

Crystal Vision

M-WEBKEY

SOFTWARE
APP

IP/SDI web page keyer

The M-WEBKEY IP/SDI web page keyer can key a web page on to a video stream, saving broadcasters money compared to a traditional graphics system. Keying a web page means that the key and fill source never become video and therefore removes the need for expensive dedicated character generator hardware. The M-WEBKEY is ideal for channel branding as well as providing news, weather, advert and emergency information overlays – and makes it easy for broadcasters to use the same resources for their broadcast graphics as they do for their website.

The M-WEBKEY allows the video input or a matte to be set as the background source, with the overlaid foreground source and key signal (which defines the graphic's location and transparency) coming from the web page URL. The M-WEBKEY will render the web page at the correct resolution and frame rate for the video signal and then key the graphic on to the video. The web pages can be constructed quickly and inexpensively using standard web design software, such as Google Webdesigner or Openelements. The M-WEBKEY's support for HTML5, JavaScript, AJAX, XML and JSON allows dynamic data to trigger and update the web page content, making it easy to produce sophisticated data-driven graphics – perfect for sports, financial and shopping channels. Local NTP allows the M-WEBKEY to show the correct time of day to analogue and digital clocks on a web page.

Web pages can be accessed remotely – with two DNS servers available via the 10GbE network interface ports – or can be loaded via FTP and stored internally on the Vision 3 frame, with expandable storage available. Multiple M-WEBKEY can access the same web server, allowing any number of channels to derive their graphics from the same source.

The M-WEBKEY 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 both SMPTE ST 2022 and ST 2110 video over 10GbE IP networks, including ST 2022-7 redundant streaming and the protect equivalent for ST 2110. 31 video formats are supported. When used with SDI or SMPTE ST 2022, the M-WEBKEY passes all ancillary data including embedded audio without modification. If ST 2110 is used, only the video content is output.

The M-WEBKEY'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.

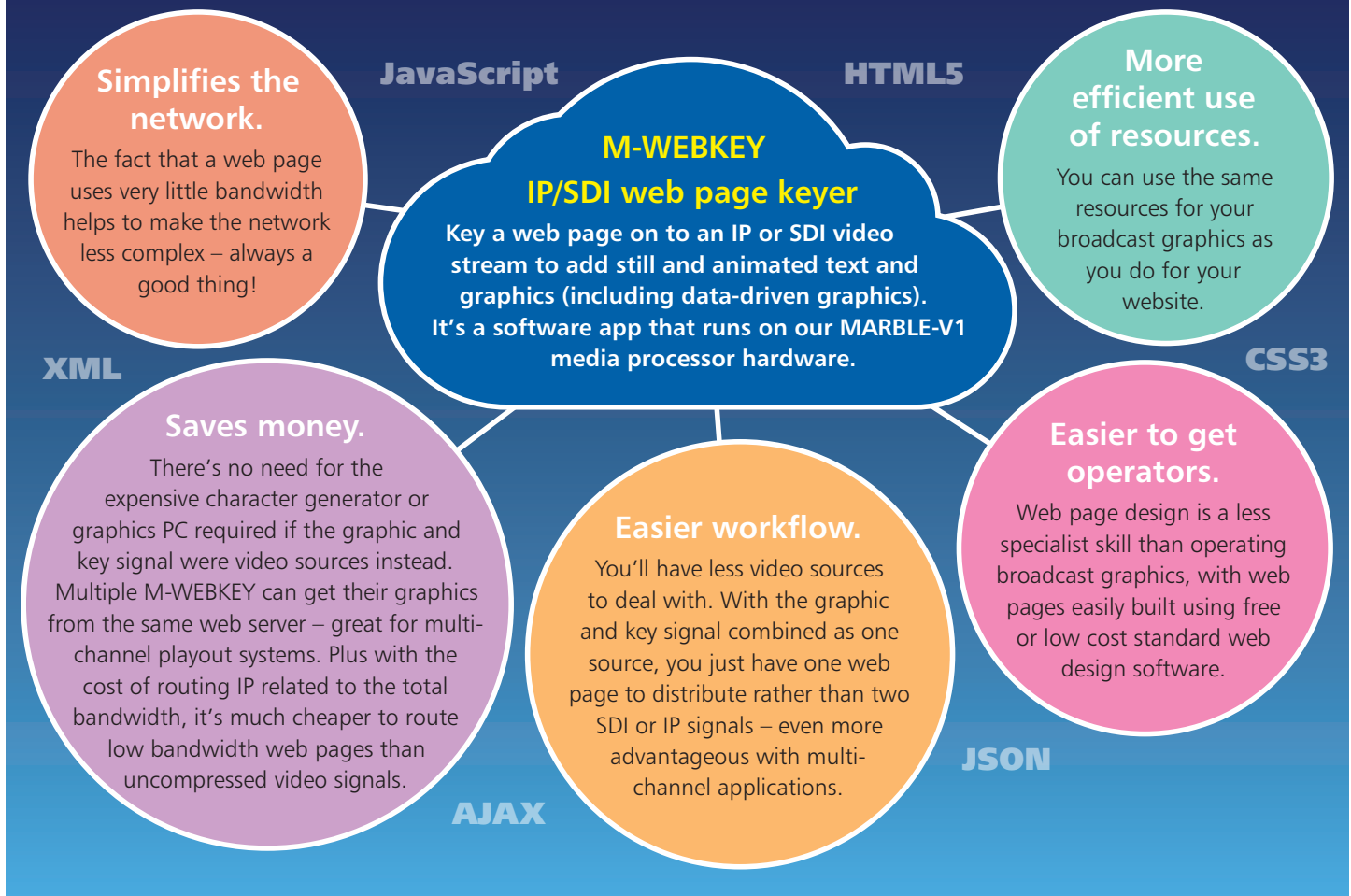
The M-WEBKEY includes a framestore synchroniser timed to an external Black and Burst or tri-level syncs analogue reference or PTP, with user configurable options for timing source priority and redundancy. Other features include the ability to fade the key up and down, crops to force areas of background or foreground, traffic shaping, ten frames of video delay and signal status monitoring – while the quad split option is useful for checking details during configuration.

