Crystal Vision

M-CLEANIT

SOFTWARE APP

IP/SDI profanity delay

The M-CLEANIT profanity delay offers numerous (and unique) ways to deal with video and audio profanities to keep your content protected – and is perfect at preventing expletives, obscene gestures, wardrobe malfunctions, bloopers, competitor mentions, coughing fits or technical problems from making it to air.

The M-CLEANIT is a software app that runs on the MARBLE-V1 media processor – purpose-built GPU/CPU hardware that fits in the Vision frame. It can be used with IP, with SDI or with both IP and SDI at the same time. Its support for multiple signal formats gives the easiest possible SDI to IP upgrade, while also making it perfect for mixed SDI and IP installations as well as fully IP or fully SDI environments. It supports SMPTE ST 2022 video over 10GbE IP networks including ST 2022-7 redundant streaming. 31 video formats are supported.

In a profanity delay system a live content stream is delayed to give the operator time to react and prevent the broadcast of unwanted or offensive video or audio material. The M-CLEANIT allows the live stream to be delayed by up to 600 frames, which is 24 seconds in 1080i50, 20 seconds in 1080i59.94, 12 seconds in 720p50/1080p50 and ten seconds in 1080p59.94.

The M-CLEANIT offers you incredible flexibility to manage your content. All of the cleaning features are user configured and individually controlled – making it easy for operating procedures to be established for each production, tailored to the content. The video and audio cover options are extensive. You can clean switch to two different video sources, jump ahead in time of the offensive content, blur the video, make the video black or blue, show colour bars, show a web page, mute individual audio channels or switch to another audio flow. One of the M-CLEANIT's most useful features is the flexibility of its delays: the 'delay to event' and 'delay to restore' can either be the same length or different, which allows for further customisation of the workflow. There are also override controls which act immediately – ideal for emergency situations where the profanity was missed. The recommended way to operate the M-CLEANIT is by using the SBB-4 smart button box, with its momentary buttons providing very precise cleaning.

The M-CLEANIT's gateway functionality can be used to integrate SDI into an IP environment or IP into an SDI environment. Its IP to IP translation functionality can be used for network address translation, protocol conversion (between any of the input formats and any of the output formats), unicast to multicast address conversion and the creation of media firewalls. The IP flows can be separated and protected across up to four bi-directional 10GbE SFP+ network interfaces.

Other features include full VLAN support, traffic shaping and signal status monitoring.

Should you want to change the functionality of your product completely, you just need to buy a new app to run on your MARBLE-V1 hardware.

- Software app that runs on the MARBLE-V1 media processor
- Flexible profanity delay system for live video and audio
- Use it with SDI, IP or both at the same time: supports 31 video formats and SMPTE ST 2022-6 and ST 2022-7 protocols (NB. Full ST 2110 support coming soon)
- Equally suited to traditional broadcasting or social media webcasts
- Main programme can be delayed by up to 600 frames (24 secs in 1080i50, 20 secs in 1080i59.94, 12 secs in 720p50/1080p50 and ten secs in 1080p59.94)
- Video protection: clean switch to two different video sources, jump ahead in time of the offensive content, blur the video, make the video black or blue, show colour bars or show a web page
- Audio protection: mute individual audio channels or switch to another audio flow
- Both timed and immediate activation of cover/uncover functions, with flexible 'delay to event' and 'delay to restore' timings
- Use the Monitor output to monitor your content: shows source routable window (video with associated audio), Cleanit out video, Source A video, Delayed Source A video, Source B video, Source C video, Event pending tally and Event active tally simultaneously
- Includes synchroniser and choice of multiple timing sources with fail-over (PTP, two analogue Black and Burst or tri-level syncs references via Vision frame, or video input)
- Supports SMPTE ST 2022-7 redundant streaming
- Fitting up to four bi-directional 10GbE network interfaces allows you to separate your IP flows as required
- Includes gateway functionality for hybrid systems, encapsulating SDI to IP and de-encapsulating SDI from IP
- Includes IP to IP translation functionality, such as network address translation, unicast to multicast address translation, setting firewall restrictions and protocol translation between any of the input formats and any of the output formats
- Tolerant of any input packet distribution, and includes output traffic shaping
- Protect your SDI programme output with dual relay bypass protection option
- Know your signal is present and valid, with SDI and IP flow signal monitoring
- Easy operation using the four momentary buttons on the SBB-4 smart button box
- Additional remote control and monitoring available: frame integrated control panel, remote control panels, ASCII and JSON protocols, SNMP and the web browser-based VisionWeb Control
- Save rack space: MARBLE-V1 media processor is a 'double slot' 96mm x 325mm card, with up to ten MARBLE-V1 fitting in 3U

WHAT MAKES THE PERFECT PROFANITY DELAY?

✓ Big choice of ways to protect your content

The M-CLEANIT offers you the most cover options – with some unique! Clean switch to two different video sources, jump ahead in time of the offensive content, blur the video, make the video black or blue, show colour bars, show a web page, mute individual audio channels or switch to another audio flow.

✓ Simple control

The SBB-4 smart button box – with its four big momentary buttons – makes live operation of the M-CLEANIT easy.

✓ Ten seconds or more of programme delay

The M-CLEANIT can delay your programme by up to 600 frames – that's between ten seconds (1080p59.94) and 25 seconds, depending on video format.

✓ Being future-proof

The M-CLEANIT can work with IP, SDI or both at the same time, and gives you the easiest SDI to IP upgrade.

