>>>> TV One <<<<

CS-500A/CS-600A Series

User's Manual

Release 4.0

FINAL

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Introduction

This manual covers both the CS-500A and CS-600A series - and when described together in this manual they are written as CS-500A/600A.

All units in the series are high quality scan converters, which converts computer-type video signals into television-type video signals. Their features and controllability make them powerful assistants for studio use, presentations, conferences and exhibitions - in fact anywhere that a need exists for high quality video output.

In addition, the CS-600A series has the added ability to genlock to an external reference source, for even better studio integration. Horizontal and Subcarrier phase adjustment are independently controllable.

The power of the CS-500A/600A is matched with its ease of use. Controllable via the integral LCD display and push-buttons, infra-red remote control or directly by a computer, all features can be accessed from the touch of a button. The ability of the CS-500A/600A's remote control to emulate a Microsoft® serial mouse makes controlling a presentation a joy.

This manual outlines the many features of the CS-500A/600A, how to use them, and how to get the best out of them. The different control methods are explained to allow you to choose the most appropriate for your own uses.

Credits

Scan Converter Hardware and Software designed by R.P.D. Mallett and A.W. White BEng AMIEE.

CS-500A/600A instructions release 4.0 (c) September 2002.

Written by R.P.D. Mallett.

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Important

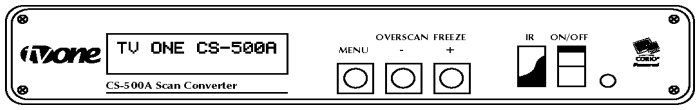
The CS-500A/600A has many unique features and operating methods, and because of this it is important that the user aquaints themselves with the operating instructions that follow the hardware sections.

Without doing so, the full potential of the unit may not be utilized.

Contents

Hardware Checklists

Desktop Version



The CS-500A or CS-600A Desktop version is supplied with the following items:

- Scan Converter unit.
- VGA Input Cable.
- Composite Video Cable.
- S-Video Cable.
- External Power Adapter.
- AC Line Cord.
- IRC-4 Remote Control.
- 75 Ohm termination BNC plug.
- CS-500A/600A Instruction Manual.

19" Rack Version.

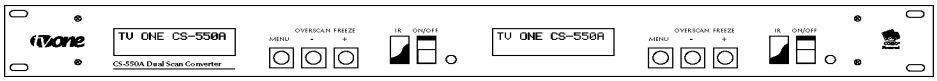
The CS-520A or CS-620A Single Rackmount version contains all of the above items, except the External Power Adapter (which is not necessary, since this model uses an internal power supply).

Please note that the ON/OFF switch on the front of the single rack-mount unit does not disconnect the unit from the AC supply, but is used to turn off the scan converter circuitry. The internal power supply remains active whenever the AC supply is present.

Additional items are:

- 4 x M6 x 16mm screws.
- 4 x M6 caged nuts.
- 4 x M6 plain washers.

Dual 19" Rack Version.



The CS-550A and CS-650A Dual 19" Rackmount contains two independent units. All controls will only control the unit with which it is associated, all inputs and outputs are totally independent for each of the two units. The remote control will control both units simultaneously, if you wish to control only one of the two units then it is necessary to turn off the other unit's IR. remote control option - see the Advanced Features section.

The Dual 19" Rackmount version is supplied with the following items:

- 2 x Scan Converter units within a standard 19" rack.
- 2 x VGA Input Cables - note that you can connect two units to one computer by 'daisy-chaining' these cables from the computer to the first unit, then from the output of the first into the second's input, and then from the second's output to the monitor (if applicable).
- 2 x Composite Video Cables.
- 2 x S-Video Cables.
- 2 x AC Power Adapters.
- 2 x AC Line Cord.
- 1 x IRC-4 Remote Control.
- 75 Ohm termination BNC plug.
- 1 x CS-500A/600A Instruction Manual.
- 4 x M6 x 16mm screws.
- 4 x M6 caged nuts.
- 4 x M6 plain washers.

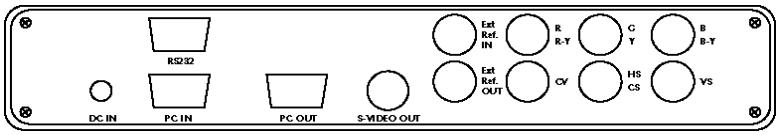
Hardware Setup

We recommend switching off all equipment before starting the setup.

Connecting the CS-500A/600A to a computer and monitor

Disconnect the monitor from the computer at the computer's video output. Connect this cable to the 'PC OUT' connector on the back of the unit. Macintosh computers and workstations may require an additional cable. This will let you see the monitor as before, even when there is no power to the CS-500A/600A.

Use the supplied computer-to-unit (15 pin to 15 pin) cable to connect the CS-500A/600A to the computer monitor output. Macintosh computers and workstations may require an additional cable. Connect this to the 'PC IN' connector on the back of the unit and to the monitor output on the computer.



Pictured is the rear of Desktop versions. Dual Rackmount versions are identical - but have two identical sets of outputs. Single Rackmount versions are identical, except they have an AC Plug instead of the DC Plug.

Connecting the video outputs

The CS-500A/600A provides several different output types to allow connection to various video displays and capture equipment (such as TVs and VCRs). The choice of output type depends on what your equipment can accept.

