tvONE®

We Engineer Confidence®

C2-2450A Edge Blender

User Guide V3.00

MNL-C2-2450-V3.00

Apr 2019

In this guide

About your C2-2450

Device capabilities

The C2-2450A uses the proprietary CORIO®2 Engine to perform its functions, being the second generation of the successful CORIO® products. The CORIO®2 technology is a powerful toolset for any application requiring high quality video signal conversion or image manipulation.

The unit features a single video processing and scaling engine, tailored to meet the demands of an edge-blending system – when used with multiple units (one per projector).

The unit offers enhanced functionality up to DVI resolutions of 1920x1200@60Hz with full HDCP support on the DVI input and output.

Edge-blending adjustments such as gamma and black-level control aid the setup of complex systems. Guide-lines can be activated from the front of the unit, as can pure black and white signals to help the user achieve the best blends.

Device features

General topography

4:4:4 RGB / YUV sampling provides full bandwidth color which allows precise keying where included in the unit's capabilities. This can be achieved through the transparent (soft) keys on the front of the unit. Each unit's video inputs accommodate multiple video and computer signal formats and resolutions – see specifications at end of manual for full details.

Ultimate flexibility

The C2-2000 series' output signal format flexibility assures that the Native Resolution of virtually any display can be matched. Because of the resolution calculator (included in the Windows® Control Panel), even new resolutions can be added to the unit. Signal parameter adjustments can be made for each video input and are stored in individual non-volatile memories for retrieval once the unit's power has been removed.

Simple control

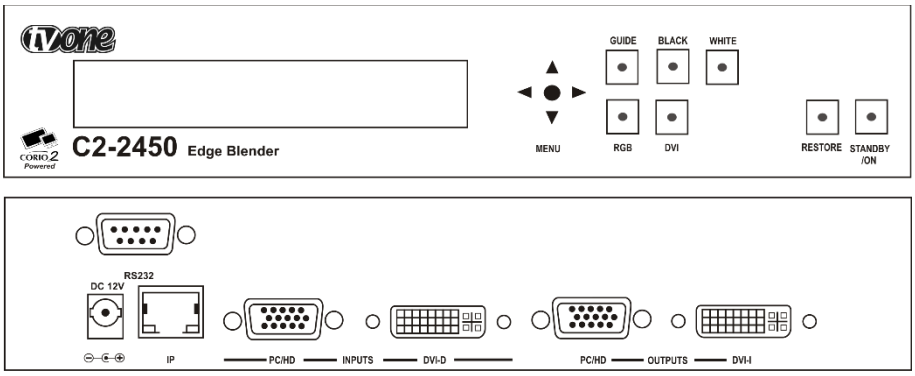
The unit can be controlled in various ways. One option is to control it from the front panel. Another option would be to control the unit from an infra-red remote control. It can also be controlled via RS-232 or via Ethernet using the Windows Control Panel or Edge Blend Tool.

Upgradeability

All C2-2000 units benefit from firmware upgradeability, thus reducing product obsolescence by allowing the installation of the latest version of firmware. This not only applies to the software used to control the unit, but also to the range of resolutions stored inside the unit, the addition of new features, and upgrades to the heart of the image processing hardware – the CORIO®2 scaling engine. See **tvone.com/support** for more detail.

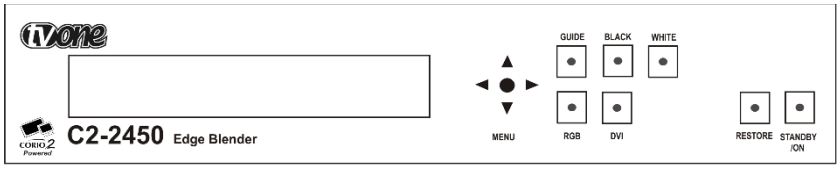
Product image

Your C2-2450A product should look like the unit below.



Front panel controls

The multi-directional switch on the front panel provides the user with a way of navigating the On Screen Display menus (OSD) which are detailed in a later section. The RS232 interface and Ethernet interface also provide further ways of controlling the unit.



Button controls

A sub-set of the following buttons will be available on the front of the unit, depending on the model in use:

Button	Button Function
Multi-directional switch	Press and hold in to store current settings into memory. They will then be restored on power-on, or when a Restore is done. See next section for more information.
RGB	Selects an RGB input as the current source for conversion.
DVI	Selects a DVI input as the current source for conversion.
GUIDE	Enables the Edge Blend Guides
BLACK	Sets the output to Black to aid the setting of the blend area
WHITE	Sets the output to White to aid the setting of the blend area
RESTORE	Restores the unit to the last saved state
STANDBY	Hold in to put the unit into Standby (power-save) mode. Hold in briefly to come out of Standby mode.

Multi-directional switch

The OSD is controlled from the front panel by using the multi-directional switch (m/d switch). This switch can be moved left, right, up or down and also pressed in. These functions let the user navigate through the menu structure or change a parameter, and are detailed in a later section.

Advanced menus

System	
Advanced menus	[Off]

The above menu item must be 'On' to activate certain menu items. These typically control the more advanced items in the menus.

Special button combinations and functions

In addition to the ability to perform a factory reset and forcing certain output resolutions, other button combinations are available:

These button combinations only work when the unit is switched on and active i.e. with the STANDBY/ON LED is off. They will not work in Standby mode, or during power-up.

Locking front panel buttons and IR remote control

This can be performed by pressing STANDBY/ON and FREEZE at the same time. All front panel buttons and IR remote control commands will be disabled, with the exception of repeating the above combination to un-lock the unit and for storing the current locked buttons setting (thus letting you make sure the unit always starts up with the buttons locked). The IR remote's LOCK and STORE buttons will always be active, giving another way to turn button/IR remote locking off.

The STANDBY/ON button will flash when the unit's buttons are locked.

Restore power-on settings

This can be done (without having to turn off the unit) by pressing STANDBY/ON and the multi-directional switch at the same time until a single beep is heard.

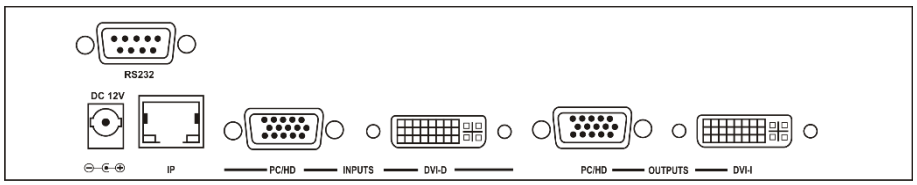
Factory Reset

If you wish to restore all operational parameters to their original condition (for example, if saved settings prevent the unit from working with your display monitor), hold the STANDBY/ON and the multi-directional switch in together until two beeps are heard.

All stored settings except resolutions are lost when the unit is reset. A Firmware update is the only way to perform a complete factory reset (including resolution data).

Video inputs and outputs

The Edge blend unit has a number of different inputs and outputs as shown below.



Computer inputs

PC/HD inputs can accept:

- Analog RGBHV
- RGsB (sync on green)
- RGBS (separate sync at TTL levels)
- YUV/YPbPr (including tri-level)

In most cases, the particular input being used will be auto-detected. See 'Adjust sources' for more information on manually selecting an input type.

YUV/YPbPr (component) inputs can also be switched to RGsB (sync on green) mode if desired – see 'Adjust sources' for more information on manually selecting an input type.

The DVI-D input accepts DVI digital connections (but on a DVI-I socket for added flexibility). An EDID signal is used to ensure that the PC or DVD player outputting the DVI signal knows the available range of resolutions in the unit.

Computer outputs

The PC/HD output can use:

- Analog RGBHV
- RGsB (sync on green)
- RGBS (separate sync at TTL levels)
- YUV/YPbPr (including tri-level).

YUV/YPbPr (component) outputs can also be switched to RGsB (sync on green) mode if desired -see 'Adjust outputs' for more information.

The DVI-I output offers both digital DVI and analog RGBHV on a DVI-I socket for added flexibility.

Unpacking and installation

Shipping carton

Your unit will arrive double boxed for maximum protection during shipping. You are encouraged to retain both boxes and all packing material, so the unit can be returned in the unlikely event that repairs should ever become necessary.

Important safety instructions

The AC power adaptor furnished with the unit should conform to the type in use in your country. Please compare the plug on your adaptor with the power socket where the unit will be installed.

If you did not receive the correct adaptor, DO NOT attempt to modify it. Instead, immediately contact your dealer or contact tvONE at the sales office nearest to your geographic location and request the proper adaptor.

The correct PSU specification is that of a 12v DC regulated 3.3Amp PSU with a 2.5mm locking center-pin positive DC power connector. A non-locking 2.5mm DC power connector will also fit.

Please also note that the power adaptor is active whenever it is plugged into the power socket – the 'Standby' mode of this product still leaves the power adaptor active.

Initial operation check using factory default settings

This product can be operated via multiple methods, but for the purposes of initially acquainting you with the operation of the unit, this manual will address the operation using the Front Panel controls.

Please note that the power adaptor cable has a 'locking' connector on it, so you will need to turn the power plug once it is inserted until it locks into position.

