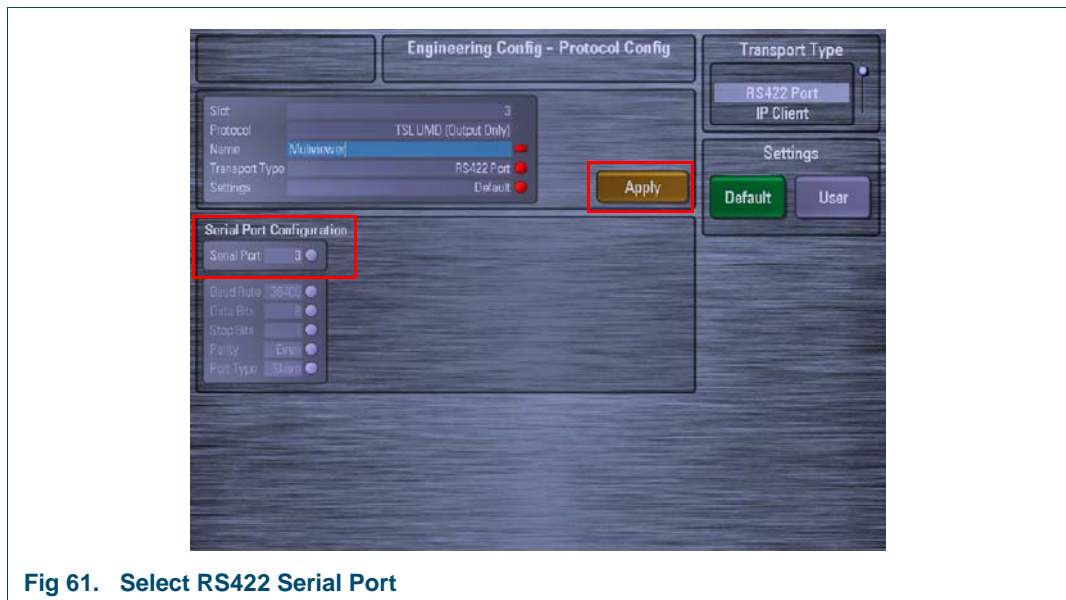


Fig 61. Select RS422 Serial Port

- Once you are happy with the setup, touch the **{Activate}** button on the **Engineering Config - Protocols** menu to activate the protocol (Fig 62.).

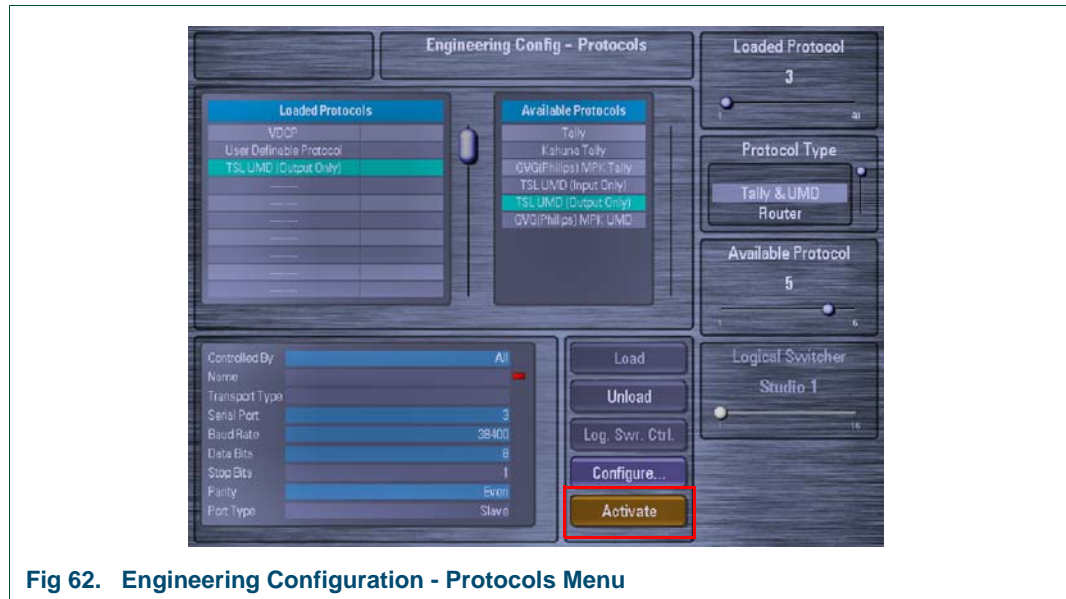


Fig 62. Engineering Configuration - Protocols Menu

4.4.3 Kahuna 360 Peripherals Setup

The peripherals menu is used to configure the way the multiviewer operates with the Kahuna 360.

- Touch the **[PERIPH]** button on the GUI, and then touch the **{TSL UMD Out...}** button (Fig 63.).

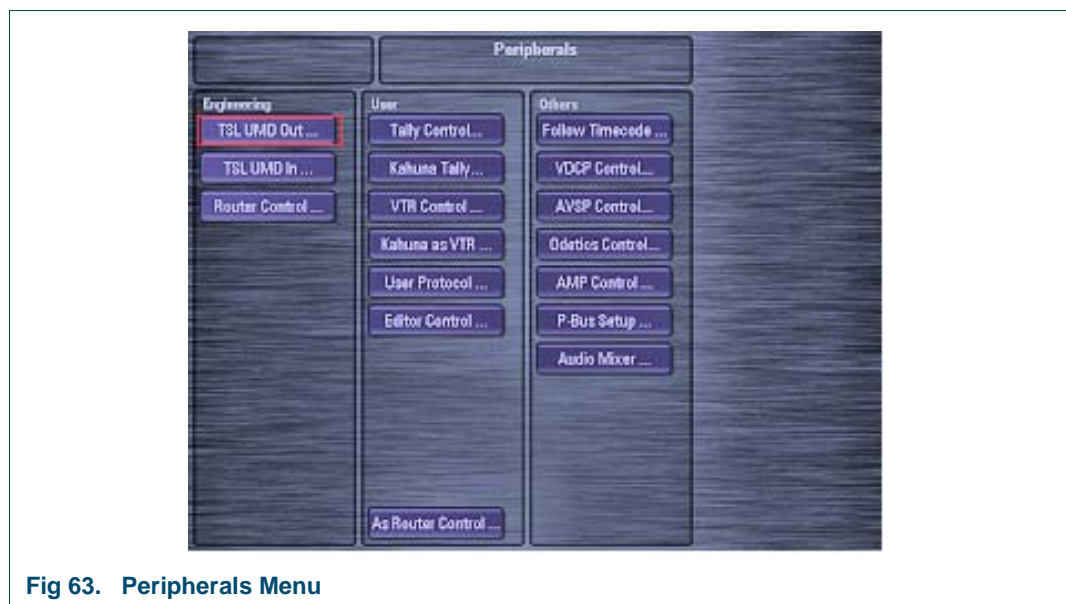


Fig 63. Peripherals Menu

2. Setup the **BNC Output** from the Kahuna 360 mainframe that is connected to each of the Sources on the multiviewer and set the **UMD Address** to **On**.
3. If **Display BNC Name** is set to **Yes** the name given to the **Physical Output BNC** will be displayed. If **Display BNC Name** is set to **No** then the name of the source is displayed.