- Composite Video - use the composite video cable provided to connect from the composite video output on the back of the unit (the BNC connector marked CV) to the composite video input of your target video equipment.
- S-Video - use the S-Video cable provided to connect from the S-Video output on the back of the unit to the S-Video input of your target video equipment. S-Video provides improved performance over Composite Video.
- RGB & Sync. Use a 4xBNC to 4xBNC cable to link from the Red, Green, Blue, and HS/CS outputs to the video display. The unit defaults to outputting negative-going CS (Composite Sync) on the HS/CS connector, but if you encounter problems then it is likely that this has been changed - see 'Advanced Features' later in this manual.

- RGB & H/V Sync. Use a optional 5xBNC to 5xBNC cable to link from the Red, Green, Blue, HS/CS and VS outputs to the video display. The unit defaults to outputting CS (Composite Sync) on the HS/CS and VS connectors, so you must see 'Advanced Features' later in this manual in order to change this to the required separate HS & VS. It is recommended that another output is used, until operation of the unit is understood.
- RGBS connection. Connect the optional 4xBNC to 4xBNC cable to your TV or video, and the BNC plugs into the correct connectors on the back of unit. The CS-500A/600A defaults to outputting CS (Composite Sync) on the HS/CS connector, but if you have problems then it is likely that this has been changed - see 'Advanced Features' later in this manual. If you have problems, it is recommended that another output is used, until operation of the unit is understood.
- YUV connection. Professional equipment may require YUV signals, and these are connected from the same outputs as the RGB signals, also labeled 'R-Y', 'Y', 'B-Y'. If the unit is set to output RGB mode (this is the default) it will be necessary to switch to YUV - see the section on switching between RGB and YUV modes in the Advanced Features section of this manual. It is recommended that another output is used, until operation of the unit is understood.

Connecting an external reference signal (optional) - CS-600A series only

The CS-600A series has the ability to synchronize its video output with a master reference signal, in the form of a composite video source. This is done by connecting the reference signal to the BNC connector marked 'Ext Ref. IN'. A looped-through output is available at the 'Ext Ref. OUT' BNC connector for connection to other devices (i.e. in a daisy-chain arrangement). If no loop-through is required, you MUST connect the supplied 75 Ohm BNC termination plug to the 'Ext Ref. OUT' connector instead - otherwise the unit may not be able to maintain a lock on the incoming signal.

Synchronization is not automatic - you need to enable it within the unit. You should also ensure that the composite video signal used is of the right standard (PAL/NTSC), and that it is a clean, stable, standard signal. Video signals from domestic video tape players and some non-standard equipment may not be suitable.

Connecting the serial cable (optional)

The CS-500A/600A can be controlled from a computer, and used as a remote Microsoft® serial mouse emulator by connecting its RS232 port to a computer's RS232 port. See the section on 'RS232 Computer Control' later in this manual on how to use this control feature (mouse emulation is the default, and merely requires connecting a suitable RS232 cable).

Connecting the AC Power

The Desktop and Dual Rackmount versions come with an external 12VDC Power Adapter. With the on/off switch on the front of the unit in the off (up) position, plug the round 'DC power plug' of the AC Adapter into the 'DC in' plug on the back of the unit.

the unit to the 'on' (down) position.

The Single Rackmount Versions (CS-520A and CS-620A) are equipped with an internal power supply. With the on/off switch on the front of the unit in the off (up) position. Plug the AC Power Cord into the back of the unit. Plug the other end of the AC Power Cord into the AC outlet. Now, switch the front panel on/off switch to the "on" (down) position.

Please note that the ON/OFF switch on the front of the single rack-mount unit does not disconnect the unit from the AC supply, but is used to turn off the scan converter circuitry. The internal power supply remains active whenever the AC supply is present.

Turning on

Make sure that all cables are connected and that all other equipment is turned on - your computer monitor should be functioning normally. Select the correct line input (AUX or AV) on the target video equipment. The TV should now be displaying the same picture as is on the computer monitor.

- When the unit is switched on the Green LED indicator on the front panel will illuminate and the LCD will display the version and copyright details before cycling through the current status settings of the unit. If this does not happen please refer to the trouble shooting section.
- If there is a picture on the video monitor, but it is the wrong shape, position or color it may be necessary to alter some of the status settings before a good picture is displayed. For example: it may be necessary to switch to PAL or NTSC settings. Further details on selecting the correct settings for your displays follow in the Advanced Features section.
- If there is no picture on the video monitor then go to the trouble shooting section - one possible cause is that the YUV output is enabled, as this will blank all other outputs. This is also covered in the Advanced Features section.