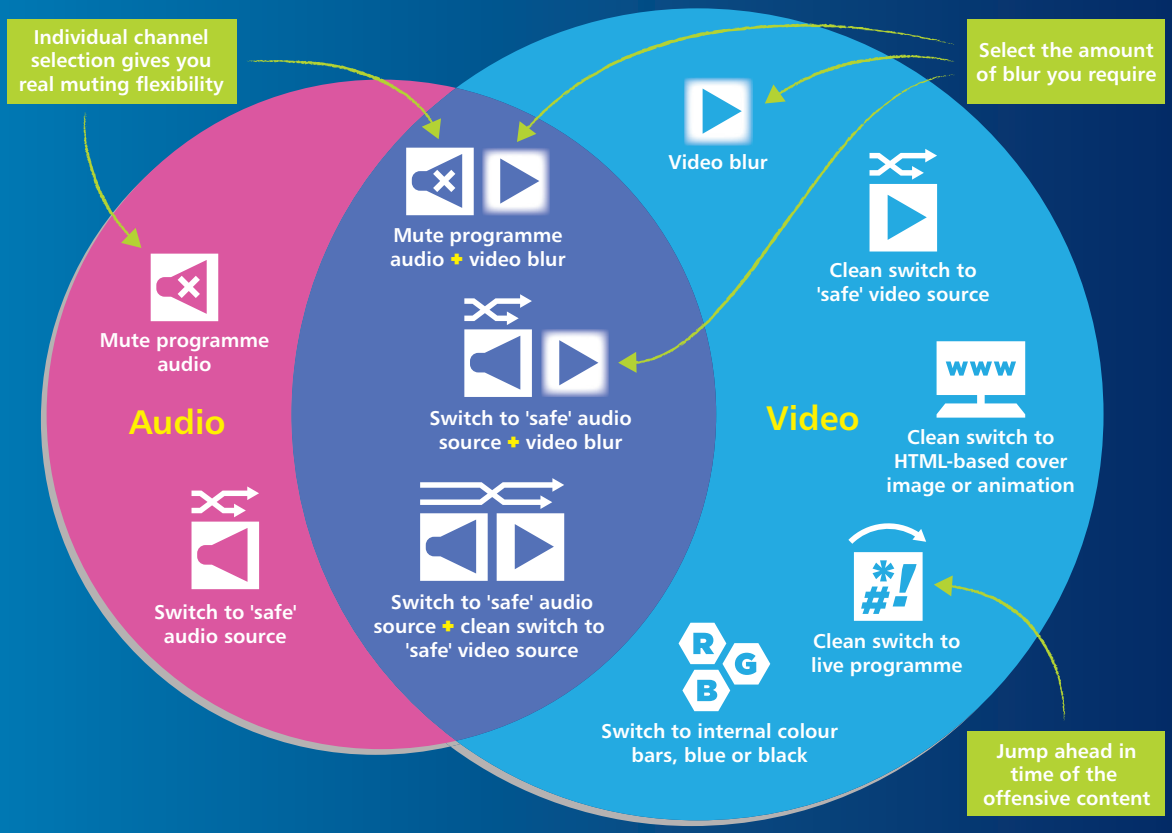
✓ Powerful content monitoring

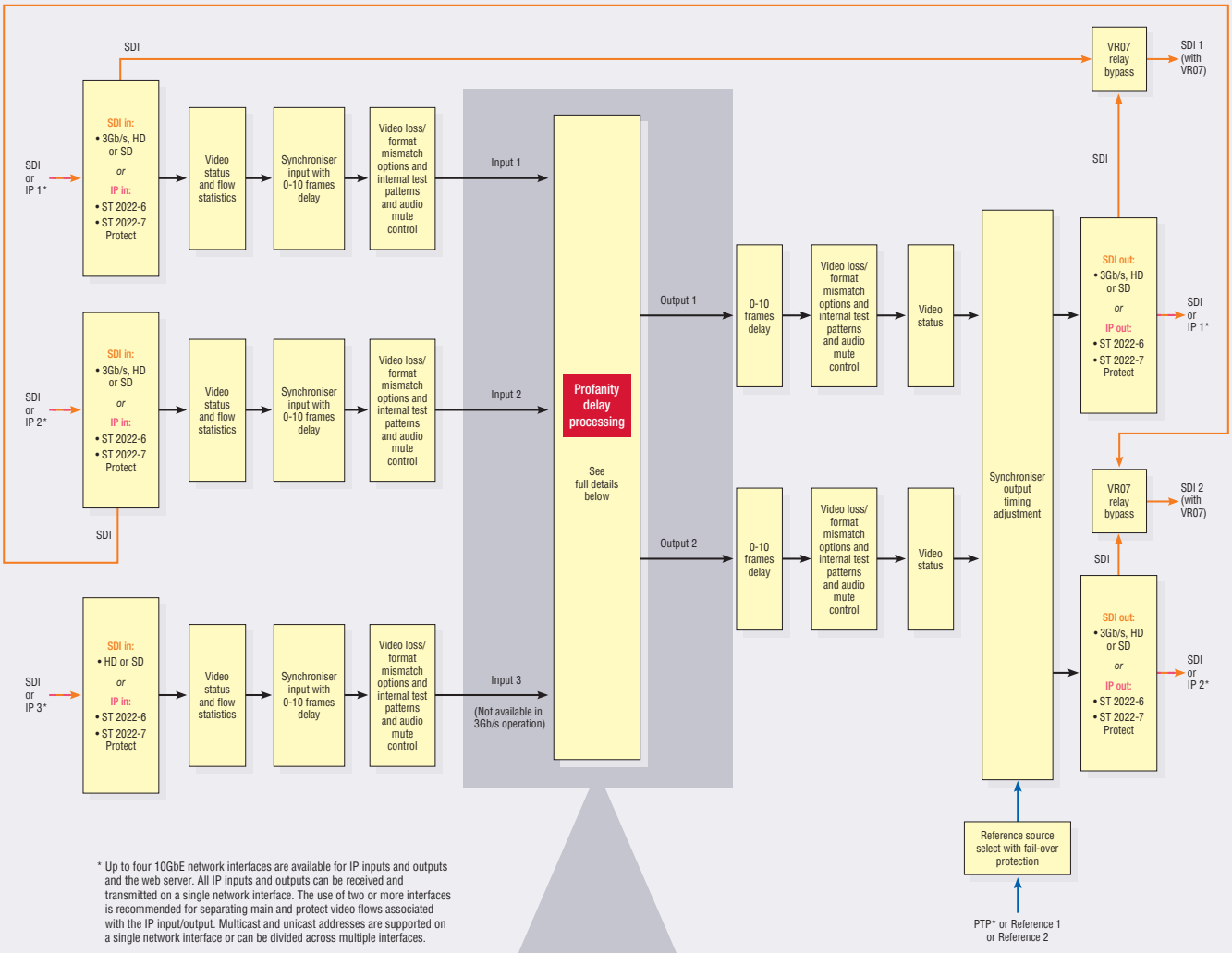
You'll have full confidence of your content with the M-CLEANIT's Monitor output, where you can view your most important sources together on one screen.