If you have problems using the unit as described below, see the 'Factory reset' description shortly afterwards.

Initial operation and test

We'll be using a PC for a signal source and a PC monitor that can support 1024 x 768 @ 60Hz as this is the default output resolution.

Disconnect the cable going from a PC's Monitor to the PC. Connect the output from the PC video card (the PC connector formerly used by the monitor cable) to the PC/HD input on the rear panel of the unit.

Next, take the cable from the PC monitor and connect it to the PC/HD output. Then connect the AC Power Adaptor to a working AC outlet, turn on the PC, monitor and then your unit.

Provided you have not changed anything from the Factory Defaults and the monitor will display output 1024x768 @ 60Hz, then your PC output will be seen on the PC monitor – but most likely at a different resolution. If this is the result, your unit is processing signals correctly.

Serial / IP control specification

PLEASE NOTE: Not all units support Serial and/or IP (Ethernet) communications – check to see if this feature is present on your unit.

This section outlines how to control a unit via a Serial or Ethernet link (if fitted to your unit), using ASCII-based commands. It details how to send and receive serial data to perform many of the functions that a user has access to on the unit.

Not all units will support the full range of adjustments listed – this will depend on the complexity of the unit you have.

Communication protocol basics

Packets of ASCII data containing hexadecimal numbers are exchanged between the unit and controller via a Serial or IP link (you cannot use both at the same time).

The Serial standard is 57600 baud, 8 bits, no parity and 1 stop bit, although this can be changed by the user (see 'System' menu).

No flow control is used - however all control packets start with an ASCII 'F', end with carriage-return (13 decimal, 0x0D hexadecimal) and all such packets sent to the unit will be acknowledged (thereby provided software handshaking). Note that a line-feed (LF) should not be sent.

It may take around 30ms (0.03 seconds) for an RS232 command to be actioned and acknowledged – this will vary between different models.

ASCII-hex data is used where a number is encoded into its hexadecimal equivalent with leading zeros – e.g. Where '00' is decimal value 0, '80' is decimal 128 and 'FF' is decimal 255. In other words, two characters are sent for each byte encoded.

Any gap of more than 1 second between the characters of a control command sent will cause a time-out - and previous characters sent will be lost.

Write packets (sending command functions to the unit) are always 20 characters long (including a carriage return at the end). The unit will respond with a full 20 character message indicating what has changed. This returned payload will reflect the actual value of the parameter changed. If the user requests a value out of bounds then the limit value is used, and the payload will then reflect the limited value used.

Read packets (sent to request information from the unit) are always 14 characters long (including a carriage return at the end), the response from the unit will be a 20 byte message with the Write flag (since it is 'writing' the value back to the host) and the ACK flag set.

The ACK flag will be returned as 0 if the command is invalid for some reason – for example a bad FUNCTION, WINDOW, OUTPUT or PAYLOAD value. An ACK=0 message will be otherwise identical to the one you sent, so you know exactly which message has the error.

Any changes made to the unit using the front panel controls will also cause the full 20 byte message to be sent indicating the change that has occurred, thus enabling a program to stay 'in-sync' with the unit. In some

cases (such as the execution of a macro) multiple 20 bytes messages will be sent indicating all the parameters that have been changed.

Only one message should be sent to the unit, another message can't be sent until a specific response is received from the unit (the user should look for a message with the same WINDOW, OUTPUT and FUNCTION values as they sent). If no message is received back within 1 second, there is likely to be a hardware communication problem (or wrong baud rate, etc.).

If absolutely required, to simplify programming the user may send packets one after the other with around 100ms (100 milliseconds) between each one. However, this will not work for all packets (such as Zooming into Still Images / Testcards or changing Logos) since this will cause the unit's micro-controller to be busy, so the user must experiment and satisfy themselves that this is possible.

Packet format

Below is a representation of data bytes in a single packet for a 'Write' to the unit to set a value:

SOP	CMD	CHA	WINDOW	OUTPUT / FUNCTION	FUNCTION	PAYLOAD x 3	CS	EOP

Below is a representation of data bytes in a single packet for a 'Read' to the unit to get a value:

SOP	CMD	CHA	WINDOW	OUTPUT / FUNCTION	FUNCTION	CS	EOP

The table below details the function of each part of the packet:

Packet part	**Function**
SOP (Start of packet)	This is always the ASCII letter 'F' to indicate the packet start.
CMD (Command)	ASCII-hex byte to indicate the type of command being sent. Each bit in the byte has a different function. Currently only the following bits are defined: Bit 7 = Write (0) or Read (1) request. Messages from the unit are always Writes. Bit 6 = ACK bit. Should be set to 0 for messages to the unit. ACK=1 returned means message was okay. ACK=0 returned means an error was present in the message. Bit 5 = 0 Reserved for future use. Bit 4 = 0 Reserved for future use. Bit 3 = 0 Reserved for future use. Bit 2 = 1 This bit *must* be set. Bit 1 = 0 Reserved for future use. Bit 0 = 0 Reserved for future use.
CHA (Channel) SOURCE or MACRO NUMBER	This byte has multiple uses, and defaults to 0 unless used for: CHA When a channel number is used in the Adjust Sources section (see later). SOURCE Byte to indicate the source channel to be altered (if appropriate). 0x10 = RGB1, 0x11 = RGB2, 0x12 = RGB3, etc. 0x30 = CV1, 0x31 = CV2, 0x32 = CV3, etc. 0x40 = YC1, 0x41 = YC2, 0x42 = YC3, etc. 0x50 = SDI1, 0x51 = SDI2, etc. 0xD0 = OUT1, 0xD1 = OUT2, etc.

	0xF0 = TC1, 0xF1 = TC2, etc. MACRO Or – for Macro related commands: Bit 7..4 = 0 Reserved Bit 3..0 = Macro number
WINDOW / LOGO / BORDER	Bit 7 = 0 (Reserved). Bit 6..0 = Represents the window to be adjusted (for multi-channel units only). E.g. Window 'A' (the default for single-channel units) is sent as '41' since 0x41 is ASCII for 'A'. 0x61 is ASCII for 'a' (a Logo) and is sent as '61'.
OUTPUT & FUNCTION HIGH	Bit 7..4 = Number representing the output to adjust 0 = Output 1, 1 = Output 2 (for multi-channel units). Bit 3..2 = Reserved (set to 0). Bit 1..0 = Bits 9 & 8 of the function code. (Remainder of bits [7..0] are in FUNC LOW.) E.g. If the function code is 0x234, and we want to adjust Output 2, then this byte is 0x12
FUNCTION LOW	ASCII-hex byte to indicate the lowest 8 bits of the actual function to set or receive (e.g. change Zoom value). A later table details all the functions available.
PAYLOAD x 3 bytes	A series of ASCII-hex bytes carrying the data to send. Read requests have no payload - the payload is in the data sent back. Write packets require a payload, and this is always in 'triple-bytes' - i.e. 3 bytes are required, MSB first. e.g. '000001' is 1 in decimal, '010000' is 65536 in decimal, and 'FFFFF0' is -16 in decimal.
CS	ASCII-hex byte that is the (check) sum of all previous bytes (excluding the SOP 'F' character). E.g. The command F0400410082000001C8 has the checksum of 04+00+41+00+82+00+00+01=C8, so the complete command to send is F0400410082000001C8. A short-cut for debugging allows the checksum to be replaced by 2 question marks, so in the previous example you could send F0400410082000001?? Instead. This is purely for test and debugging - you should normally use a checksum to ensure data validity.
EOP	This is a carriage return (no line-feed) - ASCII code 13 (decimal).

Function list

These are grouped together into their associated on-screen menus.

Your unit and this manual should be used to determine the actual function of each of the following, as only the menu text is listed here. Where an equivalent menu item does not exist on your unit, then that feature is not supported on.

Function codes are given in hexadecimal and adjustment range is in decimal (but always sent as hexadecimal!).

For dual-channel units the mode of operation also restricts what Window and Output can be used the following table shows the allowed combinations:

Mode	**Allowed Window and Output combinations**
Switcher	Output 1 (0x00) and Window A (0x41) / Z (0x5A) / Logo a (0x61)
Independent	Output 1 (0x00) and Window A (0x41) / Z (0x5A) / Logo a (0x61) OR Output 2 (0x01) and Window B (0x42) / Z (0x5A) / Logo b (0x62)
Dual PIP	Any combination of Output and Window

The following table is a list of all menu functions, their related function number and valid range of adjustment.

Note: not all items will be available on all units. If your unit does not show the menu text in the menus then that function is not supported.