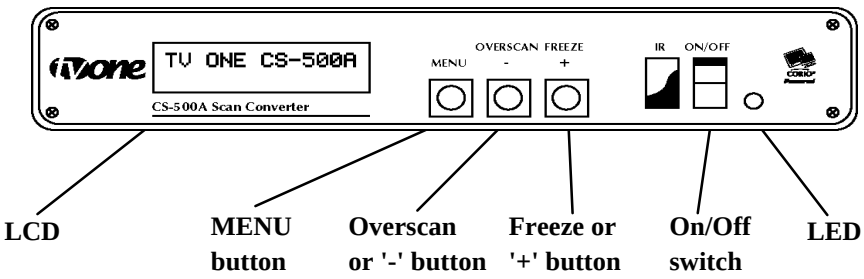
About the CS-500A/600A

There are 3 ways to control the unit:

1. By the buttons on the front panel
2. By the Infrared remote control unit
3. Directly from the computer via the serial (RS232) port

However, this manual's description of controlling the unit is based on the operation of the front panel. Descriptions of the Infrared control method, and serial control from the computer, are described later.

Shown below is a diagram that indicates the main features of the front panel. Whilst the rack-mount version may look slightly different, the operation is identical to the desktop version.



- **LCD** - the top line of the liquid crystal display (LCD) always indicates the current mode of the unit. At power-up, this will be the 'Status' mode, but this will change depending on what the user wants the unit to do. The bottom line always indicates the value that is or will be adjusted by the various control methods.
- **MENU.** This is used to initiate front panel control of the unit, and select the various options and features to change.
- **OVERSCAN**/-. This is a dual purpose button that will be described in a moment, but is normally used to decrease (or de-select) the currently displayed option or feature.
- **FREEZE**/+. This is another dual purpose button, but normally used to increase (or set) the currently displayed option or feature.
- **On/off Switch** - this switches the unit on and off. *Note that this will not prevent the mains adapter or internal power supply from being active.*
- **LED** - this is illuminated when the unit is on.

- **Sounder.** The internal sounder is used to confirm that a setting has changed, and to indicate that the unit is saving settings to non-volatile memory. You will hear it a fair bit during normal use, but it can be disabled if needed.

Quick-Set buttons

These are the dual purpose buttons described earlier, and only function when in Status mode (i.e. the top line of the LCD says 'Status').

They are provided for quick access to certain often-used functions - i.e. Toggling Underscan and Overscan, and Freeze.

Special button usage on Power-up

Certain buttons can be held down when applying power to the unit, to perform certain special functions:

- Factory Reset. Hold down both the OVERSCAN and FREEZE buttons when turning the unit on. This will reset the unit to Factory settings (and set the unit into PAL video mode). It should only be used if the unit's settings give an invalid output that the user cannot exit from, as all user-settings will be erased by this.
- Set to NTSC mode. This is done by holding the OVERSCAN button down when turning on the unit. This changes the non-volatile PAL/NTSC setting to NTSC, and will be remembered even when power is removed.
- Set to PAL mode. This is done by holding the FREEZE button down when turning on the unit. This changes the non-volatile PAL/NTSC setting to PAL, and will be remembered even when power is removed.

Special multi-hold buttons

Certain buttons can be held together when the unit is on to perform other functions.

- **Store Current Settings.** This is done by holding the MENU and FREEZE/+ buttons in together for about 2 seconds, and can be done at any time. This stores the current settings (e.g. Overscan, YUV mode, etc.) in Non-Volatile Memory, which will be read back the next time the unit is turned on.

This option will emit a high-pitched beep when complete to indicate that data has been successfully stored. If you manage to store an invalid setting, you may need to do a Factory reset (see above).

If you hear high pitch beeps at other times, it indicates that other data is being stored into memory - eg. information the unit has deduced about the graphics resolution coming from your computer, such as when you change your screen resolution.

Menu structure and feature control

This section goes through the main menus available via the LCD, and what control they have over the unit. Internally, the Infrared and Serial control links change the features in the same way as the buttons, so this section is required reading whatever the final method of control is likely to be.

Advanced features are covered in the next chapter.

Status

In Status mode, you are presented with a summary of some of the current settings. Almost all of these are repeated (and adjustable) elsewhere in the menu system, but some are not:

Overscan - Quick Set

This is called Quick Set because you don't have to scroll through menus to alter this option. The center button (marked OVERSCAN and +) toggles between underscan and overscan displays on the TV set:

- Underscan is where a border is left around the edge of the computer image when displayed on the TV.
- Overscan is where the image is intentionally too large to fit on the TV, thus ensuring that no border or edge can be seen.
- If underscan and overscan don't give you the image sizes you expect (for example, overscan still shows a border), then make sure you do an AutoSet - described later in this section of the manual.

Both sizes are user-adjustable, and the method of doing so will be described later under the 'Screen Size...' section.

Freeze - Quick Set

This is another quick-set button, labeled 'FREEZE'. When pressed the first time, the unit will enter a special mode where the video image and all other features are frozen.

- Freeze will remain active until disabled by pressing 'FREEZE' again, and the whole unit will remain frozen until this happens.
- No other features are accessible whilst in Freeze mode, except the RESET button on the remote control unit.

Total Lines - information

This will appear when in Status mode to show how many scan lines are in the incoming PC picture - including blanked lines that are not normally viewable, so a 1024x768 image might actually have a total of 806 lines in it, with 38 of them used for 'vertical blanking'.

Vert Freq - information

Again, this is just for information, and shows the vertical refresh rate of the incoming PC signal. Multiply this by the 'Total Lines' value to give the horizontal refresh rate. While

high refresh rates are generally more acceptable when displayed on computer monitors, the CS-500A/600A prefers a low refresh rate so that it's capture circuitry has more time to capture more pixels, thus giving a clearer picture.