✓ Flexible delays to suit your workflow

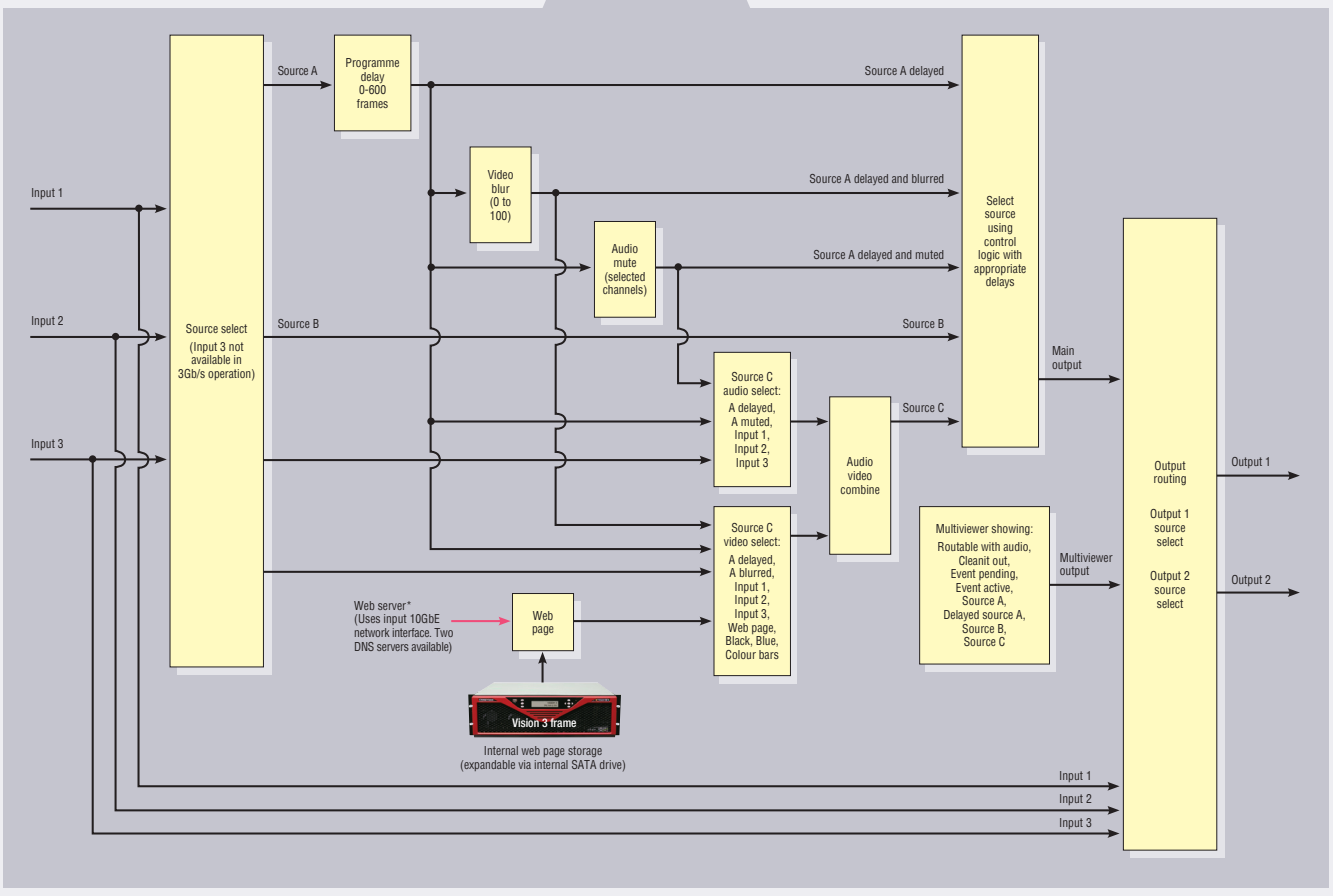
With the M-CLEANIT you can make the 'delay to event' and 'delay to restore' timings the same or different. Use a longer 'delay to restore' to add some safety delay, for example.