Fig 64. Peripherals Menu - TSL UMD Out Setup

4.4.4 Multiviewer Setup

Make sure the jumpers on the multiviewer CPU Card are set correctly (left Card with the Ribbon Cables).



Access requires the removal of the CPU card from the front of the unit with the power removed. See section 2.5 for additional information.

Links set as follows:

- J1 = Position 2/3
- J13 = Position 1/2
- J14 = Position 1/2

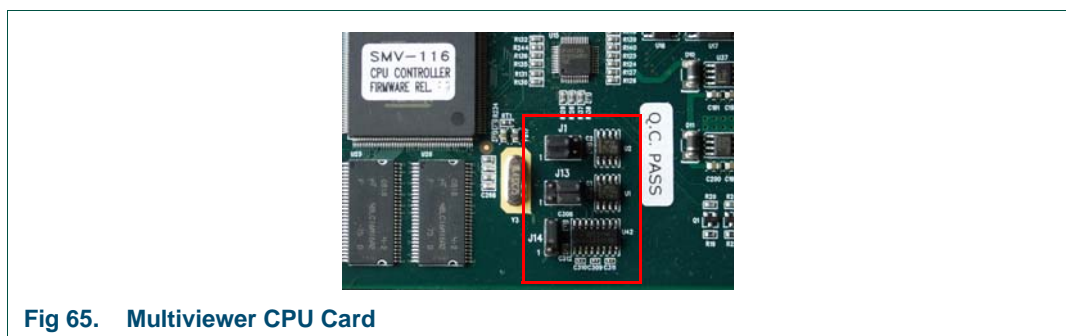


Fig 65. Multiviewer CPU Card

1. The IP Address of the multiviewer is shown on the Boot-up Screen.
2. Use a web browser to connect to the multiviewer and enter set-up (see section 3.3 for more details).
3. Module Properties are opened from the **Module** → **Setup Module** menu.

4. Select the **Protocols** tab and then select the **Serial Ports** tab (Fig 66.).

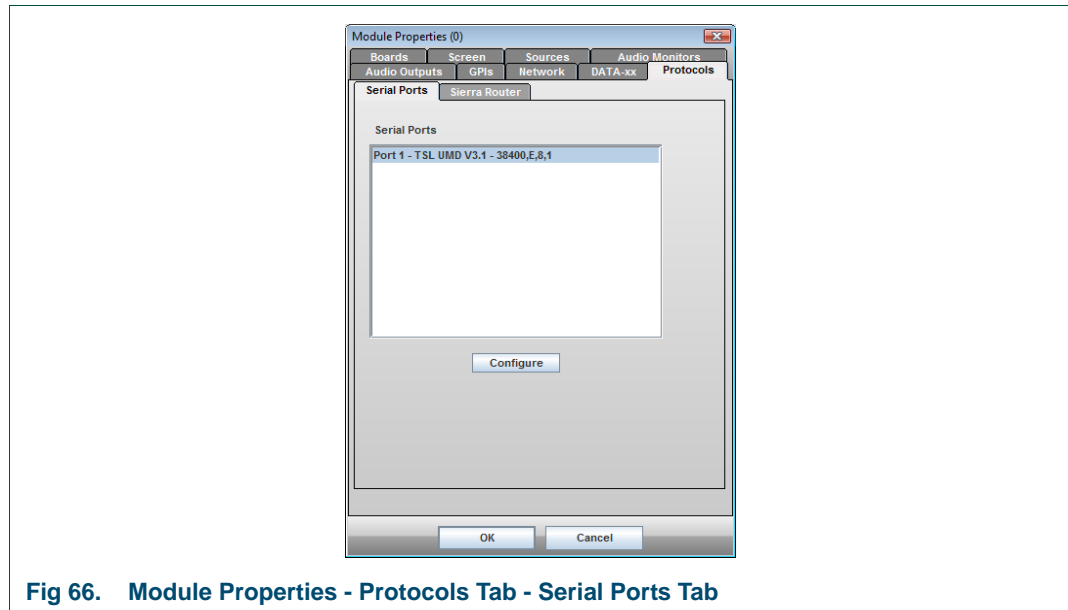


Fig 66. Module Properties - Protocols Tab - Serial Ports Tab

5. Click on the **Configure** button and set the multiviewer **Protocol** to be **TSL UMD**.

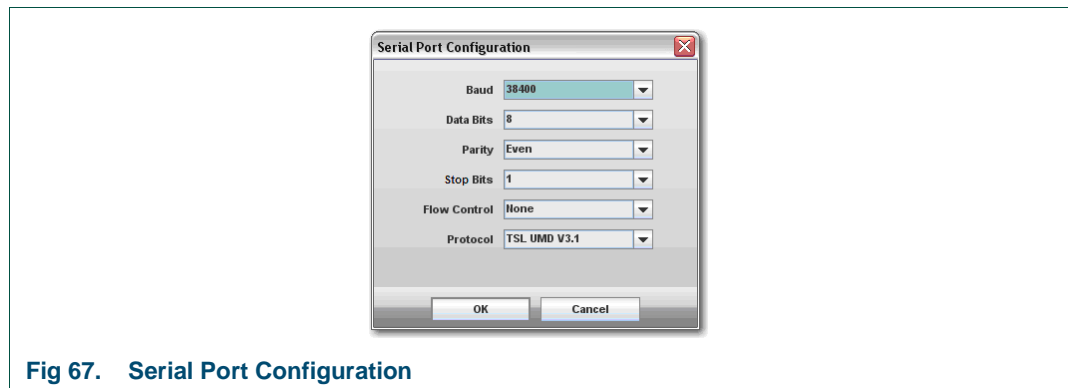


Fig 67. Serial Port Configuration

6. Click on the **OK** button to save the configuration.
7. Select the **Screen** tab to set the output screen **Resolution** and **Aspect ratio**.