Adjust...

You can enter this from 'Status' mode by pressing the MENU button once. This enters the beginning of a number of menus that allow complete control over the unit's features. All menus time-out after about 25 seconds of inactivity (returning you to the Status display), or you can press the + button when 'Exit' is displayed at the end of each menu list to return to the previous menu.

The various options from this menu, all selected by pressing MENU repeatedly, are:

Flicker Reduction

The unit defaults to using a 4-line filter, which is best for 800x600 displays. Pressing the + or - buttons when this option is displayed will change this to 2-line or 6-line.

- 2-line mode is not advisable, unless the vertical image softening that is present because of higher flicker reduction modes needs to be avoided. Line dropping will be common in this setting.
- 4-line mode is best for resolutions around 800x600 and 1024x768, but is down to personal taste, and the exact nature of the graphics or text being displayed. Thin horizontal lines cause the most flicker, and if this is seen, then the highest flicker reduction filtering should be used.
- 6-line offers the maximum amount of flicker reduction, and allows images (even CAD wire-frame drawings) to be displayed up to a resolution of 1600x1200 without line dropping. This mode may not be suitable for low resolutions, because of excessive vertical softening of the image - but again this is down to personal preference.

Auto Set

This is a powerful feature of the CS-500A/600A unit, and will make the unit automatically examine the computer image to determine its size and position within the RGB signal that it is receiving. This then lets the unit scale and position this on the TV set automatically, without further user intervention.

Pressing the + button will start this scanning, and it will take about 15 seconds. During this time the image on the TV will move around, but at the end of this the image should be stable and correctly centered. Note that:

- Until you run this feature (assuming you have not previously done so), the unit will have 'guessed' the right settings in order to give a video output that is centered and sized correctly. This 'first guess' is exactly that: a guess - as graphics cards in computers have very few 'standard' resolution/refresh rate settings, and all other settings vary drastically from computer to computer.

- This feature requires that the top, bottom, left and right edges are of a certain minimum brightness - i.e. certainly not black, but the actual level can be adjusted and the method to do so is described later. Almost all Windows programs will use the full size of the display which is fine, but some DOS programs (especially at the DOS prompt) may not do so which will cause a problem for the unit.
- Only use this feature when the full area of the computer screen is being used - this will ensure that the unit 'sees' the edges correctly, and performs its task without errors.
- If you have a problem, a 'Manual Set' mode is available to fine tune the values created by this mode. Or simply re-activate this feature when your computer screen is being more fully used.
- Once complete, the Auto Set routine will remember this particular computer resolution so that you should not need to re-do the routine (you'll hear a high-pitched beep to indicate this). The only exception is if you change the refresh rate (when Auto Set should be run again), or do an Factory Reset (which will delete all settings learnt by the unit).

Studio Gen... (CS-600A Series only)

This is a sub-menu, selected by pressing the + button when the above message is displayed on the lower line of the LCD display. *Please note: the CS-500A series does not have this feature.*

Within this sub-menu, you can define the unit's Studio Genlock features - i.e. whether synchronization mode is on or off, subcarrier phase, etc. All these settings can be stored in non-volatile memory by using the STORE feature (i.e. hold MENU and the + button together, or press the STORE button on the remote control).

Genlock - to lock to an external reference

This option lets you turn the Studio Genlock feature on and off.

- In the 'Off' condition, the unit functions using its own internal timebase generator.
- In 'On' mode, the unit will synchronize itself to an external reference signal (fed into the Ext Ref. IN BNC connector) - if no signal (or a poor signal) is present, you may get erratic results from the unit, or no picture at all.

SC Ph. (Phase) Shift - coarse subcarrier phase adjustment

The CS-600A series has a full 360 degree phase adjustment range when locking to an external source, but this is broken down into a coarse adjustment with two settings (this one), and a fine adjustment (SC Phase - see next menu option).

- With SC Ph. Shift set to 0, the SC Phase setting allows adjustment from -150 to +150 degrees relative to the incoming reference signal. This is the normal setting.

- With SC Ph. Shift set to 180, the SC Phase values from -150 to +150 are all offset by 180 degrees, giving an effective SC phase adjustment from +30 to +180 through to -180 to -30.
- Use the setting of '0' when you need a phase shift nearer 0 degrees.
- Use the setting of '180' when you need a phase shift nearer +/- 180 degrees.

SC Phase - fine subcarrier phase adjustment

This value, ranging from -150 to +150 degrees will fine-adjust the phase of the CS-600A series' subcarrier signal, relative to the incoming reference signal. This is added to the SC Ph. Shift 'coarse' value detailed above.

- With SC Ph. Shift set to 0, and with SC Phase set to a value of 0 degrees, the output signal should be directly in-phase with the incoming reference signal.
- This value can be adjusted to allow for different delays (such as cable lengths) between the unit and the mixing desk.
- Phase jitter is at a minimum when SC Phase is nearest 0 degrees.
- A poor incoming signal may reduce the range of SC Phase values that the unit can still achieve a lock with.
- Phase adjustment is most accurate, and has the least jitter, when SC Phase is set nearest to 0 degrees.