WAYS TO KEEP YOUR CONTENT CLEAN

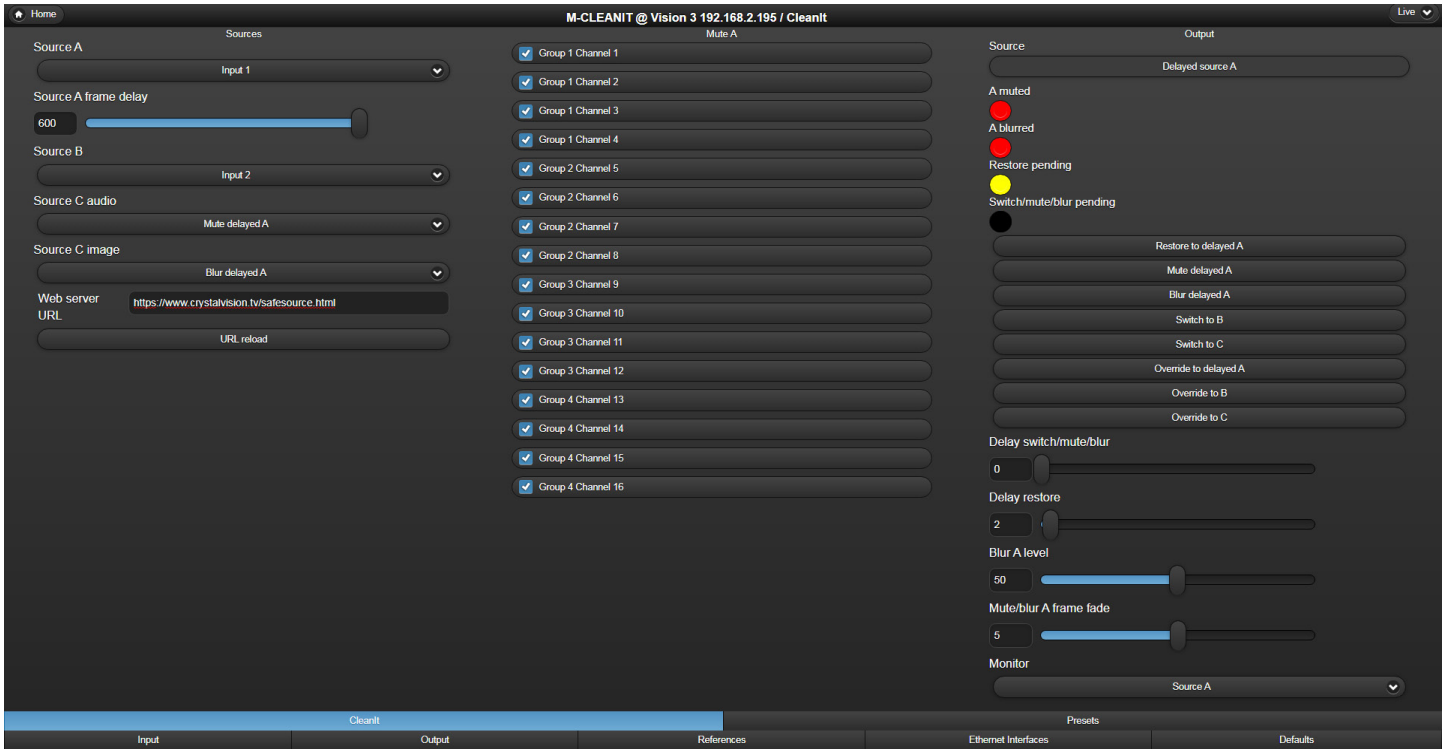




* Up to four 10GbE network interfaces are available for IP inputs and outputs and the web server. All IP inputs and outputs can be received and transmitted on a single network interface. The use of two or more interfaces is recommended for separating main and protect video flows associated with the IP input/output. Multicast and unicast addresses are supported on a single network interface or can be divided across multiple interfaces.



THE CONTROLS



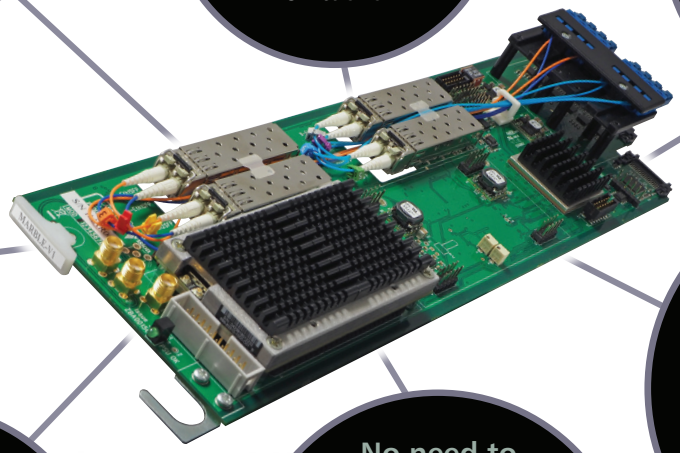
Example of a VisionWeb Control GUI

THE MARBLE-V1 MEDIA PROCESSOR

Shared hardware platform = many tasks

Powerful CPU/GPU processor = perform any task or combinations of tasks

I/O flexibility = six bi-directional SDI, four 10GbE SFP+ network interface and eight bi-directional discrete AES



Change the functionality completely = install a different app

Features to help your systems work = signal monitoring, test patterns, traffic shaping, synchronisation, video delay and more