Menu text	**CHA**	**FUNC (Hex)**	**Range of adjustment (decimal)**
Top level			
Mode (Dual-channel units only)		109	0 = Switcher 1 = Independent 2 = Dual PIP
Preset number		225	1 to 10
Preset load		226	Set to 1 to load – automatically resets to 0.
Preset store		227	Set to 1 to store – automatically resets to 0.
Preset erase		228	Set to 1 to erase – automatically resets to 0.
Adjust outputs			
Output enable		170	0=Blanked, 1=Active
Lock source (connector)		149	0x10 to 0x1F = RGB1 to RGB16 0x30 to 0x3F = CV1 to CV16 0x40 to 0x4F = YC1 to YC16 0x50 to 0x5F = SDI1 to SDI16 0xD0 = OUT1, 0xD1 = OUT2 0xF0 = TC1, 0xF1 = TC2
Lock method		10A	0 = Off 1 = Genlock 2 = Lock & Mix 3 = DARSlock (some units only) 4 = Frm.lock (some units only)
Lock H Shift		14A	-4096..4096
Lock V Shift		14B	-4096..4096

Menu text	CHA	FUNC (Hex)	Range of adjustment (decimal)
Output resolution		083	1..1000
Output image type		0E2	0 = RGBHV 1 = RGBS 2 = RGsB 3 = YUV 4 = tlYUV 7 = tlRGB
Output image type digital		16C	0 = RGBHV 3 = YUV
HDCP required		233	0..1, Off, On (if display supports it)
HDCP status		234	0=Unavailable 1=Supported 2=Active 3=Repeater supported 4=Repeater active 5=No display (Other values indicate various HDCP authentication states.)
Allow errors		2B4	0 = Off 1 = On
Background Y		13B	16..235
Background U		13C	16..240
Background V		13D	16..240
SDI optimization		197	0..1, Off, On
Output Standard		101	0 = NTSC/PAL 1 = PAL-M/PAL-N 2 = SECAM
Output CV/YC IRE		133	-7.5..12.5
Output CV/YC Hue (degrees)		139	-22..22
Output SC/H Phase		085	-180..180
Output Luma Bandwidth		134	0,1,2 = Low, Medium, High
Output Chroma Bandwidth		135	0,1,2 = Low, Medium, High
Output Chroma delay		137	-4..3
PAL WSS		130	0 = Off 1 = 4:3 Full format

Menu text	CHA	FUNC (Hex)	Range of adjustment (decimal)
			2 = 14:9 Letterbox centre 3 = 14:9 Letterbox top 4 = 16:9 Letterbox centre 5 = 16:9 Letterbox top 6 = >16:9 Letterbox centre 7 = 14:9 Full format 8 = 16:9 Full format
Take		11E	0->1 = Perform a Preview -> Program transition
Audio amp. Volume		201	-16 to 15
AES/SDI Chan. 1 source		20B	0x00 to 0x07 = SDI1-1 to SD1-8 0x08 to 0x0F = SDI2-1 to SDI2=8 0x10 to 0x1F = AES1 to AES16 0x20 = AFV (audio follow video)
AES/SDI Chan. 2 source		20C	
AES/SDI Chan. 3 source		20D	
AES/SDI Chan. 4 source		20E	
AES/SDI Chan. 5 source		20F	
AES/SDI Chan. 6 source		210	
AES/SDI Chan. 7 source		211	
AES/SDI Chan. 8 source		212	
Allow HDMI output		288	0=DVI only, 1=Use HDMI if supported
HDMI/SDI audio routing		268	0=Mute, 1=On, 2=WinA
HDMI/SDI 'On' source		269	0x10 onwards for DVI-U1, etc. 0x50 = SDI1 0x51 = SDI2
H.phone monitor		289	Headphone source 0=AES1 output … 7=AES8 output
H.phone volume		28A	0=+6dB … 15=-40dB
Adjust windows			
Program source / Window source (connector)		082	0x10 to 0x1F = RGB1 to RGB16 (Also includes DVI / YUV sources) 0x30 to 0x3F = CV1 to CV16 0x40 to 0x4F = YC1 to YC16 0x50 to 0x5F = SDI1 to SDI16 0xD0 = OUT1, 0xD1 = OUT2 0xF0 = TC1, 0xF1 = TC2
Select Universal source		241	0xE0 to 0xEF select universal inputs 1 to 16

Menu text	CHA	FUNC (Hex)	Range of adjustment (decimal)
Source resolution		0F8	Read only – returns # of resolution
Window Enable		12B	0..1 = Off, On
Zoom level %		086	100..1000
Zoom level H %		103	100..1000 (only used in Advanced A/R mode)
Zoom level V %		105	100..1000 (only used in Advanced A/R mode)
Aspect ratio in		107	0.1:1..9.99:1 (read only)
H/V zoom pan % (H)		09F	0..100
H/V zoom pan % (V)		0A0	0..100
Image freeze		09C	0..1 = Off, On
H/V crop % (H)		223	0..100
H/V crop % (V)		224	0..100
H/V out shift (H)		0AD	-4096..4096
H/V out shift (V)		0AE	-4096..4096
Shrink level %		087	10..100
Shrink level H %		104	10..100 (only used in Advanced A/R mode)
Shrink level V %		106	10..100 (only used in Advanced A/R mode)
Shrink enable		18E	0..1 = Off, On
H/V shr. pos.% (H)		0DA	0..100
H/V shr. pos.% (V)		0DB	0..100
In (top-left H)		21B	
In (top-left V)		21D	
In (H size)		21C	
In (V size)		21E	
Out (top-left H)		21F	
Out (top-left V)		221	
Out (H size)		220	
Out (V size)		222	
Aspect change		190	0..2 = Normal, Letterbox, Pillarbox
Aspect adjust		102	0..2 = Simple, Advanced, Pixel
Flicker reduction		092	0..3 = Off, Low, Med, High
Image smoothing		0A1	0..3 = Off, Med, High, Auto
Image flip		095	0..3 = Off, Horiz., Vertical, H & V
Temporal interpolation		229	0..1 = Off, On
Show source label		250	0..1 = Off, On

Menu text	CHA	FUNC (Hex)	Range of adjustment (decimal)
Audio bars		252	0=Off, 1 to 4 audio bars shown.
Max fade level		10F	0..100 = Fade level %
Fade out / in		193	-1 = Fade out 0 = No action 1 = Fade in
Layer priority		144	0..5 = Layer priority (Other layers are automatically moved.)
Headphone volume		0FD	-16..15 (-16=Mute)
Audio vol. (volume)		206	-128..127 (for digital audio processing)
Audio vol. (on/off)		207	0..1 = Off, On (for digital audio processing)
Adjust keyers (on certain models only)			
Keyer enable		127	0..1 = Off, On
Y key min/max (min)		0AF	0..255
Y key min/max (max)		0B2	0..255
Y key Softness		121	0..255
Y key Invert		122	0..1 = Off, On
U key min/max (min)		0B0	0..255
U key min/max (max)		0B3	0..255
U key Softness		123	0..255
U key Invert		124	0..1 = Off, On
V key min/max (min)		0B1	0..255
V key min/max (max)		0B4	0..255
V key Softness		125	0..255
V key Invert		126	0..1 = Off, On
Swap fore / background		144	0..1 = Off, On
Adjust keyers – edge blending (on certain models only)			
Edge Blend		180	Bit 0 = Left edge active Bit 1 = Right edge active Bit 2 = Top edge active Bit 3 = Bottom edge active
E.blnd guides		18F	0..2 = Off, Auto, On
E.blnd size V		18C	0.. limited by V height
E.blnd gamma H		188	1..150 1=0.01, 150=1.50
E.blnd gamma V		18D	1..150 1=0.01, 150=1.50

Menu text	CHA	FUNC (Hex)	Range of adjustment (decimal)
E.blnd comp cent		198	0..99
E.blnd comp side		19D	0..99
E.blnd size Left		277	0.. limited by H width
E.blnd size Right		278	0.. limited by H width
E.blnd size Top		279	0.. limited by V height
E.blnd size Bottom		27A	0.. limited by V height
E.blnd gamma Left		27B	1..150 1=0.01, 150=1.50
E.blnd gamma Right		27C	1..150 1=0.01, 150=1.50
E.blnd gamma Top		27D	1..150 1=0.01, 150=1.50
E.blnd gamma Bottom		27E	1..150 1=0.01, 150=1.50
Logos (on certain models only)			
Logo enable		12B	0..1 = Off, On
Logo number		143	0..9 Logo selection
H/V out shift (H)		0AD	0..100 %
H/V out shift (V)		0AE	0..100 %
Max fade level		10F	0..100%
Layer priority		144	0..5
Borders (on certain models only)			
Border enable		150	0..1 = Off, On
Border H size		152	0..99
Border V size		151	0..99
Border H offset		153	0..99
Border V offset		154	0..99
Border Opacity		158	0 (fully transparent) ..100 (solid)
Border Y		155	16..235
Border U		156	16..240
Border V		157	16..240
Adjust sources			
Source to adjust. *This only changes what's shown in the menu – use the CHA values below to change settings of a source.*	CHA	116	0x10 to 0x1F = RGB1 to RGB16 0x30 to 0x3F = CV1 to CV16 0x40 to 0x4F = YC1 to YC16 0x50 to 0x5F = SDI1 to SDI16 0xD0 = OUT1, 0xD1 = OUT2 0xF0 = TC1, 0xF1 = TC2