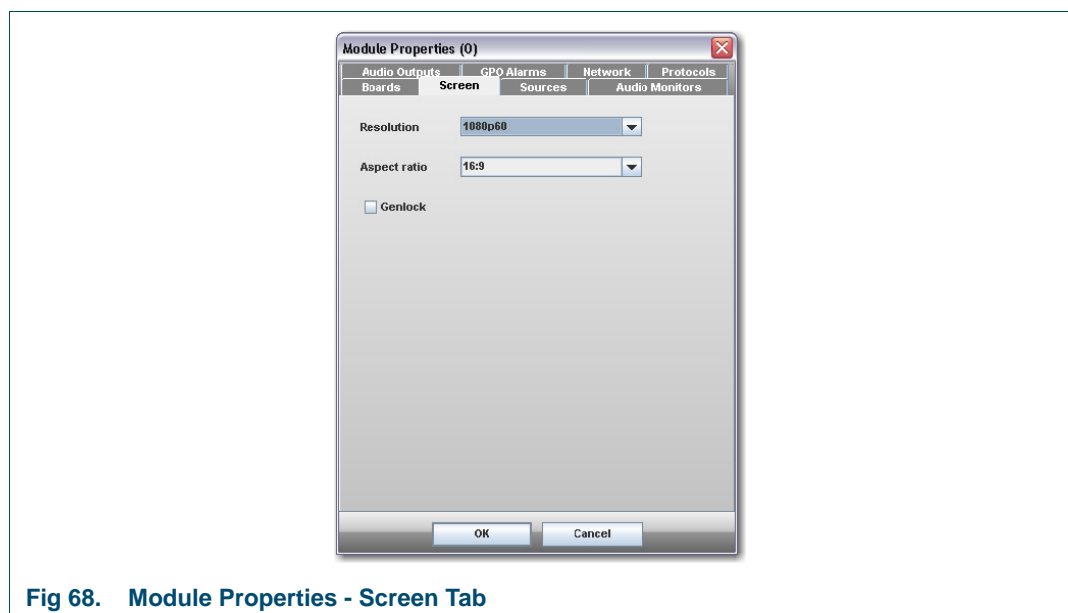


Fig 68. Module Properties - Screen Tab

8. to make sure they are SDi rather than DVi etc.

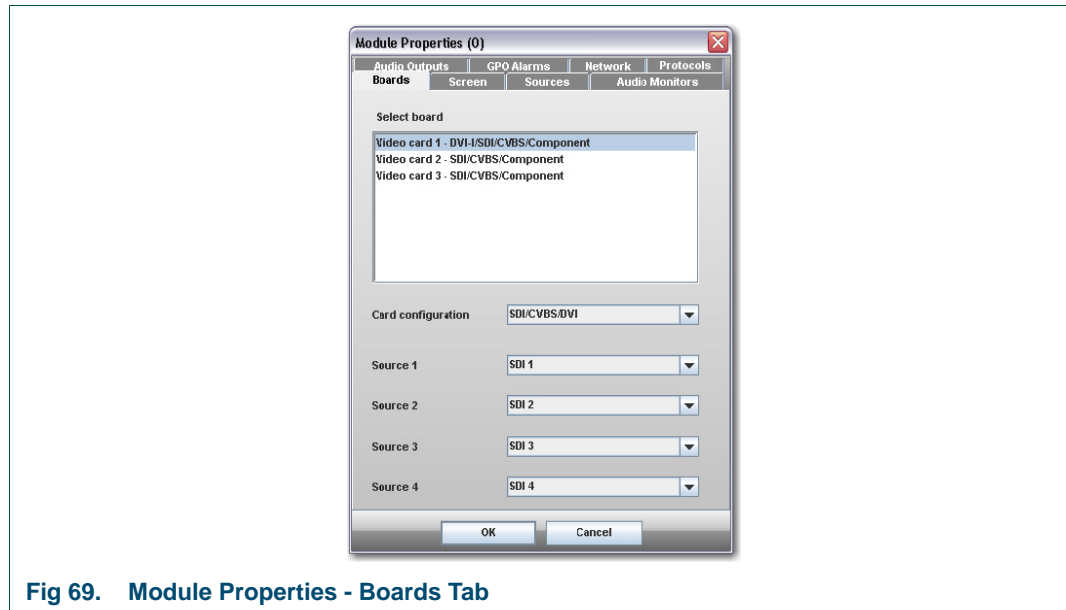


Fig 69. Module Properties - Boards Tab

9. Click on the **OK** button to save the changes.
10. Once you have a multiviewer on-screen layout setup, double click the screen to be edited. The **Edit Objects** dialog for that screen is displayed.
11. From this screen select the **Properties** tab and then select the **Tally** tab. Settings should be as shown in Fig 70.

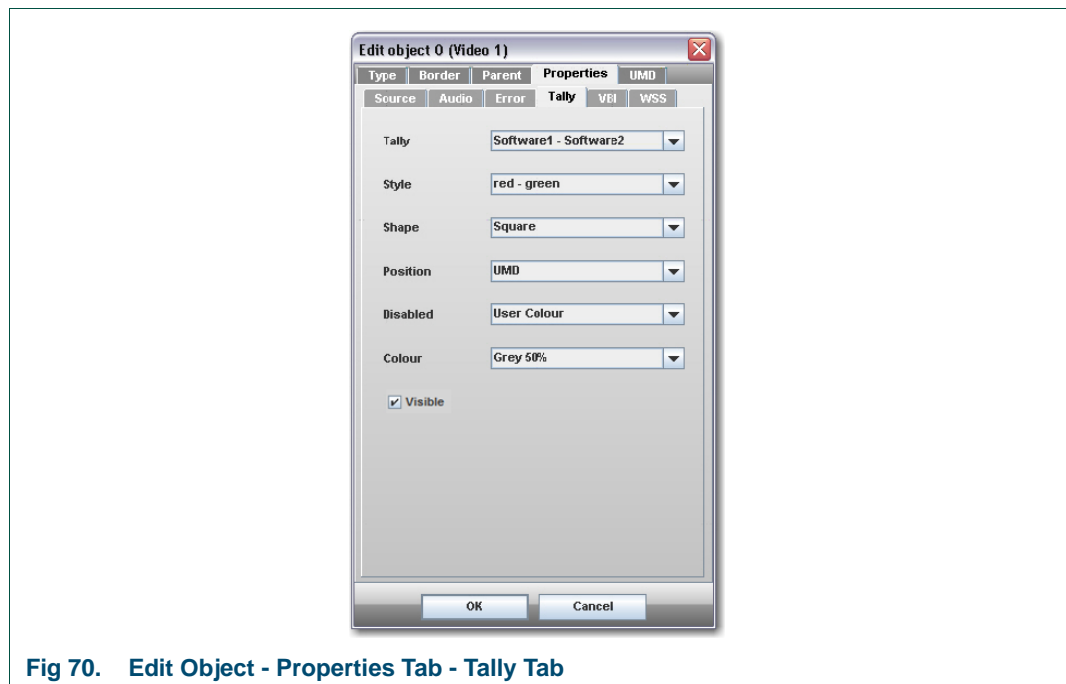


Fig 70. Edit Object - Properties Tab - Tally Tab

12. The Font, Font Size, UMD Position, etc. is set from the **UMD** tab.

Note:

If you want the UMD to be under the screen then, you need to un-tick the **Inside Tile Box**. You will then need to set the desired font size and return to the screen layout to make the screen vertical size larger so the Picture is 16:9 and then the UMD will be under the picture (If this is not done the picture will be squashed vertically). Set the video aspect to **None** in the tile set-up.



Fig 71. Edit Object - UMD Tab

13. Click on the **OK** button to save the changes.

14. The Sources on the multiviewer are UMD addresses 0,1,2,3, etc.

- Source 1 = UMD Address 0
- Source 2 = UMD Address 1
- Source 3 = UMD Address 2

15. Finally, return to the **Engineering Config - Protocols** menu on the Kahuna 360.

16. Select the “TSL_UMD (Output Only)” entry in the **Loaded Protocols** list and touch the **{Unload}** button followed by the **{Load}** button.