H Phase - horizontal sync phase adjustment

This value will adjust the relative difference between the CS-600A series' horizontal synchronization signal, and the incoming reference signal. Therefore, during Genlock mode, it will also adjust the unit's SC/H phase - ie. the timing relation between the horizontal sync and the subcarrier.

- At a value of 0, both should be in phase with each other - this is the default setting.
- A negative value will delay the unit's output relative to the reference signal.
- A positive value will advance the unit's output relative to the reference signal.
- Each step adjusts the phase by 1/8 of the NTSC or PAL subcarrier period (ie. 45 degrees), up to a maximum of around 500ns advanced or delayed.
- Ideally, SC Phase will first be adjusted to correct delays in the subcarrier signal. Then H Phase will be adjusted to correct the SC/H phase.
- If you have an unreliable color lock, it is advisable to adjust this setting (using an oscilloscope), to ensure that the reference subcarrier burst, and the unit's subcarrier burst, are aligned together - if they are too far off-alignment, you will not get a reliable color subcarrier lock.

Screen Size...

This is a sub-menu, selected by pressing the + button when the above message is displayed on the lower line of the LCD.

It displays a number of values that can be used to adjust the CS-500A/600A's output to suit your video display device. Note that you should have ideally already done an Auto Set, so that the unit knows what area of the computer image actually contains the display you want converted to video - otherwise you may have to repeat the adjustments for different screen resolutions.

- The values shown depend on whether you are in Underscan or Overscan mode, so make sure you have the appropriate one selected before proceeding to change the values.
- The values are also separately stored for NTSC and PAL outputs - adjusting one will not affect the other.
- When you finish adjusting the values, press the + button when you reach the 'Exit' message. This will return you to the 'Screen Size...' menu option, and you can continue to further sub-menus by pressing MENU as before.

If you like the new settings, use the multi-button features described earlier to remember the settings in Non-Volatile Memory. Pressing and holding the appropriate button allows fast increasing and decreasing.

Out H-Center - altering the display's left/right position

This adjusts the horizontal position of the computer image on the screen. Increasing the value (+ button) moves the display to the right, decreasing it (- button) moves it to the left.

Out H-Width - altering the display's width

Press the + button to increase the width of the picture and the - button to decrease it.

Out V-Center - altering the display's vertical screen position

Press the - button to move the picture up and the + button to move it down

Out V-Height - altering the display's height

Press the + button to increase the picture height and the - button to decrease it.

You can return to the previous menu by pressing the + button when the 'Exit' message appears.

Zoom...

Zoom allows you to view a section of the video picture at twice the normal size. Panning in the zoom mode allows you to select exactly what part of the screen is displayed. Note that:

- Again, it is highly recommended that the user should have already run the Auto Set routine, so that the unit knows exactly where the start and end of the computer

image is within the incoming computer signal. Otherwise, the user may be able to pan to areas of the computer image that are completely empty.

- The Panning settings are remembered when Zoom is subsequently turned off. This could be useful in training applications.
- It is possible to make the unit start up (from power on) in Zoom mode, and in a particular pan position. This may be useful for certain applications, and is done by using the special multi-hold buttons described earlier.

Enter the Zoom... sub-menu by pressing the + button when this message appears.

Zoom - turning on and off

Press the + button when 'Zoom Off' is displayed to turn the zoom on and the - button to turn the zoom off again. Pressing MENU will move to the options to alter the panning position.

Pan X Pos - adjusting the horizontal panning position

Press the - button once to pan left one step (i.e. move the zoomed image to the left). Similarly, press the + button once to pan right one step.

Pan Y Pos - adjusting the vertical panning position

Press the + button once to pan down one step. Press the - button once to pan up one step.

Press + when the 'Exit' message is displayed to exit this sub-menu. However, zoom will still be active until disabled.

Manual Set...

This sub-menu should only be needed when the Auto Set has failed for some reason. See the notes on Auto Set before adjusting these parameters, in case something else will solve the problem.

Otherwise, you can 'teach' the unit the correct horizontal and vertical position and size of the computer's RGB output - and thus the CS-500A/600A will be able to capture this 'input window' and display it correctly on the video output.

Whatever adjustments you make, the unit will continually try to fit the 'input window' to your preferred video output size and position setting. It is highly recommended that this mode is only used when in Underscan mode, or you will not know if you've adjusted the values correctly as some parts of the output video picture will be off the screen.

Once adjusted, the 'VGA Store' option can be invoked to remember the new settings in Non-Volatile Memory (thus overwriting any previous setting for this screen resolution and refresh rate combination).

VGA Left - start of image capture

Increasing this value will move the left edge of the 'input window' further to the right - i.e. less of the computer image will be captured into internal memory. Increase this value until the computer image just starts to be cut off, and then decrease by one.

VGA Width - width of capture
Increasing this value will make the input window wider, thus capturing more pixels into the internal memory. Ideally, only capture just enough pixels to display the whole image.

VGA Top/4 - start line of capture
Similar to VGA Left, increasing this value will move the top of the 'input window' down, and start to cut off the computer's image. Decrease by one when this happens. The /4 appears because the value shown is the actual line number at which capture starts into the internal memory divided by 4.

VGA Bot/4 - end line of capture
Like VGA Top/4, this determines the last line captured. Decrease until the image just starts to be cut off, and then increase by one.