Menu text	CHA	FUNC (Hex)	Range of adjustment (decimal)
Still Image / Testcard	F0..F1	0DC	0..10
Autoset	10..1F	0FE	1= Start Autoset procedure
Aspect correct	10..5F	240	0=Fill (default) 1=Aspect, 2=H-fit, 3=V-fit, 4=1:1
UMD display address	10..5F	263	0 to 126, as per TSL 3.1 protocol
Label font	10..5F	246	0..15 to select different fonts
Label background color	10..5F	247	0=Black, 1=Blue, 2=Green, 3=Cyan, 4=Red, 5=Magenta, 6=Yellow, 7=White, 8=Transparent, 9=Grey, 10=Opaque Black, 11=Opaque White, 12=Flashing Blue, 13=Flashing Green, 14=Flashing Red, 15=Flashing White
Label foreground color	10..5F	248	
Label H. Size	10..5F	249	0..8
Label V. Size	10..5F	24A	0..8
Label H. Position	10..5F	24D	0..3 (Off / Left / Center / Right)
Label V. Position	10..5F	24E	0..3 (Off / Top / Middle / Bottom)
Label char. to adj.	10..5F	24B	0..23
Label char. value	10..5F	24C	32..127
EDID to use	10..1F	243	0..7 to specify EDID entries 1..Mon
EDID capture entry#	10..1F	244	0..7 to specify EDID entries 1..Mon
EDID capture Grab	10..1F	245	Set to 1 to Grab. Auto-resets to 0.
HDCP advertise (DVI)	10..1F	237	0=Off, 1=On
HDCP status (DVI)	10..1F	238	0=Inactive, 1=Active
TL pos. adj. (left)	10..FF	0B6	-100..100
TL pos. adj. (top)	10..FF	0B7	-100..100
BR size adj. (right)	10..5F	0DE	-100..100
BR size adj. (bottom)	10..5F	0DF	-100..100
Audio input source (internal)	10..FF	242	0..4 Selects inputs 1 to 4 + Mute.
OPTION audio input	10..FF	0D0	0..9 = Channels 1 .. 10 on A2-2000
Audio vol	10..FF	0CF	-16..15 (-16=Mute)
Bal	10..FF	0D1	-15..15

Menu text	CHA	FUNC (Hex)	Range of adjustment (decimal)
On source loss (was Deglitch)	10..5F	0A3	0=Show, 1=Freeze, 2=Blue, 3=Black, 4=Remove
Source stable (read only)		22A	0=Unstable, 1=Stable
Input pixel phase	10..5F	091	0..31
RGB input type	10..1F	0C1	8 = Auto 6 = D-RGB 11 = D-YUV 10 = A-RGB 12 = A-YUV For universal HD15 inputs: 5 = CV/YC For units with DVI-U inputs: 13 = CV (or A-CV) 14 = YC (or A-YC) For units with DVI-U 5x BNC breakouts: 15 = B-RGB 16 = B-YUV 17 = B-CV 18 = B-YC
RGB contr. (red)	10..1F	0C5	75..150
RGB contr. (green)	10..1F	0C6	75..150
RGB contr. (blue)	10..1F	0C7	75..150
YUV setup level	10..1F	23E	0=0 IRE, 1=7.5 IRE
De-int.	10..FF	0B8	0..6 = Normal, Auto, Film 3:2, M.comp.low, M.comp.med., M.comp.high, Frame/bob
(Film mode detected)	10..FF	0E3	0..1 = Not detected, Detected
Diagonal interpolation	10..FF	22B	0..1 = Off, On
Noise reduction	10..4F	23F	0..1 = Off, On
Bright	30..4F	0BB	0..180
Contrast	30..4F	0BC	0..180
Saturation	30..4F	0B9	0..180
Hue	30..4F	0BA	-180..180
Sharpness	30..4F	080	-7..+7
Luma delay	30..4F	0BD	-4..3
Video standard	30..4F	08A	0 = PAL BGDHI / NTSC M

Menu text	CHA	FUNC (Hex)	Range of adjustment (decimal)
			1 = NTSC 4.43 50 / PAL 60Hz 2 = PAL N / NTSC 4.43 60Hz 3 = NTSC N 3.58 / PAL M 4 = NTSC-Japan 3.58 5 = SECAM 6 = B&W 50Hz / 60Hz
Field swap	10..FF	0C9	0..1 = Off, On (swaps odd/even fields)
Field Offset	10..FF	196	0..7 = -4..+3 (defaults to 4 = 0)
For units with digital audio processing:			
Audio channel 1	10..FF	213	0x00 to 0x07 = SDI1-1 to SD1-8 0x08 to 0x0F = SDI2-1 to SDI2=8 0x10 to 0x1F = AES1 to AES16
Audio channel 2	10..FF	214	
Audio channel 3	10..FF	215	
Audio channel 4	10..FF	216	
Audio channel 5	10..FF	217	
Audio channel 6	10..FF	218	
Audio channel 7	10..FF	219	
Audio channel 8	10..FF	21A	
Adjust audio (on certain models only)			
Source to adj		203	0x00 to 0x07 = SDI1-1 to SD1-8 0x08 to 0x0F = SDI2-1 to SDI2=8 0x10 to 0x1F = AES1 to AES16
Volume trim		205	-128 to 127
Delay adjust		204	-100 to 5000
Adjust transitions (on certain models only)			
Transition type		112	0..3 = Cut, Fade, Wipe, Push
Switching fade time		0F5	0 (off) to 50 (5.0 seconds)
Wipe type		145	0 = Left -> Right 1 = Right -> Left 2 = Up -> Down 3 = Down -> Up 4 = Diagonal 5 = Diamond
Wipe Size		146	10..2000
Adjust sources audio Control (C2-8000 Only)			

Menu text	CHA	FUNC (Hex)	Range of adjustment (decimal)
Audio delay		192	0..200 = delay in ms
Audio Control (S2-106AD Only)			
Sample frequency		191	0..4 = Bypass, 32, 44.1, 48, 96kHz
Audio delay		192	0..999 = delay in ms (restricted depending on Sample frequency)
Adjust tally (on certain models only)			
Tally mode		260	0 = Disabled 1 = Normal 2 = Presets
Tally input number		261	1 to 8
Tally preset to load		262	1 to 50
Adjust resolutions Note: You MUST set the 'Image to adjust' value to the correct value first, and only then change the other values - otherwise you may be adjusting the wrong entry. The user should not adjust the 'Image to adjust' entry using the front panel whilst also accessing it via RS232			
Image to adjust		081	1..1000
Interlaced		0CA	0..1 = Off, On
H.freq.crse		0BE	10000..200000
H.freq.fine		0BF	10000..200000
H/V active (H)		096	64..2047
H/V active (V)		097	64..2047
H/V start (H)		08B	0..1023
H/V start (V)		08C	0..1023
Clks/l		08D	64..4095
Lines/f		08E	64..2047
H/V sync (H)		08F	8..1023
H/V sync (V)		090	1..1023
Sync polarity		094	0..3 = ++, +-, -+, --
System			
SW (Software version)		0D2	Read only
PT (Product type)		0C4	Read only
BT (Board type)		0C2	Read only
Advanced menus		11D	0..1, Off, On
Autoset Sense		0FF	0..3 = Low, medium, high, v.high
OSD on Power up		189	0..1, Off, On

Menu text	CHA	FUNC (Hex)	Range of adjustment (decimal)
RGB1 termination		199	0..2, Off, On, Auto
Store		0C8	Set to 1 to store
Buzzer		0CB	0..1 = Off, On
CC-300 A/B bus enable		202	0..1 = Off, On
Power cycles		0D6	Read only
Firmware updates		0DD	Read only
Hours in use		0D7	Read only
Resolutions		0D8	Read only
Number of Still Images / Testcards		0D9	Read only
Number of logos		14F	Read only
Board temp. (deg.C)		0CD	Read only
Air temp. (deg.C)		148	Read only
Regulators temp.(deg.C)		147	Read only
PLD temp. (deg.C)		111	Read only
Led brightness		12C	0..100
LCD backlight		200	0..1 = Off, On
LCD contrast		270	0..255
Serial type (See Specs to see if your unit supports all options)		251	0 = RS-232 1 = RS-422 2 = RS-485
RS232 Baud rate		0AB	0..6 = 9600, 19200, 28800, 33600, 38400, 57600, 115200
Fan speed (rpm)		0CE	Read only
Fan 1 status		271	0=OK 1=Fast 2=Slow 3=STOP
Fan 2 status		272	
Fan 3 status		273	
Fan 4 status		274	
PSU 1 status		27F	0=Fault 1=NoPower 2=OK 3=Missing
PSU 2 status		280	
TAC number 0		15D	Read only
TAC number 1		15E	Read only
TAC number 2		15F	Read only