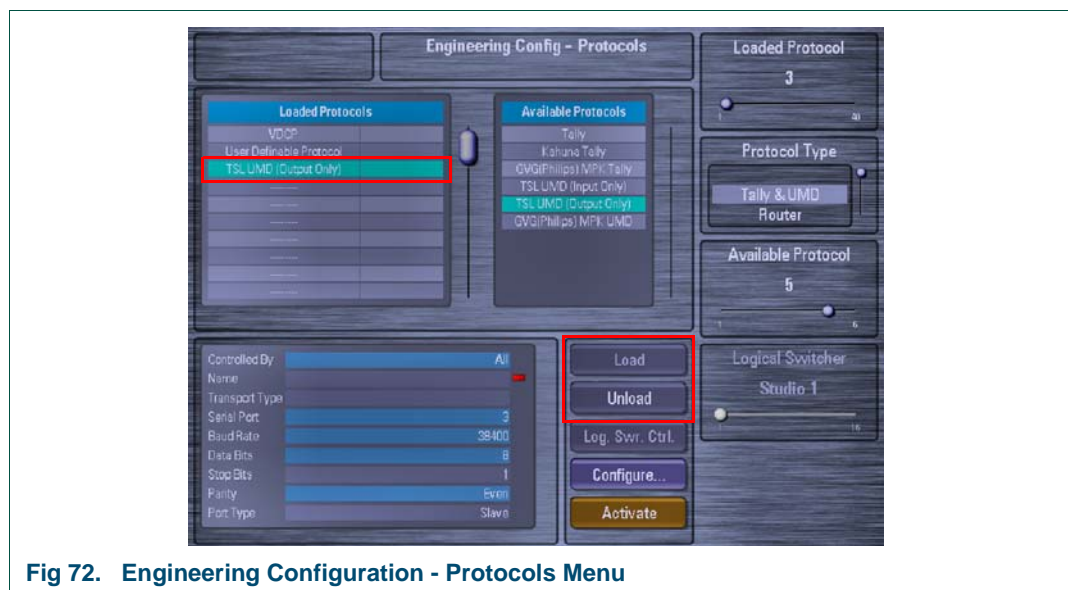


Fig 72. Engineering Configuration - Protocols Menu

17. You should now have a multiviewer layout on the monitor with UMD and Red/Green Box Tallies.

4.5 Connecting the Multiviewer to a Nucleus or Nebula Controller

The MV-16 accepts fixed or dynamic UMD (Under Monitor Display) names.

The multi-viewer can display dynamic UMD tallies of the source names when it is connected to a Nucleus or Nebula controller. The controller provides the UMD source names to the multi-viewer when they are connected together. As the sources change the UMDs will dynamically change to match the correct source name without any intervention from the user.

This section describes how to connect the MV-16 to a Nucleus or Nebula controller.

Note: The source names are limited to 8 characters.

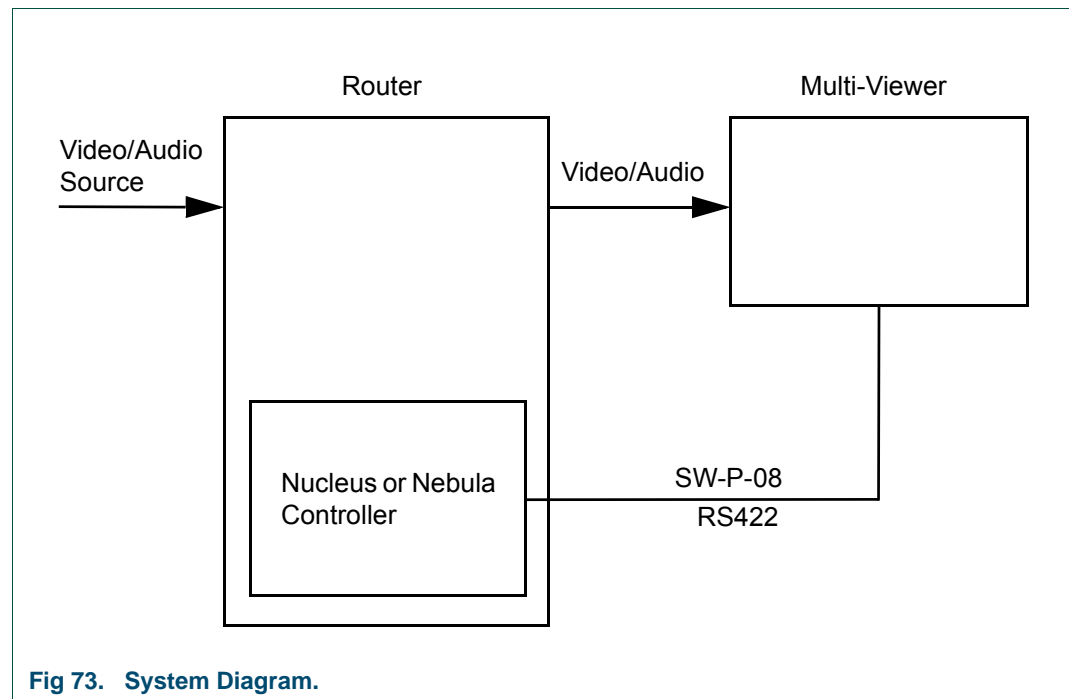


Fig 73. System Diagram.

- See section 4.5.1 for MV-16 settings.
- See section 4.5.2 for cable wiring connections to the Nucleus/Nebula controller.
- See section 4.5.3 for Nucleus controller settings.
- See section 4.5.4 for Nebula controller settings.

4.5.1 MV-16 Settings

- Configure serial port as RS422 (see section 2.5 for jumper settings)
- Configure serial port details (Setup Module > Protocols Tab > Serial Ports Tab > Configure)

Baud Rate	Data Bits	Parity	Stop Bit	Flow Control	Protocol
38400	8	None	1	None	Snell Router

Table 49. MV-16 Serial Port Settings.