VGA Store - store new VGA settings
Press the + button once to store your new settings. They will now be remembered even when the power is switched off.

Advanced Menus & Features

These features control the basic operation of the unit in order to comply with the operating environment - e.g. selecting PAL or NTSC video standards, adjusting LCD contrast, etc.

They are accessed in the same way as the previous features - i.e. from the STATUS mode press the MENU button repeatedly until the LCD displays the message 'Advanced'. Then press the '+' button to select the Advanced sub-menu.

Subsequent pressing of the MENU button will select the next Advanced feature to alter.

Any of these new settings can be stored using the 'Store Settings' multi-buttons (hold MENU and the + button together for approximately 2 seconds).

Advanced...

Video Standard - PAL/NTSC

The CS-500A/600A can switch between PAL and NTSC standards with ease.

- Press the - button to switch to NTSC mode. Press the + button to switch to PAL.
- Screen Size settings are remembered separately for PAL and NTSC, so changing the Screen Size settings in NTSC will not affect the PAL settings.

If you are using the Studio Genlocking features of the unit, make sure you select the correct Video Standard for the reference video signal being used - the two should be the same.

Output Signal - RGB/YUV

The CS-500A/600A is capable of producing either RGB or YUV outputs. The same three BNC connectors on the back of the unit supply both RGB and YUV, and in order to output the correct format the unit must be switched to that setting. By default it is in RGB output mode. The unit also has separate BNC connectors to provide horizontal (HS) and vertical (VS) sync. signals, should your target video equipment require this - see later in this section.

- ***Note that in YUV mode, the Composite Video and S.Video outputs are disabled!***
- Having the wrong setting will give incorrect colors on the output from these connectors.
- Press the - button to switch to YUV mode. Press the + button to switch to RGB.

H. Soften - Image smoothing

Horizontal filtering (softening) enables the user to smooth pixels, text and lines in the horizontal direction, where flicker filtering only allows control over the vertical line flickering.

- This is used to improve the recordability of a video signal - i.e. to reduce its bandwidth.

- H.Soften is not active during Zoom mode - it is temporarily disabled.
- Press the + button to switch the horizontal soften on, the - button to switch it off.

Sense - for AutoSet function

The sense level relates to how the Auto Set routine views the video input from the computer. If running Auto Set produces a resultant image that is too big for the TV it may be because the image is too dark for the CS-500A/600A to correctly find the edges of the picture. Altering the sense setting will change the brightness needed to find the edges satisfactorily.

- A setting of 1 will sense 30% brightness levels, 2 will sense 60%, and 3 will sense 90% (approximately). 1 is the default, and should be fine for almost all screen displays.
- Run the AUTO SET after changing the sense setting to ensure a good image on the TV. If the image is still not good enough it may be necessary to set the unit manually - see Manual Set.
- To increase the sense value press the + button. To decrease it the press - button.

IR (Infrared) - on/off

As there are many different methods of controlling the CS-500A/600A, multiple uses could be confusing.

- This feature is useful when controlling the Dual Rackmount version, so that only one unit will respond to the infra red remote control.
- It can also be used in situations where stray or random IR signals may be picked up - or even to prevent others from remotely altering the unit's features.
- In order to switch off control from the infra-red remote control press the - button, or press the + button to accept it.

RGB Term. - Input impedance

This relates to whether or not the CS-500A/600A is terminating the computer monitor output from the computer with a 75 Ohm impedance.

- Usually the unit will set the termination automatically ('Auto' mode), by sensing whether a computer monitor is linked into the circuit as well (i.e. to the 'PC OUT' connector).
- However, if necessary, it is possible to turn the termination off - for example if the unit does not sense that the monitor is attached, which would result in 'double-termination' of the RGB signals.
- Press the - button to turn the termination off, the + button to switch to automatic mode.

RS232 - Control/Mouse

This switches the use of the RS232 serial port between computer control and Microsoft® serial mouse emulation

- In order to use the remote control to emulate a mouse, this RS232 adjustment must be set to 'Mouse' mode. Similarly, to use a serial link from the computer to control the CS-500A/600A, it must be set to RS232 Control mode.
- Note that the default is 'Control' mode - you must switch to 'Mouse' mode in order to enable the mouse emulation.
- Press the - button to switch to Mouse mode, and the + button to switch to RS232 Control mode.

Baud rate - for RS232 control

In order to control the CS-500A/600A from the computer it is necessary to set the same baud rate for both the unit and the controlling computer.

- Press the + and - buttons to change to the required number. The unit does not display the actual baud rate, but a number relating to it. The table in a later section on 'RS232 Control' shows which Baud rate each number relates to. For example: to set to 9600 Baud the number must be 23.
- "9600,N,8,1" is the default setting - i.e. no parity is used, 8 data bits are required, and 1 stop bit.
- This number is only used in RS232 'Control' mode. 'Mouse' mode ignores this number, and always uses 1200 baud.

RS232 ID

This ID code can be used where multiple CS-500A/600A's are all linked via a serial cable to the same computer. The ID can be altered so that each unit's ID is unique, and thus each unit could be adjustable by itself - with one serial port. This feature is described further in a later section.