<table>
<tr><th>Menu text</th><th>CHA</th><th>FUNC (Hex)</th><th>Range of adjustment (decimal)</th></tr>
<tr><td>TAC number 3</td><td></td><td>160</td><td>Read only</td></tr>
<tr><td>TAC number 4</td><td></td><td>161</td><td>Read only</td></tr>
<tr><td>TAC number 5</td><td></td><td>162</td><td>Read only</td></tr>
<tr><td>MAC number (IP port)</td><td></td><td>208</td><td>Read only – bytes reversed!</td></tr>
<tr><td colspan="4">Not part of menu system</td></tr>
<tr><td>System STANDBY</td><td></td><td>281</td><td>0 = Operating, 1 = In STANDBY mode</td></tr>
<tr><td>Front panel lock</td><td></td><td>0FC</td><td>0 = unlocked, 1 = locked</td></tr>
<tr><td>Emulate button press</td><td></td><td>24F</td><td>See section below.</td></tr>
<tr><td>Options installed or attached – read only</td><td></td><td>264</td><td>24-bit number has a bit high to indicate that a unit is attached, or an option installed:
<table>
<tr><th>Bit</th><th>Unit</th><th>Bit</th><th>Unit</th></tr>
<tr><td>0</td><td>Audio switcher</td><td>12</td><td>S2-110CV</td></tr>
<tr><td>1</td><td>S2-106AD</td><td>13</td><td>S2-110YC</td></tr>
<tr><td>2</td><td>S2-105PC</td><td>14</td><td>S2-101AA</td></tr>
<tr><td>3</td><td>S2-105PCA</td><td>15</td><td>Ethernet</td></tr>
<tr><td>4</td><td>S2-109PC</td><td>16</td><td>Tally / UMD module</td></tr>
<tr><td>5</td><td>S2-105CV</td><td>17</td><td>-</td></tr>
<tr><td>6</td><td>S2-105CVA</td><td>18</td><td>-</td></tr>
<tr><td>7</td><td>S2-105YC</td><td>19</td><td>-</td></tr>
<tr><td>8</td><td>S2-105YCA</td><td>20</td><td>-</td></tr>
<tr><td>9</td><td>-</td><td>21</td><td>-</td></tr>
<tr><td>10</td><td>S2-108HD</td><td>22</td><td>-</td></tr>
<tr><td>11</td><td>S2-105DVIA</td><td>23</td><td>-</td></tr>
</table></td></tr>
</table>

Examples

Each example shows the packet sent to the unit and its response. When a byte is not required to be sent it is indicated by a '- 'in the table below (since a Read is 6 bytes shorter than a Write). Each character shown below is sent as a ASCII character so F0400 is sent as 'F' '0' '4' '0' '0'.

Packet sent

SOP	CMD	CHA	WIN	OUT	FUN	PAY	CS	EOP

Packet returned

SOP	CMD	CHA	WIN	OUT	FUN	PAY	CS	EOP

Set output 1 window B Source to RGB2

F	04	00	42	00	82	000011	D9	CR
F	44	00	42	00	82	000011	19	CR

Set output 1 window A to Enable advanced aspect control

Note checksum is ?? for debugging

F	04	00	41	01	02	000001	??	CR

F	44	00	42	01	02	000001	8A	CR

Set 1A Shrink to 110 – invalid max for shrink is 100

F	04	00	41	00	87	00006E	??	CR

F	44	00	41	00	87	000064	70	CR

Read 1C Zoom level – invalid as window C does not exist

F	84	00	43	00	86	-	??	CR

F	04	00	43	00	86	000000	CD	CR

Read 1B Zoom level

F	84	00	42	00	86	-	??	CR

Zoom = 100

F	44	00	42	00	86	000064	70	CR

Set baud to 9600

F	04	00	42	00	AB	000000	F0	CR

Reply is at 9600 baud

F	44	00	42	00	AB	000000	30	CR

Set 1A Zoom = 300

F	04	00	42	00	86	00012C	F7	CR

F	44	00	42	00	86	00012C	37	CR

Set 1A Shrink to 50

F	04	00	42	00	87	000032	FE	CR

F	44	00	42	00	87	000032	3E	CR

Set 1A Shrink H Posn to 0

F	04	00	42	00	DA	000000	1F	CR

F	44	00	42	00	DA	000000	5F	CR

Set 1A Shrink V Posn to 100

F	04	00	42	00	DB	000064	84	CR

F	44	00	42	00	DB	000064	C4	CR

Reading and writing macros

Depending on the unit connected there can be up to 7 macros stored in the unit. These macros can be programmed to perform a specific task, for example enable PIP mode, Position pip window at H=0, V=0, Zoom in to 120%.

The WIN and OUT bytes are not used for macro reading or writing and should be set to WIN=1A and OUT = 0

The CHA byte indicates the macro we are programming / reading / running. Macro 1 to 5 are CHA 0..4, CHA=5 is restore, CHA 6..7 are Macros 6..7.

Macro Restore (CHA=5) is read only, the units restore state is set by sending the Store command (0C8).

Menu text	**CHA**	**FUNC (Hex)**	**Range of adjustment (decimal)**
Macro			
Run macro	0..7	F1	0..1 = Run, Erase macro
Number of items within macro	0..7	F4	Read Only
Function to adjust	0..7	F2	0..4095

Value	0..7	F3	Value for Function

Reading a previously stored macro

In order to read a macro the following commands must be sent in this specific order – no other commands should be sent between these messages. The CHA in these cases relate not to the source but to the macro we are reading.

Packet sent

SOP	CMD	CHA	WIN	OUT	FUN	PAY	CS	EOP

Packet returned

SOP	CMD	CHA	WIN	OUT	FUN	PAY	CS	EOP

Read number of items currently stored in Preset 2

F	84	01	42	00	F4	-	BB	CR

Returned packet indicates 4 items available to read

F	44	01	42	00	F4	00002	FC	CR

Read the Function for the first item in the preset / macro

F	84	01	42	00	F3	-	BA	CR

Payload is the Function stored – 86 = Zoom

F	44	01	42	00	F3	000086	?80	CR

Read the Data for the first item in the preset / macro

F	84	01	42	00	F2	-	B9	CR

Payload is the data for the function – 100%

F	44	01	42	00	F2	000064	5D	CR

Read the Function for the second item in the preset / macro

F	84	01	42	00	F3	-	BA	CR

Payload is the Function stored – 87 = Shrink

F	44	01	42	00	F3	000087	81	CR

Read the Data for the second item in the preset / macro

F	84	01	42	00	F2	-	B9	CR

Payload is the data for the function – 100%

F	44	01	42	00	F2	000064	5D	CR

The above example shows the read for all the items within macro 0. The first command reads the number of items available in the macro and resets the read address. Then the following items read the function and then the data for each of the items in the preset/macro. Following a read of the data for a macro internally the next item in the macro is selected for reading so it is not possible to read the same item twice without first re-reading the number of items in the macro.

Writing to a macro

In order to read a preset / macro the following commands must be sent in this specific order – no other commands should be sent between these messages.

Packet sent

SOP	CMD	CHA	WIN	OUT	FUN	PAY	CS	EOP

Packet returned

SOP	CMD	CHA	WIN	OUT	FUN	PAY	CS	EOP

Clear macro

F	04	02	42	00	F1	000001	3A	CR

F	44	02	42	00	F1	000001	7A	CR

Write the function for first item in macro 3 = Zoom

F	04	02	42	00	F3	000086	C1	CR

F	44	02	42	00	F3	000011	01	CR

Write data for the first item = 100

F	04	02	42	00	F2	000064	9E	CR

F	44	02	42	00	F2	000011	DE	CR

Write the function for the second = shrink

F	04	02	42	00	F3	000087	C2	CR

F	44	02	42	00	F2	000011	02	CR

Write the data for the second item = 100

F	04	02	42	00	F2	000064	9E	CR

F	44	02	42	00	F3	000011	DE	CR

Run and restore macros

Macros once programmed can be run by sending one of the following commands. By running macro 5 the unit can be restored to its previously saved state, when used in conjunction with the other macros this allows a default setup or baseline for the unit to be created.

Packet sent

SOP	CMD	CHA	WIN	OUT	FUN	PAY	CS	EOP

Packet returned

SOP	CMD	CHA	WIN	OUT	FUN	PAY	CS	EOP

Restore

F	04	05	42	00	F1	000000	3C	CR

F	44	05	42	00	F1	000000	7C	CR

Run macro 1

F	04	00	42	00	F1	000000	37	CR

F	44	00	42	00	F1	000000	77	CR

Run macro 2

F	04	01	42	00	F1	000000	38	CR

F	44	01	42	00	F1	000000	78	CR

Run macro 3

F	04	02	42	00	F1	000000	39	CR

F	44	02	42	00	F1	000000	79	CR

Run macro 7

F	04	07	42	00	F1	000000	39	3E

F	44	02	42	00	F1	000000	7E	CR

Emulate a front panel button press

This is performed using function code 0x24F and the following payload codes (requires firmware version 287 onwards). Note that not all button presses are relevant to your unit.