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.

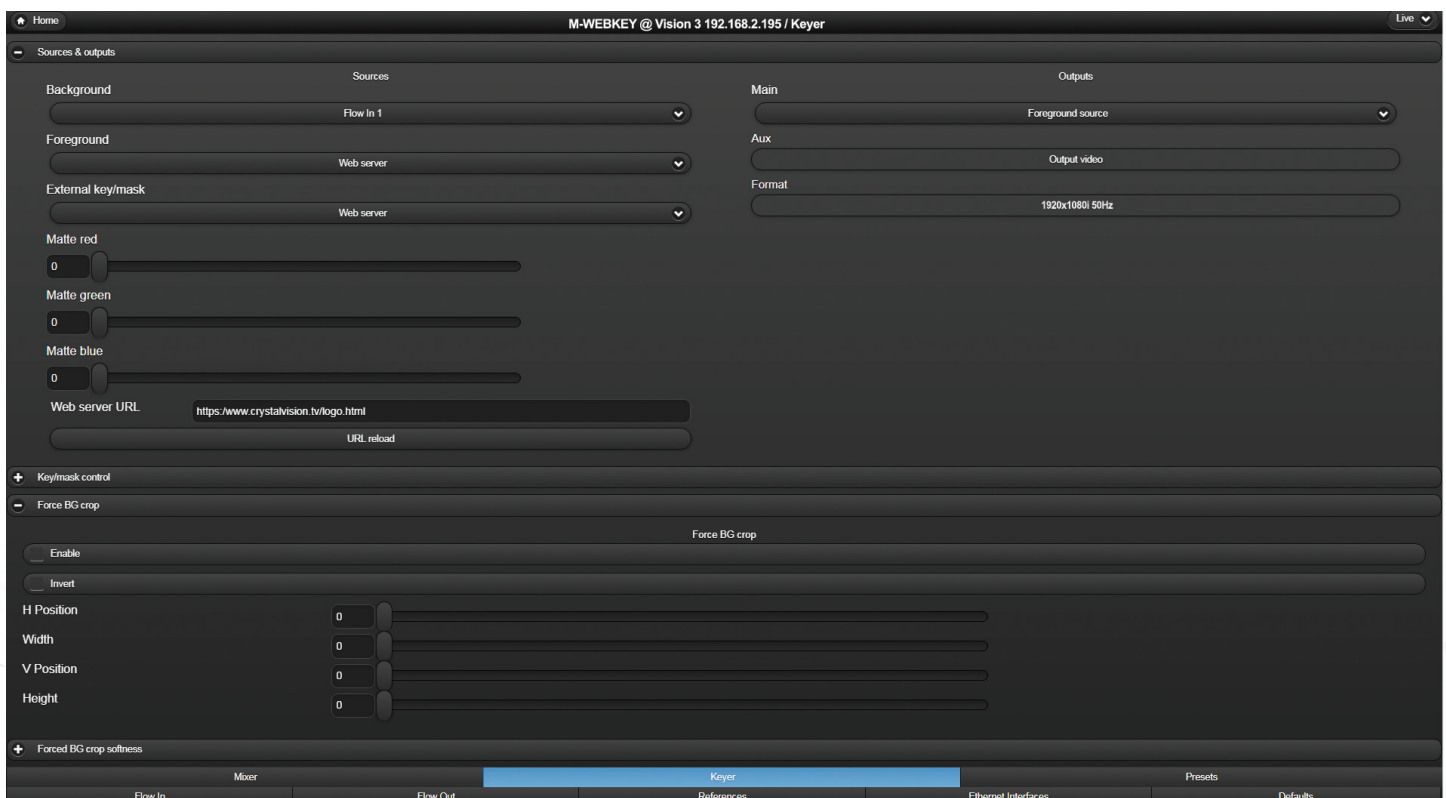


- Software app that runs on the MARBLE-V1 media processor
- Web page keyer, which can key graphics from a web page on to a video stream
- Use it with SDI, IP or both at the same time: supports 31 video formats, SMPTE ST 2022-6 and ST 2022-7 protocols and video within ST 2110 (ST 2110-10, -20 and -21 standards)
- Web pages can be stored on a web server or inside Vision frame (with expandable storage)
- Use it with simple graphics or with dynamic data-driven graphics
- Fade the keyed graphics in and out
- Override the key signal: use two internal crops to force areas of foreground and background
- 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 and ST 2110 protect
- 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
- Know your signal is present and valid, with SDI and IP flow signal monitoring
- Use the quad split to assist setup: Output video, Output key, Keyed foreground and Keyed background can be viewed simultaneously, with zoom available for fine-detail checking
- Flexible remote control and monitoring using 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