Sound - on/off

The internal sounder is used to give an indication of whether a variable has been changed, or if the CS-500A/600A is saving settings to non-volatile memory. If you do not wish any audible indications to be present, the sounder can be switched off.

- Normal beeps indicate that a feature or value has been changed.
- High-tone beeps indicate that something has been written to the unit's Non-Volatile Memory - for example when doing a Store Settings, Factory Reset, AutoSet, or when a new screen resolution/refresh rate combination has been detected.
- Press the - button to turn the sound off, the + button to turn it on again.

Sync In - from 'PC IN' connector

The CS-500A/600A does not need to have separate Horizontal and Vertical sync inputs provided by the computer, it can also accept composite sync signals, or sync-on-green (see

next option). This ensures compatibility with as many different types of computer as possible.

- If your computer outputs a composite sync signal it is necessary to switch the unit to accept it, as the default is to accept separate horizontal and vertical sync only.
- A composite sync signal can be fed into the unit in 3 different ways, corresponding to one of the options listed in the table below.
- Press the + button to cycle forward through the options, and the - button to go back.

Sync In option	Description
VGA HV	Positive or negative horizontal sync on pin 13. Positive or negative vertical sync on pin 14.
Grn+Sy	Negative composite sync present on green.
Pin 13	Negative composite sync on pin 13.
Pin 15	Negative composite sync on pin 15.

CSync In Frq - composite sync input frequency

When using a composite sync signal on the PC IN connection (either separate, or on the green signal), you may need to adjust this setting to suit the scanning rate.

- The default of 70 should suit frequencies around 55kHz.
- Reduce it to around 50 for 75kHz inputs, and increase it to around 90 for 31kHz inputs.
- Reduce it below 50 to suit even higher frequencies.
- Note that it's the horizontal scanning frequency that's important - not the vertical frequency. (Multiply vertical frequency by the number of lines in the picture to give a guide to the horizontal frequency.)

Sync Out - BNC outputs labeled CS/HS and VS

The CS-500A/600A can output either separate horizontal (HS) and vertical (VS) sync. signals, or two composite sync. (CS) signals. These syncs can be either positive or negative going, and are available from the BNC output connectors on the back of the unit. It is necessary to switch the unit to give the correct sync. outputs for your display.

- By default, the HS/CS connection and VS connection both output negative-going composite sync signals.
- Note that when using the RGB output cable (optional) this feature must be set to -CS-CS (see table).
- Press the + button to cycle forward through the options, and the - button to go back.

Sync Out option	CS/HS output	VS output
-CS-CS	Neg. comp. sync.	Neg. comp. sync.
+CS+CS	Pos. comp. sync	Pos. comp. sync
-HS-VS	Neg. horiz. sync.	Neg. vert. sync.
+HS+VS	Pos. horiz. sync.	Pos. vert. sync.

Engineering...

Items in this section will alter the basic operation of the CS-500A/600A. The changes are generally of a highly technical nature and should only be made when they are understood. Please read each item in this section carefully before making any alterations.

When the Engineering... message appears, press and hold both the + and - buttons simultaneously for approx. 2 seconds, and then release both buttons.

Settings changed in this mode can be stored in NVR the same way as other settings.

ADC Ref. - input RGB level

The CS-500A/600A takes the analog signal destined for the computer monitor and converts it to a digital signal in order to perform some signal processing and scan conversion. The actual device that does this is an analog to digital converter (ADC), and changing the upper reference level to this is similar to a brightness control, but will also clip colors that are too bright to the maximum brightness level. If this is incorrectly set then certain colors, such as yellow, may appear washed out, or even come out as white. This adjustment is factory set and should not normally need altering.

- It is highly recommended that this value is only adjusted when problems arise, and even then only when a full color bar is displayed on the computer screen and an oscilloscope is connected to a video output - thus allowing monitoring of the effects.
- Pressing the + button increases the voltage at the ADC reference input (thus making the sampled image darker, and reducing 'clip' effects), the - button decreases it (making the image brighter, but at some point will start to 'clip' the RGB input).
- The factory setting allows for an input up to 0.8v, thus allowing for out-of-tolerance RGB inputs.

DAC Ref. - output video level

The digital to analog converter (DAC) changes the digital data output from the processing circuit into an analog form that can be displayed on a standard video monitor or TV. Altering the reference level has an effect similar to changing the contrast of the output signal.

- It is highly recommended that this value is only adjusted when problems arise, and even then only when a full color bar is displayed on the computer screen and an oscilloscope is connected to a video output - thus allowing monitoring of the effects.
- Pressing the + button increases the voltage at the DAC reference input, the - button decreases it.

CV Filter - for Composite Video

The CS-500A/600A allows some control over the amount of filtering on the Composite Video output. Altering this may give a clearer image, or reduce dot-crawl.

- In most circumstances, this should never need changing.
- Pressing the + button increases the value thus applying more filtering, whilst the - button decreases it.

Adj. Osc. - for subcarrier frequency adjustment

This fine-adjusts the unit's internal oscillator, which is used to generate all timings when not in genlock mode. (In genlock mode on the CS-600A series, the external reference signal is used instead.) In particular, it adjusts the subcarrier frequency of the PAL or NTSC signal being generated. This frequency is factory set, but may need adjusting in certain conditions.