Button press	**Payload**
Power down	0400E1
Power back on – see Reset command.	N/A
Reset menu settings to power-on values	0100E2
Reset menu settings to factory defaults	2300E2
Lock / unlock front panel buttons	0100E3
Set to NTSC output	0000E7
Set to PAL output	0000E8

Button press	Payload
Set to default output resolution for unit	0000E9
Set to 480p output	0000EA
Set to 720p 59.94Hz output	0000EB
Set to 720p 60Hz output	0000EC
Cycle presets (demo mode)	0100EE
Select DVI-I1 as source	000200
Select DVI-I2 as source	000201
Select DVI-I3 as source	000202
Select DVI-I4 as source	0002A2
Select CV1 as source	000203
Select CV2 as source	000204
Select CV3 as source	000205
Select YC1 as source	000206
Select YC2 as source	000207
Select YC3 as source	000208
Select SD1 as source	00022B
Select SD2 as source	00022C
Select SD3 as source	0002A4
Select SD4 as source	0002A5
Select TC1 / SIS1 as source	000209
Select TC2 / SIS2 as source	00020A
Select OUT1 as source	00020B
Select OUT2 as source	00020C
Toggle window A/B/Z	00020D
Toggle output 1/2	00020E
TAKE (activate transition)	00020F
FREEZE	000211
KEY	000212
MIX	00024D
INPUT	00024E
AUTOSET	00024F
FADE	000251
ZOOM	000252
PAN	000253
SIZE	000254

Button press	Payload
POS	000255
LOCK	000256
PIP	000257
MIX / PIP	00025A
ASPECT	00025D
PAN / POS	00026F
ZOOM	000270
LOCK / MIX	000269
Decrease Shrink value	000213
Increase Shrink value	000214
Decrease Zoom value	000215
Increase Zoom value	000216
Reset settings to power-on values	000217
Identify current window	000218
Run Macro 1	000219
Run Macro 2	00021A
Run Macro 3	00021B
Run Macro 4	00021C
Run Macro 5	00021D
Run Macro 6	000267
Run Macro 7	000268
Add to Macro 1	020119
Add to Macro 2	02011A
Add to Macro 3	02011B
Add to Macro 4	02011C
Add to Macro 5	02011D
Add to Macro 6	020167
Add to Macro 7	020168
Erase Macro 1	280119
Erase Macro 2	28011A
Erase Macro 3	28011B
Erase Macro 4	28011C
Erase Macro 5	28011D
Erase Macro 6	280167
Erase Macro 7	280168

Button press	Payload
Decrease Horizontal Pan value	00021E
Increase Horizontal Pan value	00021F
Decrease Vertical Pan value	000220
Increase Vertical Pan value	000221
Select window A	000223
Select window B	000224
Select window C	0002A0
Select window D	0002A1
Select window Z	000225
Select Output 1	000226
Select Output 2	000227
SELECT (menu adjust)	000128
Left rotary (menu adjust rotary control)	000129
Right rotary (menu adjust rotary control)	00012A
Left (menu adjust)	000158
Right (menu adjust)	000159
Decrement / ZOOM (menu adjust)	00024B
Increment / FREEZE (menu adjust)	00024C
Decrement / PIP (menu adjust)	00029E
Increment / KEY (menu adjust)	00029F
Set transition to FADE	00026A
Set transition to WIPE	00026B
Set transition to PUSH	00026C
Select DVI1 as source for window A	00023C
Select DVI2 as source for window A	00023D
Select DVI3 as source for window A	00023E
Select DVI4 as source for window A	0002A7
Select DVI5 as source for window A	0002A8
Select DVI6 as source for window A	0002A9
Select DVI7 as source for window A	0002AA
Select DVI8 as source for window A	0002AB
Select DVI9 as source for window A	0002AC
Select DVI10 as source for window A	0002AD
Select DVI11 as source for window A	0002AE
Select DVI12 as source for window A	0002AF

Button press	Payload
Select CV1 as source for window A	00023F
Select CV2 as source for window A	000240
Select CV3 as source for window A	000241
Select YC1 as source for window A	000242
Select YC2 as source for window A	000243
Select YC3 as source for window A	000244
Select TC1 as source for window A	000245
Select TC2 as source for window A	000246
Select TC3 as source for window A	0002B9
Select OUT1 as source for window A	000247
Select OUT2 as source for window A	000248
Select SDI1 as source for window A	000249
Select SDI2 as source for window A	00024A
Select SDI3 as source for window A	000271
Select SDI4 as source for window A	000272
Select SDI5 as source for window A	000273
Select SDI6 as source for window A	000274
Select SDI7 as source for window A	000275
Select SDI8 as source for window A	000276
Select DVI1 as source for window B	00022D
Select DVI2 as source for window B	00022E
Select DVI3 as source for window B	00022F
Select DVI4 as source for window B	0002B0
Select DVI5 as source for window B	0002B1
Select DVI6 as source for window B	0002B2
Select DVI7 as source for window B	0002B3
Select DVI8 as source for window B	0002B4
Select DVI9 as source for window B	0002B5
Select DVI10 as source for window B	0002B6
Select DVI11 as source for window B	0002B7
Select DVI12 as source for window B	0002B8
Select CV1 as source for window B	000230
Select CV2 as source for window B	000231
Select CV3 as source for window B	000232
Select YC1 as source for window B	000233

Button press	Payload
Select YC2 as source for window B	000234
Select YC3 as source for window B	000235
Select TC1 as source for window B	000236
Select TC2 as source for window B	000237
Select TC3 as source for window B	0002BA
Select OUT1 as source for window B	000238
Select OUT2 as source for window B	000239
Select SDI1 as source for window B	00023A
Select SDI2 as source for window B	00023B
Select SDI3 as source for window B	000277
Select SDI4 as source for window B	000278
Select SDI5 as source for window B	000279
Select SDI6 as source for window B	00027A
Select SDI7 as source for window B	00027B
Select SDI8 as source for window B	00027C
Lock to CV1	00025B
Lock to YC1	00025C
Toggle CV1 / YC1 as source	00025E
Toggle CV2 / YC2 as source	00025F
Toggle DVI-D1 / SDI1 as source	000260
Toggle RGB1 / YUV1 as source	000261
Select DVI-D1 as source	000262
Select RGB1 as source	000263
Select RGB2 as source	00027D
Select YUV1 as source	000264
Logo 1A toggle on/off	000265
Logo 2B toggle on/off	000266
Window 1A toggle on/off	00026D
Window 2B toggle on/off	00026E
Go to Lock menu item	00027E
Output 1 toggle on/off	00027F
Output 2 toggle on/off	000280
Select UNI1 as source for window A	000281
Select UNI2 as source for window A	000282
Select UNI3 as source for window A	000283

Button press	Payload
Select UNI4 as source for window A	000284
Select UNI5 as source for window A	000285
Select UNI6 as source for window A	000286
Select UNI7 as source for window A	000287
Select UNI8 as source for window A	000288
Select UNI1 as source for window B	000289
Select UNI2 as source for window B	00028A
Select UNI3 as source for window B	00028B
Select UNI4 as source for window B	00028C
Select UNI5 as source for window B	00028D
Select UNI6 as source for window B	00028E
Select UNI7 as source for window B	00028F
Select UNI8 as source for window B	000290
Load Preset 1	000291
Load Preset 2	000292
Load Preset 3	000293
Load Preset 4	000294
Load Preset 5	000295
Load Preset 6	000296
Load Preset 7	000297
Load Preset 8	000298
Load Preset 9	000299
Load Preset 10	00029A
Store Preset 1	020191
Store Preset 2	020192
Store Preset 3	020193
Store Preset 4	020194
Store Preset 5	020195
Store Preset 6	020196
Store Preset 7	020197
Store Preset 8	020198
Store Preset 9	020199
Store Preset 10	02019A
Erase Preset 1	280191
Erase Preset 2	280192

Button press	Payload
Erase Preset 3	280193
Erase Preset 4	280194
Erase Preset 5	280195
Erase Preset 6	280196
Erase Preset 7	280197
Erase Preset 8	280198
Erase Preset 9	280199
Erase Preset 10	28019A
Set output to BLACK	00029B
Set output to WHITE	00029C
Toggle edge blend lines on/off	00029D
Cycle scaler inputs	0002A3

I.e. insert the 6 digit code from above into the following text string:

F041041024F######??<CR>

E.g. to Load Preset 1, use the text string:

F041041024F000291??<CR>

Reset command

This is a special command to reset a unit (as if power had been removed and re-applied). Note that unlike the above commands, this is sent as binary (i.e. not as ASCII text).