- Configure the Multiviewer inputs in the Snell Router Network tab (Setup Module > Protocols tab > Snell Router Network tab > Video Router tab)

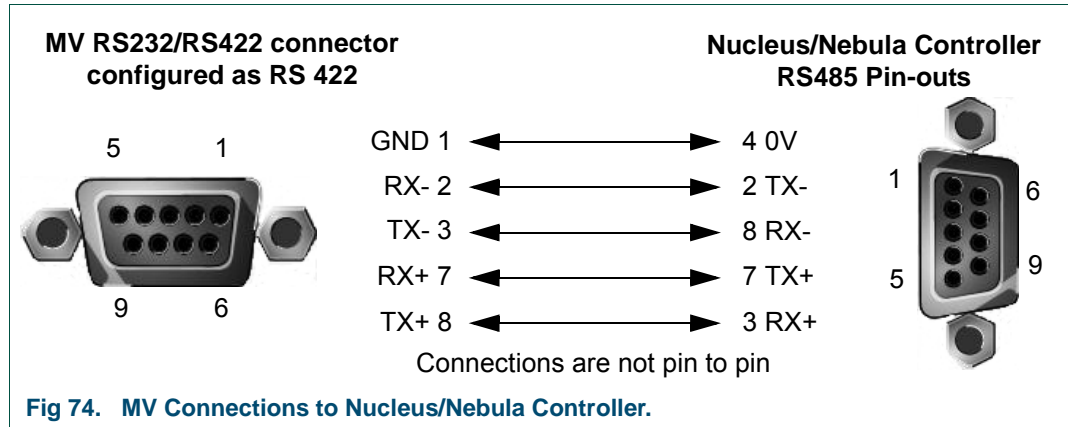
MV Inputs	Matrix N ^o .	Matrix Level	Router Destination	Router Association	Connected Tick Box
MV BNC Input	1	0	As required. Destinations start at 0	As required. Destinations start at 0	Tick to enable polling of Router designations for status changes or background updates if connection is lost
MV BNC Input	1	0	As required. Destinations start at 0	As required. Destinations start at 0	
MV BNC Input	1	0	As required. Destinations start at 0	As required. Destinations start at 0	

Table 50. MV-16 Video Router Tab Settings.

4.5.2 MV-16 Wiring Connections to Nucleus/Nebula Controller

The cable wiring connections for the Nucleus/Nebula are shown in Fig 74.

Note: The connections shown in Fig 74. are not pin to pin



4.5.3 Nucleus 2450 Settings

- Use Centra to configure the Nucleus 2450 serial port as **ptGeneralRemotein**.

Baud Rate	Data Bits	Parity	Stop Bit	Flow Control	Protocol
38400	8	None	1	None	Snell Router

Table 51. Nucleus Serial Port Settings

4.5.4 Nebula Settings

- Use the Nebula editor to configure the Nebula RS485-1 or RS485-2 serial port.

Protocol	Baud Rate	Data Bits	Parity	Stop Bit
General Remote	38400	8	None	1

Table 52. Nebula Serial Port Settings

5. Maintenance Tasks

5.1 Uploading Graphics Files

Graphics files may be uploaded to the frame and assigned as tile objects for display. They might be used for channel identification purposes and up to four images may be displayed at any one time.

Graphics files to be stored in the frame must be in .png format. Uploading the files is performed using a PC connected to the MV-16 LAN port directly, or over a network.

1. Establish communication with the MV-16 frame by using Windows Explorer to search for the IP address of the frame: <ftp://192.168.000.120> or whatever the current IP address is set to.
2. Right click in the right hand side of the Windows Explorer page and select Login As... from the menu. The FTP server Log On As window appears. Log in with the user name root, using the password smv. The complete list of currently loaded files is revealed.
3. Navigate to the Logos directory.
4. Copy the graphics file to the clipboard and paste them into the Logos directory on right hand side of the Windows Explorer page.
5. The file transfer will begin.
6. When the upload is complete, reboot the browser to update the file list.

Note: The IP addresses of the frame and the PC must be in the same range. If necessary, the IP address of the frame can be changed within the on-screen configuration menu.

5.2 Multiviewer System Settings

The Multiviewer system settings are stored in XML format on the controller and can be backed up and restored to the Multiviewer if required. The settings can also be written to a different multiviewer if required.

5.2.1 Backing Up the Multiviewer

1. Establish communication with the MV-16 frame by using Windows Explorer to search for the IP address of the frame: <ftp://192.168.000.120> or whatever the current IP address is set to.
2. Right click in the right hand side of the Windows Explorer page and select **Login As...** from the menu. The FTP server Log On As window appears. Log in with the user name root, using the password smv. The complete list of currently loaded files is revealed.
3. Select the .XML file in the right hand side of the Windows Explorer page and copy it to the PC desktop or wherever the file is to be stored.
4. The file transfer will begin.
5. When the download is complete close the Windows Explorer screen down.

5.2.2 Restoring the Backup file to a Multiviewer

1. Establish communication with the MV-16 frame by using Windows Explorer to search for the IP address of the frame: <ftp://192.168.000.120> or whatever the current IP address is set to.
2. Right click in the right hand side of the Windows Explorer page and select **Login As...** from the menu. The FTP server Log On As window appears. Log in with the user name root, using the password smv. The complete list of currently loaded files is revealed.
3. Copy the .XML file to the clipboard and paste it into the right hand side of the Windows Explorer page.
4. The file transfer will begin.
5. When the upload is complete, reboot the browser to update the file list.
6. Reboot the multiviewer to use the uploaded settings.

6. Upgrading Firmware

From time to time, firmware updates may be made available. The current firmware status of the multi-viewer can be checked in the browser interface Help - About menu, or the on-screen Configuration Mode menu. Uploading new firmware files is easily performed using a PC connected to the MV-16 LAN port directly, or over a network.

1. Establish communication with the MV-16 frame to be upgraded by using Windows Explorer to search for the IP address of the frame: <ftp://192.168.000.120> or whatever the current IP address is set to.
2. Copy the replacement file or files to the clipboard and paste them into the right hand side of the Windows Explorer page.
3. The file transfer will begin.
4. When the upload is complete, reboot the frame to enable the updates to take effect. This will take several minutes to complete, depending on the nature of the updates.

Important:

The IP addresses of the frame and the PC must be in the same range. If necessary, the IP address of the frame can be changed within the on-screen configuration menu.

Other freely available or commercial FTP clients may be used as an alternative to Windows Explorer. For example, WinSCP. This may be required should difficulties be encountered using Windows Explorer. For example, file transfer could be blocked by some Windows security measures. The procedure when using other FTP clients is generally similar.

1. Open the FTP client.
2. Enter the IP address of the MV-16 as the Host Name.
3. Enter 'ftp' as the User Name (no password required).
4. Check that the file protocol is set for FTP and press Enter or Login (as required).
5. If prompted for a password, leave blank and press OK.
6. A window will appear. Copy the new firmware files from the left-hand side (PC) and paste to the right-hand side (MV-16).
7. If in any doubt as to the procedure for your specific FTP client, consult the appropriate user guide or product vendor.

Important:

The IP addresses of the frame and the PC must be in the same range. If necessary, the IP address of the frame can be changed within the on-screen configuration menu.

6.1 Updating the scalers

Some firmware updates may include additional revisions for the video board scalers. The requirement for updating the scalers can be determined by going to the Help - About menu. If any scalers need updating, then there will be a tag "(needs updating)" next to the scalers listed. Where scaler updates are required, proceed with steps 1 to 3 above and continue as follows (note that this process takes approximately 25 minutes for each installed video board):

1. Open a DOS command window.
2. At the command prompt type; 'telnet 192.168.0.120', or whatever the current IP address is set to.
3. Log in with the user name 'root', using the password 'smv'.
4. Type; './update-scalers'
5. The status of the update will be indicated in the command window. Ensure that when the process is complete, all scalers have been updated (there are four scalers per video board).