WHY M-WEBKEY IS BETTER THAN A TRADITIONAL LINEAR KEYER

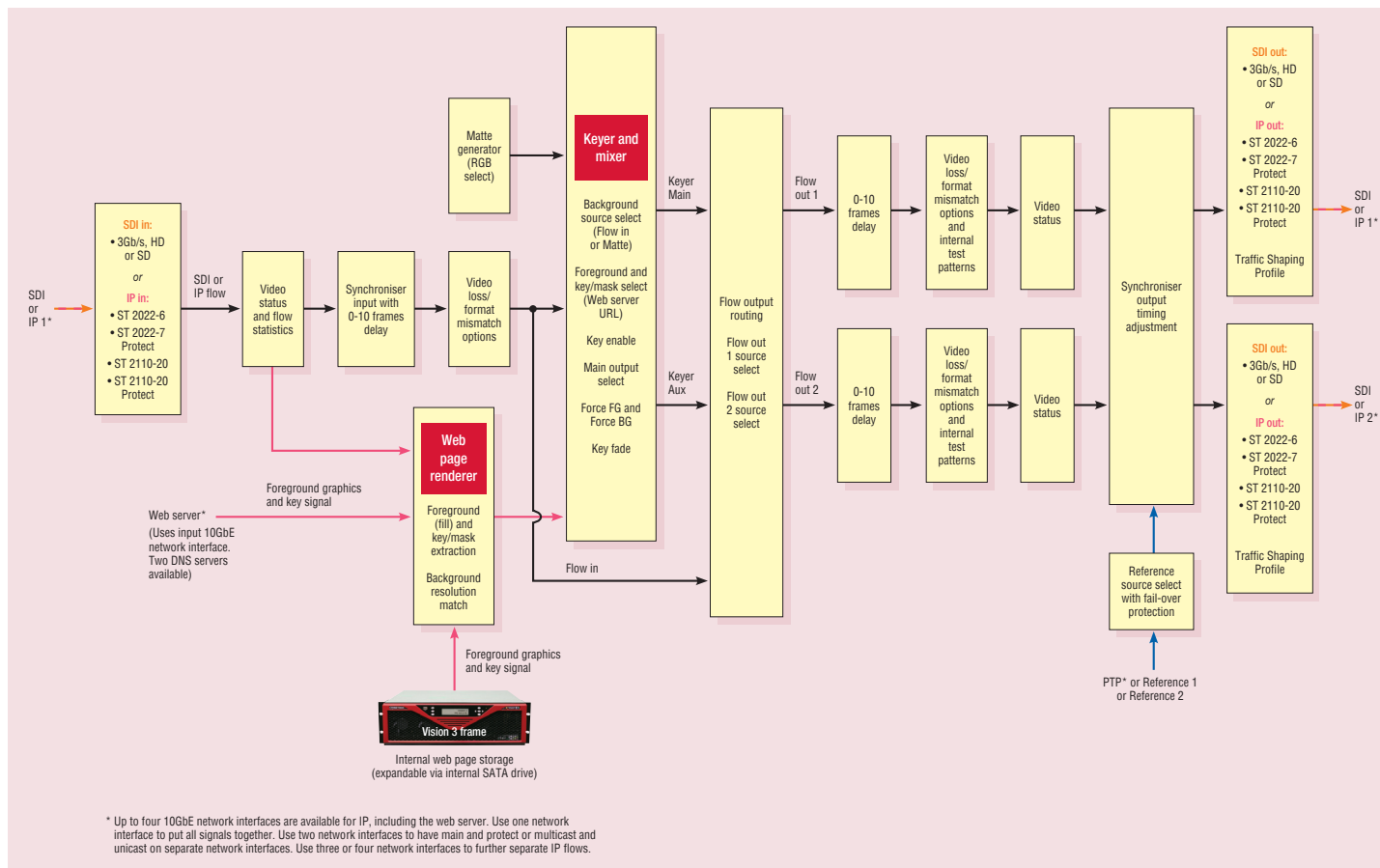


THE CONTROLS



Example of a VisionWeb Control GUI

THE INPUTS AND OUTPUTS



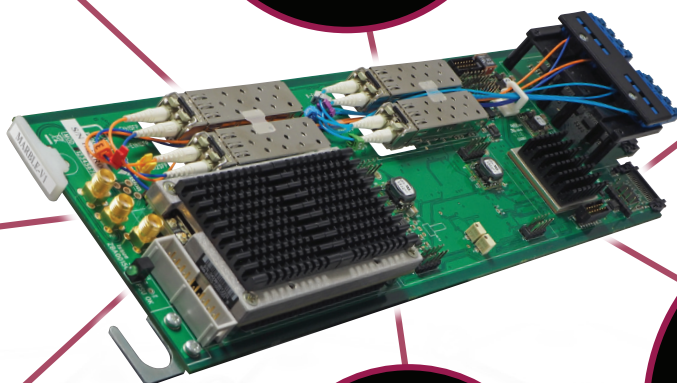
THE MARBLE-V1 MEDIA PROCESSOR

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

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



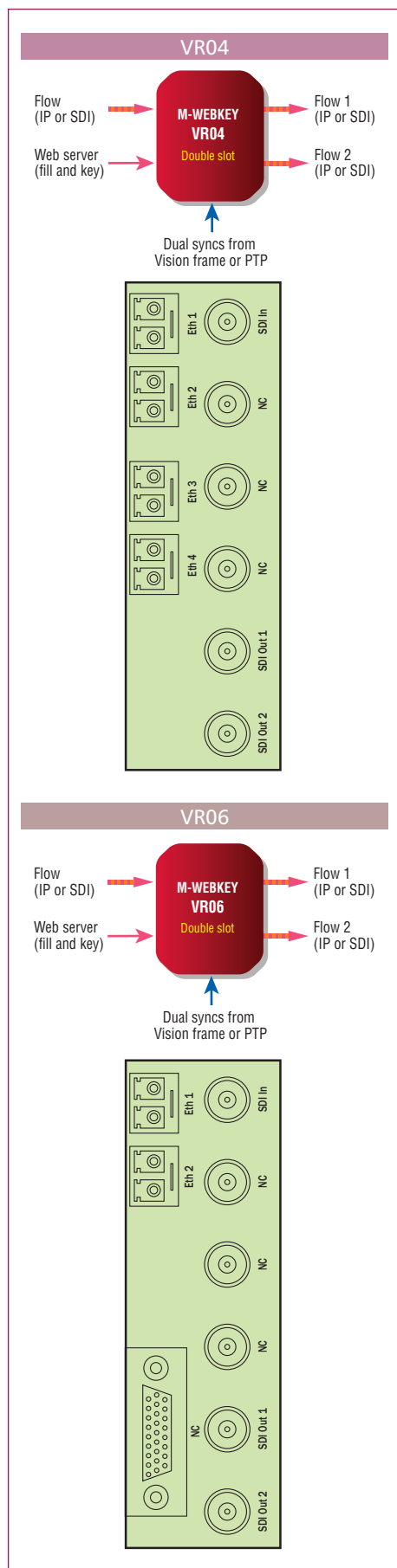
Features to help your systems work = signal monitoring, test patterns, traffic shaping, synchronisation, video delay and more

No need to choose between IP and SDI = apps can work with IP, SDI or both

Change the functionality completely = install a different app

REAR MODULE CONNECTIONS

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



SPECIFICATION

M-WEBKEY 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

INPUT AND OUTPUTS

Input can be IP or SDI

Outputs can be IP and/or SDI

Three 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)

Input and outputs can be mixture of ST 2022 and ST 2110. Video can be passed between ST 2022 and ST 2110, although audio and any other non-video data will be lost

IP only, SDI to IP and IP to SDI applications require at least one SFP+ transceiver option, up to a maximum of four. Use one SFP+ to put all signals together, use two SFP+ to have main and protect or multicast and unicast on separate network interfaces and use three or four SFP+ to further separate flows – such as having one network interface exclusively for the web server

SDI only applications do not require any SFP+ when using a web page located in the Vision frame. When using a web server for the web page, SDI only applications will require one SFP+

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

SDI VIDEO INPUT

(NB. Input can be IP instead)