Software-based platform = easy to create custom products or add features

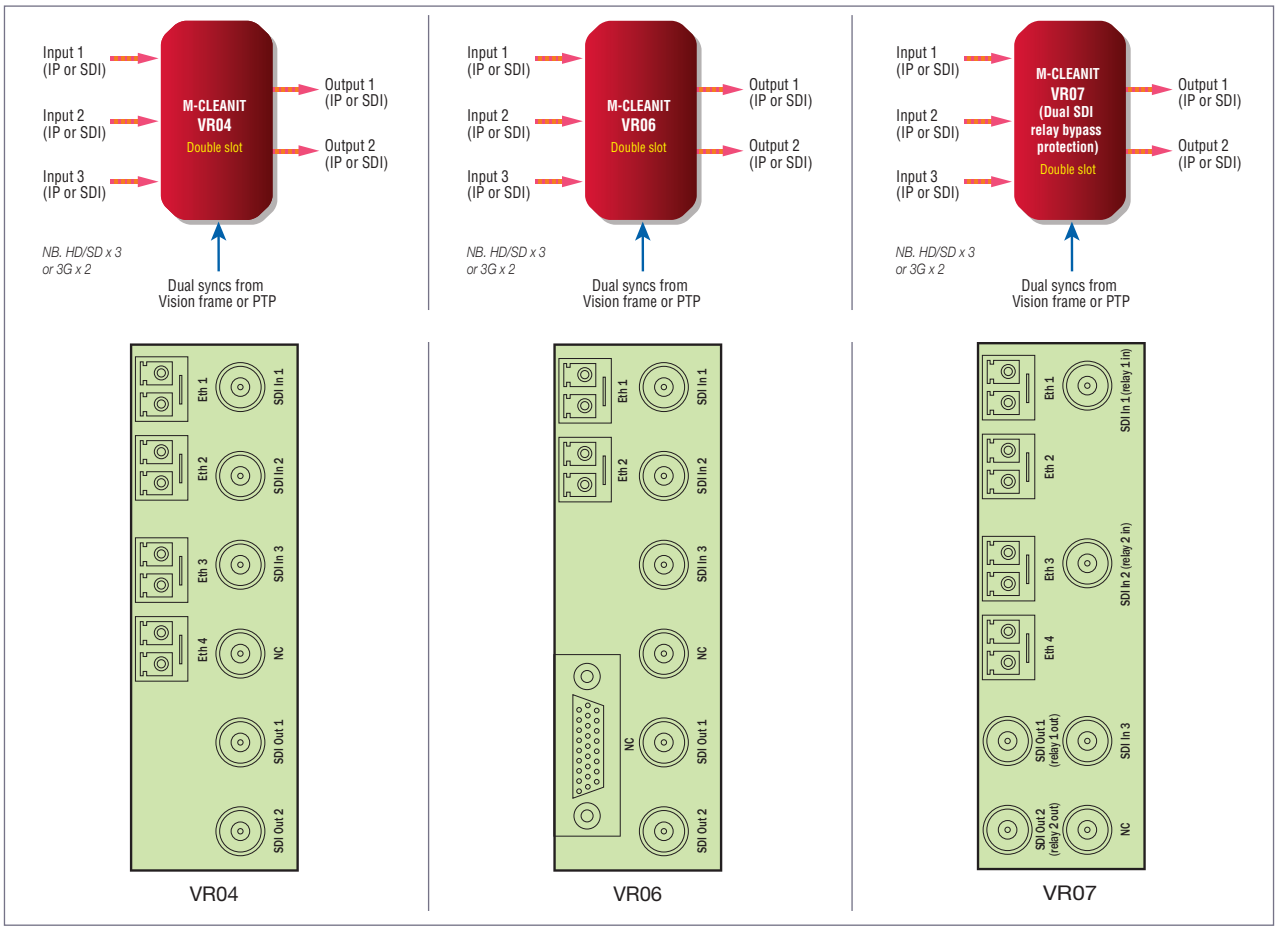
No need to choose between IP and SDI = apps can work with IP, SDI or both – and include IP gateway and translation functionality

MONITOR YOUR OUTPUT

In a profanity delay system, confidence in the content is crucial. The M-CLEANIT provides this confidence by allowing one of its two outputs to show the Monitor output – a fixed multiviewer which allows you to monitor everything that is happening.

REAR MODULE CONNECTIONS

NB. A generic label will be supplied with purchase of the VR04, VR06 and VR07 rear modules. The labels shown below are provided to help you understand the signal connections, such as for wiring purposes.



continued overleaf...

M-CLEANIT APP RUNNING ON MARBLE-V1 MEDIA PROCESSOR

MECHANICAL

'Double slot' Vision card 96mm x 303mm (96mm x 325mm including finger pull)

Weight: 355g

Power consumption: 25 Watts, plus 1 Watt for each SFP+ fitted to MARBLE-V1

INPUTS AND OUTPUTS

Inputs can be IP and/or SDI

Outputs can be IP and/or SDI

Five BNCs for SDI and up to four fibre SFP+ 10GbE IP network interfaces. Choice of fibre modules: either 850nm multi-mode (for up to 300m) or 1310nm single-mode (for up to 10km)

IP inputs and outputs can be ST 2022 (NB. ST 2110 coming soon)

IP only, SDI to IP and IP to SDI applications require at least one SFP+ transceiver option, up to a maximum of four. All IP inputs and outputs can be received and transmitted on a single network interface. The use of two or more interfaces is recommended for separating main and protect video flows associated with the IP input/output. Multicast and unicast addresses are supported on a single network interface or can be divided across multiple interfaces. One network interface could be used exclusively for the web server, if required

SDI only applications do not require any SFP+, unless using a web server for a web page cover source in which case one SFP+ will be required

Uses VR04, VR06 or VR07 frame rear modules. VR04 or VR07 must be used when more than two SFP+ are fitted

The video format mode can be set using Defaults->Mode. By default, the mode is set to "1&2:SD/HD 3:SD/HD", where Input 1, Input 2 and Input 3 are available for HD or SD. For 3Gb/s operation the mode should be changed to "1&2:SD/HD/3G 3:Disabled", which allows for Input 1 and Input 2 to be 3Gb/s with Input 3 disabled

SDI VIDEO INPUTS

(NB. Some or all of the inputs can be IP instead)

Up to two 3Gb/s SDI inputs or three HD or SD SDI inputs. If the input is 3Gb/s then Input 3 is disabled

270Mb/s or 1.5Gb/s or 3Gb/s serial compliant to SMPTE 259, SMPTE 292-1 and SMPTE 424/425-A

3Gb/s cable equalisation up to 100m using Belden 1694A. HD cable equalisation up to 140m with Belden 1694A or equivalent (approx. 100m with Belden 8281). SD cable equalisation >250m Belden 8281 or equivalent

IP INPUTS

(NB. Some or all of the inputs can be SDI instead)

Up to two 3Gb/s video over IP inputs or three HD or SD video over IP inputs. If the input is 3Gb/s then Input 3 is disabled

Packet distribution is not important as variable input buffer will compensate for any timing irregularities

A protect input for SMPTE ST 2022-7 seamless protection switching can come from any of the 10GbE IP network interfaces. This protects the video flow from lost packets by creating two streams of the same data using different routing to the destination. IP packet analyser handles the analysis and reconstruction of the protected video flow. Any IP input can come from any of the 10GbE IP network interfaces and can either be multicast or unicast

SDI VIDEO OUTPUTS

(NB. Some or all of the outputs can be IP instead)