0x53, 0x06, 0x04, 0x01, 0x55, 0xAA, 0x55, 0xB2

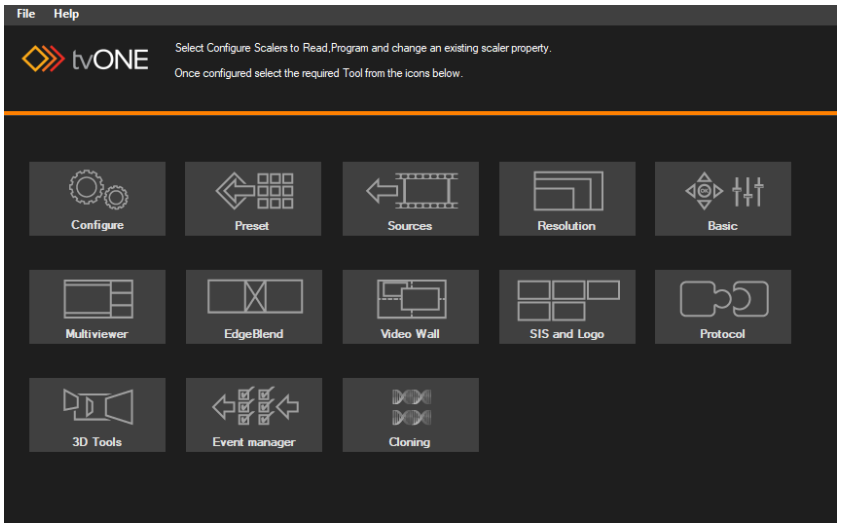
E.g. In Visual Basic, send the string:

Chr$(&H53) + Chr$(&H6) + Chr$(&H4) + Chr$(&H1) + Chr$(&H55) + Chr$(&HAA) + Chr$(&H55) + Chr$(&HB2)

CORIOtools suite

CORIOtools Suite allows you to simply set up your unit. Download the latest version of CORIOtools Suite from **tvONE.com/softwares**.

CORIOtools Suite runs on Windows XP and above, and requires.NET framework 4.0 or above.



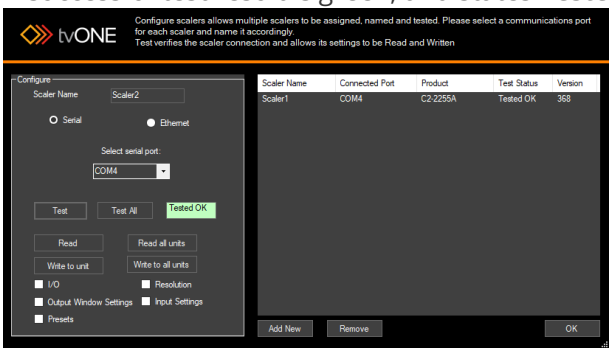
Demo mode

CORIOtools Suite has a demo mode that allows you to explore the application without connecting to a unit. Select **Help** > **Demo mode**.

Adding your units

When you first open CORIOtools Suite, add your units.

1. From the CORIOtools Suite home screen, select **Configure.**
2. Select **Serial** or **Ethernet**, depending on how your units are connected.
3. Select a serial port, or enter the IP address of your unit.
   All scalers on your network share the same IP port.
4. Select **Test**.
   A successful test result is green, and states **Tested OK**.



5. For each additional unit, select **Add New** and repeat steps 2-4.
6. When you have added all your unit, select **Read all units**.
   CORIOtools Suite updates with information from your units.
7. Select **OK**.

Saving and loading configurations

You can save your whole configuration to a file on your computer, or you can load a configuration from a saved file.

- Select **File** > **Save as**, or **File** > **Load**.

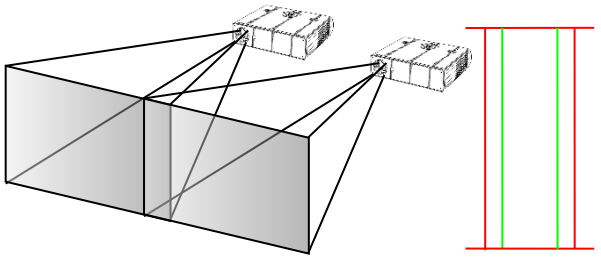
Saving settings to and reading settings from your unit

You can save specific settings to your unit and read specific settings from your unit.

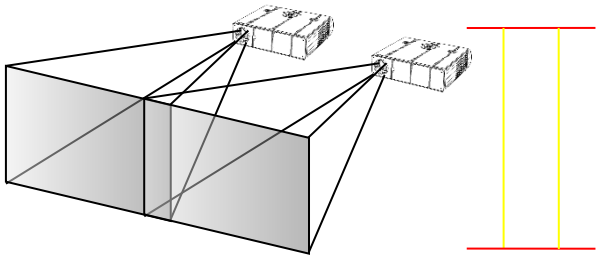
1. From the CORIOtools Suite home screen, select **Configure.**
2. Select a unit from the right-hand side.
3. Select settings to save to your unit or read from your unit.
   Settings include inputs and outputs, presets, and resolution settings.
4. Select **Write to unit** or **Read**.
   You can also choose to save settings to or read settings from all units.

Creating an edge blend with the edge blend tool

1. From the CORIOtools Suite home screen, select **EdgeBlend**.
2. From **Scaler Assign**, select the units you want to use in your edge blend.
   You need one unit per projector, and at least two units to create an edge blend.
3. Select **Configuration** and enter the number of displays you want to create. You can also choose to use multisource mode.
   Two projectors and one edge blend creates a single display.
4. Select **Video**. Select a source for each unit, and then enter or select the native resolution and output type of a projector. Select **Apply**. Repeat for each projector.
5. Select **Mapping** and drag each source to the correct position on your display. When all sources are in place, select **Apply**.
6. Select **Blend width** and use the slider to adjust the blend width.
   CORIOtools Suite sends a pattern of red and green lines to the projectors to help you with setting the blend width. When the lines overlap perfectly to produce yellow lines, you have set the blend width correctly.



Projectors overlapped, but blend width not yet correct



Perfect alignment – red and green vertical lines overlapping to produce yellow lines.

7. If the alignment of your edge blend isn't quite right, select **Picture adjustment**, select a source from the right-hand side, and adjust the size and offset of the image.
   You can turn on guidelines to make it easier to see the overlap.
   Note: if you select **Apply to all**, the settings are saved on all units in your system.
8. If the overlapped area of your display appears brighter than other areas, select **Gamma,** select a source from the right-hand side, and use the slider to adjust the brightness.
   Note: if you select **Apply to all**, the settings are saved on all units in your system.
9. If adjusting the gamma value did not remove all bright spots, select **Compensation,** select a source from the right-hand side, and use the slider to adjust the center.
   Note: if you select **Apply to all**, the settings are saved on all units in your system.

Adding a logo, still image, or testcard

You can add up to ten still images or testcards on each unit. Still images and testcards are stored in the Still Image Store (SIS). The system compresses images during processing. Complex images like photographs lose quality when compressed. For best results, use simple images and testcards.

You can add up to two logos on each unit, and you can choose to key the dark areas of a logo to make them transparent.

To add a still image or testcard

1. From the CORIOtools Suite home screen, select **SIS and Logo**.
2. From **Scaler**, select a unit.
3. On the **SIS** tab, select **Load Image** and find the image you want to add.
   Images can be in .GIF, .JPG, .PNG, and .BMP format, and up to 2048 pixels high and wide.
4. Enter a name for your image.
5. Choose a slot number for your image from **SIS Number**.
6. Select **Program**.

To add a logo

1. From the CORIOtools Suite home screen, select **SIS and Logo**.
2. From **Scaler**, select a unit.
3. On the **Logo** tab, select **Load Image** and find the image you want to add.
   Images can be in .GIF, .JPG, .PNG, and .BMP format, and up to 1024 pixels high and wide, with a maximum total size of 32768.
4. Choose a slot number for your logo from **Logo Number**.
5. If you want to make the dark areas of your logo transparent, select Apply key on black.
   Transparency is applied on a scale, where darker areas are more transparent and brighter areas are less transparent. Black is completely transparent.
   Transparency works best when your logo has a low number of colors.
6. Select **Program**.

Troubleshooting and FAQs

There is no picture on the output

If no LEDs are on, then ensure that the AC power adaptor is connected properly and the power switch is on at the AC outlet.

If the Standby/ON LED on the unit is off but another blue LED is active then check that the monitor output from the computer is connected at both the computer and the unit. Check that the output connector you are using from the unit is also connected at the unit and the display equipment.

Check that the display video equipment is set to the correct line input and format/standard as appropriate.

Check that the device connected to the output is on and can support the resolution set in the Adjust output menu, ensuring that the Sync type e.g. RGBHV, is also set correctly.

The image is shifted and not fully viewable

There are several ways to correct this, depending on the actual problem, although it's generally best to perform a Factory reset.

Try an AUTOSET if the input is RGB or YUV/YCbCr. Next adjust the TL pos. adj. values in the Setup Program source menu until the incoming video signal is displayed correctly. You may also need to adjust the BR size adj. setting to ensure the incoming video signal is properly displayed.

The output resolutions no longer appear as expected

Because any changes made in the Adjust resolutions menu are automatically stored, it may be that the resolution data has become altered or corrupted beyond the ability of a display to show it.

Either manually correct the resolution data, or restore the data to full factory conditions by doing a firmware update. The user should avoid altering the resolution parameter data unless absolutely necessary.

There is excessive flicker on the output

Try using a different Flicker reduction mode. Turning the contrast down and the brightness up on the output device can have a large effect on flicker. Or try adjusting the brightness and contrast of the source input by selecting the Input adjust menu.

The Output image is distorted

This may occur where some of the areas of the image are very dark and others are very bright. The solution is to adjust the contrast and brightness settings on your Output device to rectify the problem.

Alternatively, if the Adjust resolutions menu has been used to the output resolution in question, a firmware update is recommended to perform a FULL factory reset.