Up to one 3Gb/s or HD or SD SDI input 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 FLOW INPUT

(NB. Input can be SDI instead)

Up to one 3Gb/s or HD or SD video over IP input

Packet distribution is not important as variable input buffer will compensate for any timing irregularities. Any traffic shaping option from ST 2110-21 can be used, or packets can come from a device which does not meet the shaping requirement of ST 2110-21

A protect input for SMPTE ST 2022-7 seamless protection switching or the equivalent protect input in ST 2110-20 can come from any of the 10GbE IP network interfaces. This protects the stream from lost packets by creating two streams of the same data using different routing to the destination. Flow analyser

handles the analysis and reconstruction of the protected stream. 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 FLOW 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 or ST 2110 seamless protection switching, 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

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 supported on network interfaces: SMPTE ST 2022-6, SMPTE ST 2022-7, SMPTE ST 2110-20 (uncompressed video), SMPTE ST 2110-10 (system architecture and synchronisation), SMPTE ST 2110-21 (traffic shaping), IGMPv3, ARP, ICMP ping, IPv4, IEEE802.1q, VLAN, IEEE802.3-2012 (10G Ethernet)

NTP via Vision 3 frame provides time of day for clock displays on web pages

Packing options of the ST 2110 output are selectable per flow between BPM and GPM (Block Packing Mode or General Packing Mode)

Packet shaping and distribution (compulsory in ST 2110 and optional in ST 2022) is selectable per flow 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 and ST 2110 flow protection facilitates the dual stream output

SPECIFICATION CONTINUED...