Up to two 3Gb/s or HD or SD SDI outputs

270Mb/s or 1.5Gb/s or 3Gb/s serial compliant to SMPTE 259, SMPTE 292-1 and SMPTE 424/425-A

IP OUTPUTS

(NB. Some or all of the outputs can be SDI instead)

Up to two 3Gb/s or HD or SD video over IP outputs

Any of the 10GbE IP network interfaces can be used to provide a protected output for SMPTE ST 2022-7, which protects the stream from lost packets by creating two streams of the same data using different routing to the destination

Alternatively it is possible to have a unicast on some network interfaces and a multicast on others

RELAY BYPASS PROTECTION (SDI ONLY)

The VR07 frame rear module provides dual relay bypass protection when M-CLEANIT is used with both SDI inputs and SDI outputs

The relay bypass protection protects the video output on frame power failure or if the MARBLE-V1 card loses power or is removed

An electromechanical relay switch on the VR07 needs power to hold the switch in one state and will revert to the other state (card bypass) on loss of power. It prevents signal loss by mechanically connecting an SDI input to an SDI output: SDI In 1 is connected to SDI Out 1 and SDI In 2 is connected to SDI Out 2

NB. Use of the VR07 requires issue 5 or later of MARBLE-V1

VIDEO FORMATS SUPPORTED

The video formats supported are 625i, 525i, 720p50, 720p59.94, 720p60, 1080i50, 1080i59.94, 1080i60, 1080p23.98, 1080p24, 1080p25, 1080p29.97, 1080p30, 1080p50, 1080p59.94, 1080p60, 1080PsF23.98, 1080PsF24, 1080PsF25, 1080PsF29.97, 1080PsF30, 2048x1080p23.98*, 2048x1080p24*, 2048x1080p25*, 2048x1080p29.97*, 2048x1080p30*, 2048x1080PsF23.98*, 2048x1080PsF24*, 2048x1080PsF25*, 2048x1080PsF29.97*, 2048x1080PsF30* (*= YUV 4:2:2 10 bit)

IP PROTOCOLS

Protocols currently supported on network interfaces: SMPTE ST 2022-6, SMPTE ST 2022-7, IGMPv3, ARP, ICMP ping, IPv4, IEEE802.1q, VLAN, IEEE802.3-2012 (10G Ethernet), LLDP

Packet shaping and distribution of the video flow (optional in ST 2022) is selectable per IP output between TPNL and TPN (narrow linear or narrow gapped packet distribution). There is also a mode for burst packet distribution with a control for the burst rate limit. This is for connecting between Crystal Vision and other compatible devices that allow for a reduced transmission delay

SMPTE ST 2022-7 video flow protection facilitates the dual stream output

VIDEO AND AUDIO COVER

To prevent profanities from being broadcast, it is possible to clean switch to two different video sources, jump ahead in time of the offensive content, blur the video, make the video black or blue, show colour bars, show a web page, mute individual audio channels or switch to another audio source

SOURCES

Note: Input 3 not available in 3Gb/s operation

Source A: Input 1, Input 2 or Input 3 can be selected as the Source A programme feed

Source B: Input 1, Input 2 or Input 3 can be selected as an alternate 'safe' feed to switch to during a cover event

Source C video: Input 1, Input 2, Input 3, Blurred A, Delayed A, Black, Blue, Colour bars or Web server can be clean switched to during a cover event. Web pages can be accessed remotely – with two DNS servers available – or can be stored internally on Vision 3 frame via FTP, with storage expandable via internal SATA SSD drive. Note: For only the Source C audio to be affected during a Switch to C event, select Delayed A here

Source C audio: The audio from Input 1,

continued overleaf...

Input 2, Input 3, Delayed A or Muted A can be switched to during a cover event

PROGRAMME DELAY

Source A programme delay adjustable in steps of frames

Minimum delay: 0 frames

Maximum delay: 600 frames, which is:

- 25 seconds (1080p23.98, 1080p24, 1080PsF23.98, 1080PsF24, 2048x1080p23.98, 2048x1080p24, 2048x1080PsF23.98, 2048x1080PsF24)
- 24 seconds (625i, 1080i50, 1080p25, 1080PsF25, 2048x1080p25, 2048x1080PsF25)
- 20 seconds (525i, 1080i59.94, 1080i60, 1080p29.97, 1080p30, 1080PsF30, 2048x1080p30, 2048x1080PsF30, 2048x1080p29.97, 2048x1080PsF29.97)
- 12 seconds (720p50, 1080p50)
- 10 seconds (720p59.94, 720p60, 1080p59.94, 1080p60, 1080PsF29.97)

Programme delay adjustments can be made live. The M-CLEANIT applies the adjustments slowly over time, with small delay adjustments therefore going virtually unnoticed. Increasing the delay slows down the video until the delay is correct, while reducing the delay speeds up the video until the delay is correct

EVENT AND RESTORE DELAYS

Switch/mute/blur delay: Set in seconds, this is the time before an initiated event occurs on the delayed output. This time is used as a reaction time for the user to react to improper content

Restore delay: Set in seconds, this is the time before an initiated restore occurs on the delayed output. This time is used to ensure that the cover length is long enough to cover the entire event

The 'delay to event' and 'delay to restore' timings can either be the same length or different, to suit all workflows. Setting a longer 'delay to restore', for example, adds some safety delay to ensure all objectionable content is covered

EVENT ACTIONS

Restore to delayed A: Action to initiate the restore to Delayed Source A. Timer begins and counts down the time in the 'Restore delay' setting; when timer expires the Cleanit output will restore to Delayed Source A. If using the SBB-4, releasing a button will initiate the restore timer countdown

Mute delayed A: Action to initiate an audio mute of Source A. Timer begins and counts down the time in the 'Switch/blur/mute delay' setting; when timer expires the Cleanit output will mute the designated audio channels. The 'Mute/blur A fade time' setting allows a mute fade time of 0 to 10 seconds. If using the SBB-4, pressing the Mute button will initiate the timer countdown