Appendix A. Hydra Open Protocol

A.1 Introduction

The MV-16 contains a selection of the commands defined in the Barco Hydra Open Protocol. They have been adapted to control the MV-16 in as close as possible way as they would control a Hydra, with the aim being to enable existing scripts already used with a Hydra to be utilized. This protocol uses XML to control certain features of the MV-16 in a user-friendly way on a LAN.

A.2 Formatting

All messages sent to and received from the MV-16 use XML formatting, with each message enclosed in the tag XML. The first element inside the XML tag is always PACKET. The structure is always of the format:

```
<XML>
<PACKET MODULE="MV-16" VERSION="1.0">
...
</PACKET>
</XML>
```

The `MODULE` and `VERSION` attributes in the `PACKET` element are not essential - they are simply there to comply with the Hydra Open Protocol, but are ignored by the MV-16. The response to this will be the same.

A.3 Connections

The Hydra Open Protocol has two types of connections - one for transactions and one for event handling. However, the MV-16 currently only supports transaction types. This is done using TCP port 8881. The normal procedure for sending transactions is:

- Connect using TCP port 8881 to the MV-16
- Send a transaction as XML formatted text
- Receive the result of this transaction as XML formatted text
- Repeat this procedure for further transactions. The connection can be kept open for as long as necessary.
- Close the socket when finished.

A.4 Transactions

A transaction contains a number of commands to be executed by the MV-16. It sits inside a `PACKET` tag and has the following format:

```
<TRANSACTION SERIAL="serial" MODE="mode">
...
</TRANSACTION>
```

`serial` is a unique string to identify each transaction. The MV-16 uses it in the reply to the transaction. `mode` is ignored by the MV-16 and is not essential (it is just present to comply with the format of the Hydra Open Protocol).

The result of a transaction is always sent with the following tag:

```
<TRANSACTIONRESULT SERIAL="serial" ERROR="error">
```

`serial` is the same string that was used in the `TRANSACTION`'s `SERIAL` attribute that was originally sent to the MV-16, and `error` is the number of commands that have failed due to errors in the command sent. Within this transaction response, the command results are stored in the same order that they sent in the original transaction.

A.5 Commands

Each command sits inside a `TRANSACTION` tag and is of the following format:

```
<COMMAND ID="name" SERIAL="serial">
...
</COMMAND>
```

`name` is the name of the command and `serial` is a unique string that the MV-16 uses in the command's transaction result. The result of a command sits inside a `TRANSACTIONRESULT` tag and is of the following format:

```
<COMMANDRESULT SERIAL="serial" ERROR="error">
...
</COMMANDRESULT>
```

`error` is 0 if the command was successful, non zero if not successful. `serial` is the serial string that was supplied in the original `COMMAND` transaction.

In summary, the complete format of a command transaction XML document is:

```
<XML>
<PACKET MODULE="MV-16" VERSION="1.0">
<TRANSACTION SERIAL="serial" MODE="mode">
<COMMAND ID="name" SERIAL="serial">
...
</COMMAND>
```

...more `<COMMAND>` and `</COMMAND>` tags if more than one command is to be sent

```
</TRANSACTION>
</PACKET>
</XML>
```


...and the complete response is:

```
<XML>
<PACKET MODULE="MV-16" VERSION="1.0">
<TRANSACTIONRESULT SERIAL="serial" ERROR="error">
<COMMANDRESULT SERIAL="serial" ERROR="error">
...
</COMMAND>
```

...more `<COMMANDRESULT>` and `</COMMANDRESULT>` tags if more than one command was sent

```
</TRANSACTIONRESULT>
</PACKET>
</XML>
```

A.5.1 Commands - Summary

The commands currently available are listed in the table below.

Command	Description
adjustborder	Updates the border of an object
adjustumd	Updates the UMD text in an object
adjusttext	Updates the lines in a text object
getsourcetally	Gets the state of a tally for a source
getversion	Gets the version of firmware running
loadlayoutandupdate	Load a layout and send it to the screen
setsourcenam	Sets the name (UMD) for a source
setsourcetally	Sets the state of a tally for a source

Table 53. Available Commands

A.5.2 Object related commands

A.5.2.1 Adjust UMD

Adjust the UMD text of an object

Send/Receive	Description
Send	<pre><COMMAND ID="adjustumd" SERIAL="example"> <MODULE ID="module1"> <OBJECT ID="object1"> <LINE ID="0">Line1</LINE> <LINE ID="1">Line2</LINE> </OBJECT> <OBJECT ID="object2"> <LINE ID="1">Text</LINE> </OBJECT> </MODULE> </COMMAND></pre>
Receive	<pre><COMMANDRESULT SERIAL="example" ERROR="0"> </COMMANDRESULT></pre>

Table 54. Adjust UMD

For each object, specify the module name (currently ignored by the MV-16), object name (the username given to the object), line number in the UMD (0 or 1), and text for the UMD line. It is volatile, meaning that it only remains applied to the UMD while the current layout remains on screen. Uploading a new layout or even uploading the current layout again will overwrite the UMD with the text stored in the layout.

A.5.2.2 Adjust Border

Adjust the border color an object

Send/Receive	Description
Send	<pre><COMMAND ID="adjustborder" SERIAL="example"> <MODULE ID="module1"> <OBJECT ID="object1">green</OBJECT> <OBJECT ID="object2">yellow</OBJECT> </MODULE> </COMMAND></pre>
Receive	<pre><COMMANDRESULT SERIAL="example" ERROR="0"> </COMMANDRESULT></pre>

Table 55. Adjust Border

For each object, specify the color of the border. See section A.6.1 on Parameter Colors for the list of colors available.

A.5.2.3 Adjust Text

Adjust the lines of text in a text object

Send/Receive	Description
Send	<pre><COMMAND ID="adjusttext" SERIAL="example"> <MODULE ID="module1"> <OBJECT ID="text1"> <LINE ID="0">Line 1</LINE> <LINE ID="2">Text</LINE> </OBJECT> <OBJECT ID="text2"> <LINE ID="1">Line 2</LINE> </OBJECT> </MODULE> </COMMAND></pre>
Receive	<pre><COMMANDRESULT SERIAL="example" ERROR="0"> </COMMANDRESULT></pre>

Table 56. Adjust Text

For each object, specify the line numbers to update and the text to apply. Note: this does not alter the on/off state of a line of text. For changes made using this command to be visible, the associated lines of text need to be turned on in the Object Properties of the text object in the current layout.

A.5.3 Source related commands

A.5.3.1 Set Source Name

Set the UMD text for a source

Send/Receive	Description
Send	<pre> <COMMAND ID="setsourcename" SERIAL="example"> <MODULE ID="module1"> <SOURCE ID="5"> <NAME>Source5</NAME> </SOURCE> <SOURCE ID="11"> <NAME>Source11</NAME> </SOURCE> </MODULE> <MODULE ID="module2"> <SOURCE ID="8"> <NAME>Source8</NAME> </SOURCE> </MODULE> </COMMAND> </pre>
Receive	<pre> <COMMANDRESULT SERIAL="example" ERROR="0"> </COMMANDRESULT> </pre>

Table 57. Set Source Name

For each source, specify the module name (currently ignored by the MV-16), the source number (0 to n), and the name of the source. The name given will be applied to the first line of the UMD in any objects displaying this source. It is volatile, meaning that it only remains applied to the UMD while the current layout remains on screen. Uploading a new layout or even uploading the current layout again will overwrite the UMD with the text stored in the layout.