ROUTING

The keyer processing block provides a main and aux output. The aux output shows the final result of the keyer processing (output video), whereas the main output can show different stages of processing (see KEYER section)

The flow output routing allows selection between Keyer Main and Keyer Aux for each of the two flow outputs. For example, Flow Out 1 could be set to Keyer Aux and therefore display the final output video of the keyer processing, whereas setting Flow Out 2 to Keyer Main allows this output to be used to preview different stages of the keyer processing. Additionally the Flow Out routing can be set to Flow In 1 to monitor the input flow being used as the background source to the keyer

WEB PAGE RENDERER

Web page provides the fill and key

Web pages can be accessed remotely – with two DNS servers available – or can be stored internally on Vision 3 frame, with storage expandable via internal SATA SSD drive

Web page resolution is matched to background video resolution

Web page fill and key transparency information is extracted

Web page can include areas of the key to be masked

KEYER

External Key mode uses web page transparency to key the web page over a background source

Background source can be set to Flow in 1 or Matte

Foreground and external key/mask source is fixed to the web server

Keyer Aux Output shows processed Output video only

Keyer Main Output can be set to show processed Output video, Output key, Output key inverted, Foreground source, Background source, External key source, Keyed foreground, Keyed background or Output video/Output key/Keyed foreground/Keyed background quad split

The quad split option is useful for checking details during configuration. Controls are Quad zoom (0-100%), Quad H position and Quad V position. The single set of controls are applied to all four quads. Zoom of 0% shows the entire images in the quads and zoom of 100% expands a single pixel to fill each quad. When the image is expanded, the position controls define the area of the image to be displayed. External keying can be enabled or turned off

INTERNAL FORCE FOREGROUND AND FORCE BACKGROUND CROPS

Two internal crops can be turned on or off to force areas of foreground and background. They can be inverted and adjusted in position and size

Edge softness controls prevent hard edge on crop, with each edge individually selectable

INTERNAL MATTE GENERATOR

The keyer background source can be replaced

with a colour produced by an internal matte generator

MIXER

Key can be faded up or down as a timed transition, with fade time set from 0-10 seconds

Fade level can be manually adjusted between 0% and 100%

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 a flow 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 flow

TEST PATTERNS

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

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, dependent on number of SDI available. “Hold” means it will hold the timing of the last good reference)

When using video reference, a video input of the same frame rate as the reference will be locked to the external reference. An input with a differing frame rate will be locked and maintain timing with no drift, but the sync point will be undefined

When using PTP reference, a video input of any supported standard will be correctly locked to the PTP reference

PTP timing reference should be used when there is a ST 2110-20 output to ensure the RTP timestamp is related to the time of day. However without a PTP reference, a valid ST 2110-20 signal will still be generated using a free running RTP timestamp

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 flow input video delay (adjustable in one frame steps) allows delay compensation between the background source and delayed sources from the web server

Ten frames of flow output video delay (adjustable in one frame steps) allows compensation for any big system delays. This delay can be configured individually for each SDI output or IP output flow

ANCILLARY DATA

All ancillary data (including audio) is passed from SDI or ST 2022 input to SDI or ST 2022 output. When ST 2110 input or output is selected, all ancillary data is discarded

LED INDICATION OF:

Power okay

PRESETS

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

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

SPECIFICATION CONTINUED...

- Audio group 1 present
- Audio group 2 present
- Audio group 3 present
- Audio group 4 present

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 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

Software:

VisionWeb Control is available via the web server on the frame and allows monitoring using a standard web browser on a PC or tablet
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 configured for each order). The SBB-4 uses information from VisionWeb for settings. Uses Power over Ethernet so must be used with PoE enabled switch

ORDERING INFORMATION

M-WEBKEY	IP/SDI web page keyer. Supports 3G/HD/SD and ST 2022-6, ST 2022-7 and ST 2110-20 protocols. Software app which runs on the MARBLE-V1 media processor
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-WEBKEY 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 when M-WEBKEY 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 when M-WEBKEY app used with IP signals and/or external web server
App support	Purchase with M-WEBKEY 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-WEBKEY in 3U. Input and outputs can be any mixture of SDI via BNCs and IP via up to four 10GbE network interfaces. Gives access to one SDI (3G/HD/SD) or IP input and two SDI or IP outputs. Video input provides background source, with fill and key coming from web page stored either on external web server or in Vision frame
VR06	Two slot frame rear module. Allows ten M-WEBKEY in 3U. Input and outputs can be any mixture of SDI via BNCs and IP via up to two 10GbE network interfaces. Gives access to one SDI (3G/HD/SD) or IP input and two SDI or IP outputs. Video input provides background source, with fill and key coming from web page stored either on external web server or in Vision frame
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

Performance and features are subject to change. Figures given are typical measured values. M-WEBKEYP0720B