Some colors appear to be incorrect on the CV/YC output

First try altering the color, contrast and brightness settings on your TV or video display. These are usually set up for a very different reason than viewing computer graphics and may need changing to suit. If you cannot achieve exactly what you desire then alter the inputs levels in Adjust sources until the correct colors are restored.

How can I reduce color smearing on CV connections?

Smearing usually occurs on Composite Video connections and is generally unavoidable - unless you can switch to using S-Video or RGB / YUV connections. It occurs because the brightness and color information is transmitted as one combined (composite) signal and the two parts have to be 'bandwidth-limited' to avoid them interfering with each other – which then reduces the quality.

I can no longer adjust the Output image resolution

When the unit is in Lock mode, the output resolution is fixed to be the same as the Lock source input resolution. During this time the Output image menu item is not displayed.

The picture on the video display is black and white

Ensure that all the cables are correctly connected. If you are using a PAL TV to display the output then the unit may be providing resolution set to NTSC mode, or vice versa.

The picture on the video display is green

The Output type is probably incorrectly set to YUV mode, whereas you are connecting to an RGB monitor – see Adjust outputs menu.

The RGB input is selected but the image is rolling or pink

Check the Adjust sources menu and confirm that the input type and sync method is set correctly. (Having YUV input selected, instead of RGBHV often causes this problem).

The video signal from my DVD player does not appear to work

Some DVD players have a switch at the back that selects between 'Component' and 'S-Video' output, because most will not let you output both at the same time. Make sure it is in the right position for the output you want.

Image is flashing, snow is present, or source image does not appear

You may be experiencing a HDCP compatibility problem.

If one of the sources you are using is HDCP encrypted, and your unit is not set to output HDCP, then your unit will not allow the source image to pass through the unit (it may flash on and off).

The solution (if your unit supports HDCP) is to ensure it is enabled in both 'Adjust outputs' and in the 'Adjust sources' menu for that source signal.

If you unit does not support HDCP, or your output device does not support HDCP (e.g. an analog monitor), then there is no way to display a HDCP encrypted source signal.

General troubleshooting checklist

If specific troubleshooting advice isn't helping, or your product has stopped working, go through the points below. If your product still doesn't work, you might need to return it for repair.

1. Make sure your product is set up correctly, as shown in this guide.
2. Check that your cables and equipment are all connected firmly.
3. Check that your product is connected to an electrical outlet that is switched on.

   Can you see LED lights on the front of your product?
4. Test your sources by connecting them directly to a display.
5. Test your display by connecting it directly to a source.
6. Test each cable.
7. Try restoring your product to factory default settings.

   Note: during factory reset your custom settings are deleted.
8. Try updating your firmware.

   Note: during a firmware update your custom settings are deleted.

Returning a product for repair

You can request to return your product to tvONE™ for repair. When you contact tvONE support, have the following information ready.

- Product type
- Serial number of the faulty unit (this is on the underside of the unit)
- Full details of the issue
- Invoice number (if available)

Contact tvONE support for your area.

- Customers in North, Central, and South America (NCSA), email tech.usa@tvone.com.
- Customers in Europe, the Middle East, and Africa (EMEA), email tech.europe@tvone.com.
- Customers in Asia, email tech.asia@tvone.com.

EMEA and Asia

Customers in EMEA and Asia receive an RMA Request form from tvONE support. Complete the form and return it to tvONE support for your area.

All customers

tvONE support decides if your product needs to return for repair, and, if needed, provide a return authorization number.

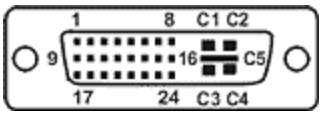
Send your product to tvONE by insured carrier or registered mail. Write your return authorization number on the outside of the packaging, and on any documents you send with your product.

You must arrange and pay for shipping and insurance. Products in transit are your responsibility. tvONE does not accept responsibility for products lost in transit.

Do not return a product for warranty repair without a return authorization number. tvONE will not repair your product.

Connector pinouts

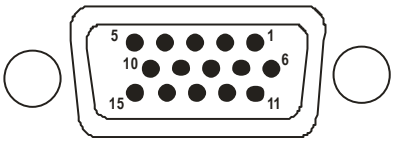
DVI-I connector



PIN#	SIGNAL	PIN#	SIGNAL
1	T.M.D.S DATA 2-	16	HOT PLUG DETECT
2	T.M.D.S DATA 2+	17	T.M.D.S DATA 0-
3	T.M.D.S DATA 2/4 SHIELD	18	T.M.D.S DATA 0+
4	Not used	19	T.M.D.S DATA 0/5 SHIELD
5	Not used	20	Not used
6	DDC CLOCK	21	Not used
7	DDC DATA	22	T.M.D.S CLOCK SHIELD
8	ANALOG VERT. SYNC	23	T.M.D.S CLOCK+
9	T.M.D.S DATA 1-	24	T.M.D.S CLOCK-
10	T.M.D.S DATA 1+		
11	T.M.D.S DATA 1/3 SHIELD	C1	ANALOG RED
12	Not used	C2	ANALOG GREEN
13	Not used	C3	ANALOG BLUE
14	+5V POWER	C4	ANALOG HORZ SYNC
15	GND	C5	ANALOG GROUND

(DVI-D connectors do not have connections to pins C1 to C5 or pin 8.)

HD15 connector



PIN#	SIGNAL	PIN#	SIGNAL
1	Red / Pr / R-Y	9	No Connection
2	Green / Y	10	GND
3	Blue / Pb / B-Y	11	GND on input, pulled high on output (used for auto-termination)
4	ID2 (input & output linked)	12	SDA (input & output linked)
5	GND	13	H sync(composite sync for RGBS)
6	GND	14	V sync
7	GND	15	SCL (input & output linked)
8	GND		

Specifications

Computer input

DVI-D (on DVI-I connector) supporting up to 162MHz (1920x1200 @ 60Hz).

EDID 1.3 data on DVI-D connector to communicate available resolutions.

Analog RGB/YPbPr supporting RGBHV, RGBS, RGsB, YPbPr, auto-terminating into 75 Ohm.

Digital sync (in RGBHV or RGBS mode): TTL Level, 10K termination, pos or negative.

Analog sync (in RGsB, YPbPr, YUV modes): 0.3v negative.

Analog RGB Level Range: 0.5-2.0 Vp-p approx.

Scan Rate Detection: automatic.

Analog PC Resolutions: any up to 2048x2048.

Analog HDTV Resolutions: any up to 1080p.

Analog max horizontal scan rate: 150kHz.

Computer outputs

DVI-D output on DVI-I connector, supporting up to 162MHz maximum clock/pixel rate (1920x1200 @ 60Hz).

Analog output impedance 75 Ohm.

Analog RGBHV, RGBS, RGsB, YPbPr (0.7v RGB / 1.0v sync-tip to white, approx. 0.4v DC offset).

Connectors: HD-15 and/or 5 x BNC.

Analog PC Resolutions: any up to 2048x2048 (user adjustable).

Analog HDTV Resolutions: any up to 1080p.

Vertical Refresh Rate: any to 250Hz

Scaling, sampling, memory

Size and position: automatic via AutoSet or Manual

Image size: user-definable presets

Image freeze: one video frame

Settings memory: non-Volatile

Zoom range: variable to 10x Zoom (1000%)

Shrink range: variable to 10%

Image mirroring: Horizontal and/or Vertical

Horizontal filtering: full digital

Conversion technology: proprietary

Color resolution: 24-bit (16.8 Million Colors)

C2-2000A sampling rate: 162MHz maximum

Previous C2-2000 sampling rate: 108MHz maximum

Digital sampling: 24-bit, 4:4:4 format

Firmware memory: flash, upgradeable via RS-232

Regulatory compliance

Main unit conforms to FCC, CE, RoHS

Environmental

Operating Temperature 0° to +45° C (+32° to +113° F)

Operating Humidity 10% to 85%, Non-condensing

Storage Temperature -10° to +70° C (+14° to +158° F)

Storage Humidity 10% to 85%, Non-condensing

Power requirement

External power supply: 12V DC @ 1.5A maximum.

Actual current consumption varies between units.

Internal over-voltage & over-current protection.

Full PSU specification: 12v DC regulated 1.5 Amp (or above) PSU with a 2.5mm locking center-pin positive DC power connector. A non-locking 2.5mm DC power connector will also fit.

Control methods

The unit can be controlled locally via the front panel buttons, multi-directional switch and On Screen Display. It can also be controlled remotely via the RS-232 interface using a D9 female connector or again remotely using Ethernet via a RJ45 Ethernet connector.

Mechanical

Size (H x W x D): 1.6” x 8.6” x 5.9” (41.5 x 218 x 150mm)

Weight (Net): 2.6 lbs (1.2 kg)

Optional accessories

RM-220: single/dual rack-mount Kit

Contact us

tvone.com

info@tvone.com

Support NCSA: tech.usa@tvone.com

Support EMEA: tech.europe@tvone.com

Support Asia: tech.asia@tvone.com