A.5.3.2 Set Source Tally

Set the tallies for a source

Send/Receive	Description
Send	<pre> <COMMAND ID="setsourcetally" SERIAL="example"> <MODULE ID="module2"> <SOURCE ID="8"> <TALLY ID="1"> <STATE>0</STATE> </TALLY> <TALLY ID="2"> <STATE>1</STATE> </TALLY> </SOURCE> </MODULE> </COMMAND> </pre>
Receive	<pre> <COMMANDRESULT SERIAL="example" ERROR="0"> </COMMANDRESULT> </pre>

Table 58. Set Source Tally

For each source, specify the source number (0 to n), tally number (0 to 2), and tally state (0 or 1).

Tally numbers 0 and 1 are the two software tallies - the tallies need to be set as software ones in the tally properties of the object(s) displaying this source for the tallies to be affected by this command.

Tally 2 is a hardware output tally (GPI) - the source needs to have a GPI output assigned as a tally output to this source for tally 2 to have any affect. (These are set in the Module Properties > GPIs > GPO Alarms tab - tally outputs are assigned here by selecting a Source x tally output option from the list).

A.5.3.3 Get Source Tally

Get the tallies for a source

Send/Receive	Description
Send	<pre> <COMMAND ID="getsourcetally" SERIAL="example"> <MODULE ID="module2"> <SOURCE ID="9"> <TALLY ID="0"></TALLY> <TALLY ID="1"></TALLY> <TALLY ID="2"></TALLY> </SOURCE> <SOURCE ID="18"> <TALLY ID="1"></TALLY> </SOURCE> </MODULE> </COMMAND> </pre>
Receive	<pre> <COMMANDRESULT SERIAL="example" ERROR="0"> <MODULE ID="module2"> <SOURCE ID="9"> <TALLY ID="0"> <STATE>0</STATE> </TALLY> <TALLY ID="1"> <STATE>1</STATE> </TALLY> <TALLY ID="2"> <STATE>0</STATE> </TALLY> </SOURCE> <SOURCE ID="18"> <TALLY ID="1"> <STATE>1</STATE> </TALLY> </SOURCE> </MODULE> </COMMANDRESULT> </pre>

Table 59. Get Source Tally

For each source, specify the source number (0 to n), and tally number (0 to 2).

Tallies 0 and 1 refer to the two software tallies and return their current on/off state as set by the setsourcetally command or other sources that can control the tallies by software such as the TSL UMD protocol.

Tally 2 is the state of the hardware tally input (GPI) that is assigned to the source. These are configured in the Module Properties > GPIs > GPI Inputs tab. (Note: a single source can have more than one GPI input assigned as an input tally. If a source does have multiple input tallies then the getsourcetally will indicate a state of 1 if any of these assigned tallies are currently asserted. Otherwise the state will be 0).

A.5.4 Module related commands

A.5.4.1 Load a layout

Load a layout and send it to the screen

Send/Receive	Description
Send	<pre><COMMAND ID="loadlayoutandupdate" SERIAL="example"> <MODULE ID="module1"> <LAYOUT ID="test"> </LAYOUT> </MODULE> </COMMAND></pre>
Receive	<pre><COMMANDRESULT SERIAL="example" ERROR="0"> </COMMANDRESULT></pre>

Table 60. Load a Layout

In the LAYOUT tag, in the ID attribute, specify the name of the layout file to load and send to the screen.

A.5.4.2 Get Firmware Version

Get the version of firmware running on the system

Send/Receive	Description
Send	<pre><COMMAND ID="getversion" SERIAL="example"> </COMMAND></pre>
Receive	<pre><COMMANDRESULT SERIAL="example" ERROR="0"> <VERSION ID="FIRMWARE">2.0.84</VERSION> <VERSION ID="OS">2.6.22.1.151</VERSION> </COMMANDRESULT></pre>

Table 61. Get Firmware Version

The VERSION tag with the ID attribute set to FIRMWARE contains the version of the multiviewer application running. The VERSION tag with the ID attribute set to OS indicates the version of Linux running on the system.

A.6 Parameter Values

Some of the values applied are text values relating to a particular attribute of an object. For example colors are set using color names. The text values available are listed here.

A.6.1 Color Values

Colors available for setting objects that can have their color attribute set are:

black, blue, red, green, magenta, cyan, yellow, white, grey75, grey50, grey25, grey15, darkblue, darkred, darkgreen, darkmagenta, darkcyan, darkyellow

The text values used are not case sensitive.

Appendix B. Technical Appendix

This chapter provides tabular overviews about the technical details of the MV-16, its components and of their interfaces.

B.1 Technical Data

The following table contains data relating to the Main Frame.

Item	Description
Signal Inputs	
Video	<p>Up to 16 video inputs (4 per video I/P card).</p> <p>Video I/P card MV-VIP1, any mix of:</p> <p>Composite video PAL, PAL-M, NTSC, NTSC-4.43, SECAM, CVBS: 1Vpp</p> <p>S-video (Y/C)</p> <p>Component video RGB / YUV</p> <p>SDI - SMPTE 259M</p> <p>Two DVI-I digital or analog component</p> <p>DIV input formats: 800x600 @ 60Hz, 1024x768 @ 60Hz, 1280x1024 @ 60Hz, 1280x768 @ 60Hz, 1600x1200 @ 60Hz, 1920x1080 @ 60Hz</p> <p>Video I/P card MV-VIP2, same as MV-VIP1, plus</p> <p>HD-SDI - SMPTE292M - 1920x1080i60, 1920x1080i59.94, 1920x1080i50, 1920x1080p30, 1920x1080p29.97, 1920x1080p25, 1920x1080p24, 1920x1080p23.98, 1280x720p60, 1280x720p59.94, 1280x720p50, SMPTE424M - 1920x1080p60, 1920x1080p59.94, 1920x1080p50</p> <p>(some connector related limitations apply)</p> <p>Auto-sense on composite, SDI and HD-SDI feeds</p>
Embedded Audio	Embedded audio derived from SDI/HD-SDI (up to 16 channels per source)
External Audio	<p>Via optional input cards:</p> <p>Analog - up to 32 channels (16 pairs)</p> <p>AES/EBU - up to 32 channels (16 pairs) with SRC (32kHz-96kHz re-sampled to 48kHz)</p>
Outputs	<p>One DVI-I output supporting resolutions; XGA, 720p60, 720p50, SXGA, SXGA+, 1080p60, and 1080p50 (as per the pixel aspect ratio, or other selectable options for non-square pixels). Processing delay approximately 1 video frame, depending on video source.</p> <p>Video sources fully scalable and displayed in native format (4/3, 16/9)</p> <p>Audio monitoring output, up to 8 analog output channels as standard</p> <p>Audio bars superimposed or external to video</p> <p>Genlocked video sources</p>