Blur delayed A: Action to initiate a video blur of Source A. Timer begins and counts down the time in the 'Switch/blur/mute delay' setting; when timer expires the Cleanit output will blur the video. User defines the amount of video blur applied (0-100) using the 'Blur A level setting, while the 'Mute/blur A fade time' setting allows a blur fade time of 0 to 10 seconds. If using the SBB-4, pressing the Blur button will initiate the timer countdown

Switch to B: Action to initiate a switch to Source B. Timer begins and counts down the time in the 'Switch/blur/mute delay' setting; when timer expires the Cleanit output will switch to Source B. If using the SBB-4, pressing the Switch to B button will initiate the timer countdown

Switch to C: Action to initiate a switch to Source C. Timer begins and counts down the time in the 'Switch/blur/mute delay' setting; when timer expires the Cleanit output will switch to Source C. If using the SBB-4 smart button box, pressing the Switch to C button will initiate the timer countdown

Override to delayed A: Action to initiate an instant restore to Delayed Source A

Override to B: Action to initiate an instant switch to Source B

Override to C: Action to initiate an instant switch to Source C

ROUTING

The output routing allows selection between the Cleanit output, Monitor output, Input 1, Input 2 or Input 3. (Input 3 not available in 3G mode)

MONITOR OUTPUT

One of the two outputs can be set to show the Monitor output, which allows the content to be monitored and is available as either SDI or IP

This fixed multiviewer simultaneously shows a source routable window (video with associated audio), Cleanit out video, Source A video, Delayed Source A video, Source B video and Source C video. Audio flow embedded in signal is a routable source. Video output also shows yellow tally of action pending and red tally when action is active

VIDEO LOSS CONTROLS

The video loss/format mismatch controls – available at both the input and output stages – allow the user to select what will happen to an input or output in the event that the video is lost or the video format does not match the specified format. The user can specify to freeze the last good frame or show a black or blue screen or 100% colour bars (with or without an initial delay of three seconds). No output can also be selected. This is independently adjustable on each input/output

TEST PATTERNS

The test pattern controls allow the user to override each individual input or force the output to output a test pattern including Colour Bars, Blue, Black, EqCheck, PllCheck, Pluge, Checkfield, Grey Horizontal Steps, Grey Vertical Steps, Luma Horizontal Ramp, Luma Vertical Ramp, Cycle Colour, Checker Board or Colour Square, or to freeze the picture. This is independently adjustable on each input/output

AUDIO MUTE CONTROL

The input and output audio mute controls allow the user to mute the audio embedded within any of the SDI or ST 2022 inputs or outputs

SYNCHRONISER AND TIMING ADJUSTMENTS

Video sources are synchronised to common reference timing source

Choice of timing options:

- PTP (SMPTE ST 2059-2) master and backup, via 10GbE IP network interface
- Two tri-level syncs or analogue Black and Burst references (Reference 1 and Reference 2), connected via the Vision 3 frame
- SDI video input, where available (defaults to SDI 1)

Chosen reference is the global reference source for all inputs and outputs

There are up to ten options for the reference selection, selectable via VisionWeb. The hierarchy runs from left to right – should the timing source at the top of the list become missing or invalid, the app will move down the list until it finds a valid timing reference source. When used with IP inputs, the SDI reference option is not applicable and therefore the reference will move to the next valid timing source:

- PTP>Ref1>Ref2>Hold
- PTP>Ref1>Hold
- PTP>Ref2>Ref1>Hold
- PTP>Ref2>Hold
- PTP>Hold
- PTP>Ref1>Ref2>SDI>Hold
- PTP>Ref1>SDI>Hold
- PTP>Ref2>Ref1>SDI>Hold
- PTP>Ref2>SDI>Hold
- PTP>SDI>Hold

("PTP" means PTP Master>PTP Backup. "SDI" means SDI1>SDI2>SDI3>SDI4>SDI5>SDI6, depending on number of SDI available.

continued overleaf...

"Hold" means it will hold the timing of the last good reference)

When using video reference, video inputs can be different formats but only inputs with the same frame rate as reference video will be locked to that reference. Input signals of same frame rate as reference will be locked together and locked to external reference. Inputs with a differing frame rate will be locked and maintain timing with no drift, but their sync point will be undefined (all same frame rate signals will, however, be locked to each other)

When using PTP reference, input sources of different format and/or frame rate will all be correctly locked to the PTP reference

When Auto relock enable is selected, the card will automatically relock when a lost reference is restored. Selecting Force lock (with Auto relock disabled) will force the synchroniser to relock after a reference is restored, and can be activated at a non-critical time to avoid video disturbance

Output timing can be fully adjusted with respect to the reference using three time-based controls: 0 - 42ms adjustable in 0.1ms steps, 0 - 100us adjustable in 1us steps and 0 - 1us adjustable in 5ns steps. Sub frame timing alignment to chosen reference is global to all outputs

Ten frames of input video delay and ten frames of output video delay (adjustable in one frame steps) are available in addition to the M-CLEANIT's main programme delay

ANCILLARY DATA

All ancillary data (excluding audio) is passed from SDI or ST 2022 input to SDI or ST 2022 output. Audio and locked Dolby E is passed through unless muted or replaced by the operator

LED INDICATION OF:

Power okay

PRESETS

The current app settings can be saved in one of 16 locations to be recalled as required

App settings and Input/Output configuration settings can be stored and recalled independently

SIGNAL MONITORING

Comprehensive SDI, IP and PTP monitoring information is available and can be used to generate SNMP traps

Checks can be performed on the following video and audio parameters:

- Video present and time present
- Video format
- Video black
- Video frozen
- Video error
- Audio group 1 present
- Audio group 2 present
- Audio group 3 present
- Audio group 4 present
- Audio present on group 1 channel 1
- Audio present on group 1 channel 2
- Audio present on group 1 channel 3
- Audio present on group 1 channel 4
- Audio present on group 2 channel 5
- Audio present on group 2 channel 6
- Audio present on group 2 channel 7
- Audio present on group 2 channel 8
- Audio present on group 3 channel 9
- Audio present on group 3 channel 10
- Audio present on group 3 channel 11
- Audio present on group 3 channel 12
- Audio present on group 4 channel 13
- Audio present on group 4 channel 14
- Audio present on group 4 channel 15
- Audio present on group 4 channel 16
- Silence group 1 channel 1
- Silence group 1 channel 2
- Silence group 1 channel 3
- Silence group 1 channel 4
- Silence group 2 channel 5
- Silence group 2 channel 6
- Silence group 2 channel 7
- Silence group 2 channel 8
- Silence group 3 channel 9
- Silence group 3 channel 10
- Silence group 3 channel 11
- Silence group 3 channel 12
- Silence group 4 channel 13
- Silence group 4 channel 14
- Silence group 4 channel 15
- Silence group 4 channel 16

Black or frozen video will be indicated by an amber LED. This alert can be delayed by 1-120 seconds to prevent false warnings during brief video pauses

The audio silence alert is triggered at an audio level of -93dbFS and can be delayed by 1-120 seconds to prevent false warnings during quiet audio periods

The following IP parameters are monitored for input flows:

- Network error
- Packet loss
- Duplicated packets
- Packet delay variation. Shown as the skew (difference in time of packet arrival) between the main and protected input, and also as the min and max nano second gap between the packets on each input

The Ethernet interfaces are monitored for:

- Count of packets ignored by the app (general network traffic non-media packets, which do not require processing by the app). Jumps in 100 step increments indicate network traffic flood
- Ignored multicast packets. LED indicates multicast traffic not requested by the app is present on the Ethernet Interface, indicating incorrectly configured IGMP at the network switch

References are monitored for:

- Reference 1 and 2 present and time present
- Reference 1 and 2 format
- PTP master and backup clock present and time present
- PTP statistics – network delay, delay variation, reference offset and sync period

REMOTE CONTROL

The SBB-4 is the recommended way of controlling the M-CLEANIT, but all the standard Crystal Vision control methods are available to suit all preferences

Software:

VisionWeb Control is available via the web server on the frame and allows control and monitoring using a standard web browser on a computer, tablet or phone

SNMP monitoring and control available as standard

Control using ASCII and JSON protocols

Hardware:

Control from integrated control panel on Vision 3 frame

Control from VisionPanel 3U remote panel

SBB-4 smart button box connects to the frame via Ethernet and provides four programmable LCD switches, which are momentary and use a button press to initiate the ON action and a button release to trigger the OFF action. By default these buttons are set to Mute A, Blur A, Switch to B and Switch to C, but the customer can request any of the available actions to be assigned to a button. The SBB-4 uses information from VisionWeb for settings. Uses Power over Ethernet so must be used with PoE enabled switch

SBB-4 smart button box

ORDERING INFORMATION

M-CLEANIT	IP/SDI profanity delay. Supports 3G/HD/SD and ST 2022-6 and ST 2022-7 protocols. Software app which runs on the MARBLE-V1 media processor (larger memory version)
MARBLE-V1	Media processor hardware which runs Crystal Vision's software apps. Housed in the Vision frames, with up to ten MARBLE-V1 in 3U. Requires between one and four 850nm or 1310nm SFP+ transceiver modules when used with M-CLEANIT app and IP signals and/or external web server
SFP+10G-850MM	Multi-mode 850nm 10GbE SFP+ transceiver module for MARBLE-V1 media processor – fit between one and four SFP+10G-850MM (or SFP+10G-1310SM) when M-CLEANIT app used with IP signals and/or external web server
SFP+10G-1310SM	Single-mode 1310nm 10GbE SFP+ transceiver module for MARBLE-V1 media processor – fit between one and four SFP+10G-1310SM (or SFP+10G-850MM) when M-CLEANIT app used with IP signals and/or external web server
App support	Purchase with M-CLEANIT app to get software upgrades for changes in standards, new features and bug fixes plus telephone and e-mail operational support (with support for the first year included for free)
Vision 3	3U frame with integrated control panel and smart CPU for up to 20 Crystal Vision cards from the Vision range
VR04	Two slot frame rear module. Allows ten M-CLEANIT in 3U. Inputs and outputs can be any mixture of SDI via BNCs and IP via up to four 10GbE network interfaces on dual LC. Gives access to three HD/SD (two 3Gb/s) SDI or IP inputs and two SDI or IP outputs
VR06	Two slot frame rear module. Allows ten M-CLEANIT in 3U. Inputs and outputs can be any mixture of SDI via BNCs and IP via up to two 10GbE network interfaces on dual LC. Gives access to three HD/SD (two 3Gb/s) SDI or IP inputs and two SDI or IP outputs
VR07	Two slot frame rear module. Allows ten M-CLEANIT in 3U. Inputs and outputs can be any mixture of SDI via BNCs and IP via up to four 10GbE network interfaces on dual LC. Provides dual relay bypass protection for up to two inputs when used with SDI inputs and outputs. Gives access to three HD/SD (two 3Gb/s) SDI or IP inputs and two SDI or IP outputs. NB. Use of the VR07 requires issue 5 or later of MARBLE-V1
VisionPanel	3U Ethernet remote control panel with touch screen
SBB-4	Smart button box with four programmable LCD switches. It is powered by PoE (Power over Ethernet) and therefore needs to be connected to a PoE enabled switch
VisionWeb Control	VisionWeb web browser control included within frame software
SNMP	SNMP monitoring and control included in frame

Crystal Vision

Crystal Vision Ltd. Lion Technology Park, Station Road East, Whittlesford, Cambridge CB22 4WL, England.
Tel: +44 (0)1223 497049 E-mail: sales@crystalvision.tv @crystalvisionuk www.crystalvision.tv