Table 62. Technical Data

Item	Description
Alarms	
Video Inputs	Sync loss, Black, Freeze frame
Audio Inputs	Loss of embedded or external audio, over-level, out of phase channel pairs
Metadata Inputs	Loss of VITC (SDI only), teletext (analogue), subtitles, video non-sync detection Loss of V-chip (composite only)
Alarm Indication	Visual (in display), GPI, LAN, SNMP traps
Metadata	
Decoding/Monitoring	Teletext (analog), Subtitles, AFD driving aspect ratio (SDI only), WSS driving aspect ratio (composite only), VITC (SDI only)
GPI I/O	16 inputs and 8 outputs
Sales and Ballistics	
NORDIC	Overall dynamic range: 54dB (+12 to -42dB) Attack time: 10mSec Decay time: 1.7 Sec per 20dB decay
DIN/PPM	Overall dynamic range: 55dB (+5 to -50dB) Attack time: 10mSec Decay time: 1.5 Sec per 20dB decay
BBC PPM	Overall dynamic range: 55dB (+5 to -50dB) Attack time: 10mSec Decay time: 1.5 Sec per 20dB decay
VU	Overall dynamic range: 23dB (+3 to -20dB) Attack time: 300mSec Decay time: 300mSec per 20dB decay
VU EXT	Overall dynamic range: 60dB (+10 to -50dB) Attack time: 300mSec Decay time: 300mSec per 20dB decay
AES/EBU	Overall dynamic range: 60dB (0 to -60dB) Attack time: < 5 ms Decay time: 1.5 Sec per 20dB decay
Phase Correlation Display	Attack time: 0.4 Sec for zero to ± 1 deviation Decay time: 0.4 Sec for ± 1 to zero deviation Input dynamic range: 45dB Minimum input level: -45dBu

Table 62. Technical Data

Physical Spec	
Mechanical	<p>1U 19" Rack Mount box.</p> <p>Outline Dimensions: 484mm(W) x 426mm(D) x 44.5mm(H)</p> <p>Weight: 8kg (full frame)</p>
Power	<p>Auto-sensing, 90 - 264 V AC and 50/60 Hz, dual redundant mode power supplies. Power supply and fan failure LED indicators on front panel.</p> <p>Maximum power consumption 190W (fully loaded frame with 16 x 3G video sources)</p>
Environmental	Temperature 0°C to 30°C Humidity 70% max.
Cards	<p>Video Input card A: composite, SDI, DVI-I, S-Video, Component</p> <p>Video Input card B: as card A with HD-SDI</p> <p>Audio input or output card consumes 1 slot</p>
Front Panel	<p>USB connector for keyboard</p> <p>10 preset buttons</p> <p>6 on-screen menu control buttons</p>
Rear Panel	<p>2 x 32 way 'D' input connectors for audio inputs / outputs</p> <p>2 x DVI-I connectors for digital or analog component inputs</p> <p>1 x DVI connector for digital or analog display</p> <p>16 x BNCs for auto-sensing video inputs</p> <p>1 x BNC for LTC input</p> <p>1 x BNC for video sync input</p> <p>1 x 25 way 'D' connector for audio monitoring out</p> <p>1 x RJ45 connector for Ethernet (LAN) for browser and NTP clock update</p> <p>1 x RS232/RS422 connector for UMD tally via TSL, Image Video or other protocols</p> <p>1 x 26 way 'D' connector GPI/O port</p>

Table 63. Physical Technical Data

Appendix C. Trouble Shooting

C.1 Problem solving

The power switch should illuminate red whenever mains power is supplied. Always make sure that power is connected before using the problem solving guide.

A spare fuse is provided in the IEC mains connector before the unit leaves the factory. Always replace the fuse with one of the correct value as shown in the Installation section.

In the event of a power supply failure, there is front panel and remote panel indication. The second supply is able to sustain operation of the unit until it can be removed from service and the fault rectified.

The table in section C.1.1 provides some sample faults and their solutions.

For faults outside these, contact the Snell Customer Service desk.

C.1.1 Sample problems and their solutions

There is no video output

Check that there is power to the unit and that it is turned on.

Check that the video output resolution is not beyond the capability of the display. (see answer to question below).

An output should be seen once the unit has booted.

The image appears fuzzy or lacking clarity

If an analog or digital LCD/Plasma screen is used, check that the output resolution of the MV-16 is the same as the native resolution of the panel. This will avoid forcing the screen to rescale the image. Most LCD/Plasma screens produce artifacts when their internal scalars are active.

Output resolution is set using the Screen Resolution function under the System menu.

The image is not centered in the screen

Use the monitor controls to align the image.

If an analog LCD screen is used use the auto-adjust facility.

Unit fails to respond correctly to commands

Power cycle the unit and/or perform a Master Reset. A Master Reset will restore all settings to the factory default. Turn off the power for a few seconds, then turn it back on while pressing both Fade/Function buttons during boot up. Follow any required configuration steps after reset.

Can digital audio be balanced or unbalanced?

Yes.

AES/EBU inputs may be jumper selected per channel to be either balanced or unbalanced inputs. The settings are set via jumpers on each digital audio input card as explained in the installation section.

Can I use analog bar graphs for digital inputs (or digital scales for analog inputs)?

Yes.

The range colors, break points and level references are set for the scale type and NOT the source assigned.

For example assuming the following settings:

- Analog scale type: AES/EBU
- Analog/Digital scale reference: -18dBfs
- Analog 0dB reference: 0dBu
- Digital upper range point: -18dBfs
- Digital lower range point: -40dBfs

Feeding in analog 0dBu will produce a level of -18dBfs, with the color changes occurring at -40dBfs and -18dBfs.

Changing the Analog 0dB reference to +4dBu will produce a level of -22dBfs, with the color changes unaltered.

Changing the Analog/Digital reference to -20dBfs (with the analog ref still at +4dBu) will produce a level of -24dBfs, with color changes unaltered.

The same applies to displaying digital channels on an analog scale; the color changes will adhere to the analog upper and lower settings.

What are the RS232/RS422 options?

RS232 or RS422 operation can be selected via jumpers on the controller (CPU card), as explained in the installation section.

Why are time clock/date settings lost when the frame is power cycled?

This data is normally maintained by a rechargeable battery situated on the CPU board, which has a typical life of 6+ years. Loss of data indicates that the battery requires replacement. Please contact your Snell dealer.

Why does the message 'Program Will Not Load' appear when launching the web interface?

.This message is issued by the Java application. It's caused by the caching of an incompatible version of the applet. If using Windows, open Control Panel and click on the Java icon. Within the Temporary Internet Files section, select View. Within the Show drop-down menu, select Resources. Click on the URL heading bar to sort the view by URLs, then scroll down to 192.168.0.120:80/Applet.jar (or the appropriate IP address for the frame), and delete it.

The applet should load correctly after restarting the browser.