- Decrease this value with the - button (from the default of 0), to lower the subcarrier frequency.
- Increase this value with the + button to up the subcarrier frequency.

SC/H Phase

This adjusts the phase delay between subcarrier and horizontal sync signal.

- This adjustment has no effect when the Studio Genlock feature is active.
- This adjustment will usually only be required for studio setups, where the actual phase relationship can be measured.
- The value of 4 is the default, and corresponds to approximately 0 degrees shift. The remaining values are indicated below:-

Value	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Phase	*-180*	*-135*	*-90*	*-45*	*0*	*45*	*90*	*135*

  This should enable SC/H phase adjustment to the nearest 22.5 degrees.
- Pressing the + button increases the phase value, the - button decreases it.

Y/C delay - for video output

The Y/C delay setting allows control of the delay between the luminance (Y) and chrominance (C) parts of the video signal.

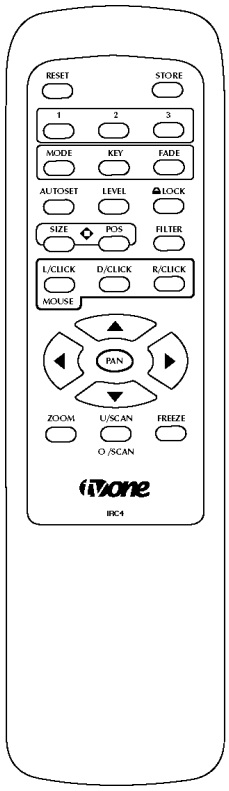
- This affects ALL video outputs - composite video, S-video, RGB and YUV.

- Pressing the + button increases the delay (thus making any color smearing move left), the - button reduces it (making any color smearing move right).
- The default of 1 should give correct luminance and chrominance line-up.

Infra Red Remote Control

Remote Control

The remote control can be used to control the features of the CS-500A/600A, change its settings and control the computer's mouse.



The IRC-4 (picture above) remote controls can be used with the CS-500A/600A. The MODE, KEY and FADE buttons are not used fir the CS-500A/600A.

Make sure you have read the previous sections on controlling the features of the unit before using the infra-red controller.

The unit's LCD display will change to show the features altered by the remote control, and a beep will be emitted from the sounder (if it has not been disabled).

RESET
As its name implies, this resets the unit back to the last-saved user settings. It is useful if you want to clear any changes made to screen size or position. If you've saved an invalid setting to the non-volatile memory, you may want to do a Factory Reset - as described earlier.

STORE
This button is used for saving new settings to the unit's memory and will be remembered even after the unit has been switched off.

U.SCAN / O.SCAN
(Underscan / Overscan.) Pressing this button will toggle you between Underscan and Overscan modes.

FREEZE
The Freeze function allows you to freeze the current image on the screen, and all the settings of the unit itself. Pressing the freeze button again will unfreeze the image.

AUTOSET
This is a powerful feature that will scan the incoming computer image to determine its size and position - thus optimizing it for display on the desired TV unit.

- If the Autoset feature does not look like it is finding the edges of the display correctly, then you can press RESET to stop it going any further.
- Also see the 'MANUAL SET' option later in this section for details on how to manually adjust this feature.

FILTER
This button will toggle between 4 and 6 line flicker reduction modes.

SIZE & POS
These buttons allow you to adjust the Underscan or Overscan size and position on the TV (whichever is currently selected). You can then use the arrow keys to adjust the horizontal and vertical size or position of the image being displayed.

Please note: you should ideally have done an AutoSet before making these adjustments, so that the unit knows the size of the "incoming" computer image.

- Only SIZE or POS is active at any one time, but you can easily switch from one to the other.
- Once adjusted, STORE the setting for future use.

ZOOM

Enter the Zoom function by pressing ZOOM on the IR remote control. Pressing ZOOM again will return you to the normal viewing size.

- You can adjust other settings whilst in Zoom mode.
- You may need to press the PAN button to restore control over the Zoom position, after adjusting other settings.

LOCK

Pressing this button once will disable the unit's front panel buttons. To re-enable the front panel buttons simple press the LOCK button again. This setting can be STOREd, to prevent people from adjusting the unit without the remote control.

This feature is intended for use where the settings of the unit should not be disturbed - eg. in an educational environment, or at an exhibition.

LEVEL

This button is not used on the CS-500A/600A.

How to do a manual set

This function should only be needed when the AutoSet has failed for some reason, or the Computer image that you are using has a dark background which Auto Set cannot see. Please read the notes on AutoSet & Level adjustments in the Infra-red Remote Control section before adjusting these parameters, in case something else will solve the problem.

With these adjustments you can manually set what area of the computer's image is to be used for display on your TV.

It is highly recommended that this method is only used when in Underscan mode, or you will not know if you've adjusted the values correctly.

- Press AUTOSET on remote control twice (within 1.5s) - two 'beeps' will be heard.
- Adjust Top and left-hand edge by pressing the arrow keys.
- Press AUTOSET again.
- Adjust Bottom and right-hand edge by pressing the arrow keys.
- Press AUTOSET - this will give a high beep to indicate that this has been saved.

Manual set mode times-out after 20s - ignoring any settings.

Mouse Control

Introduction

The CS-500A/600A has an RS232 communications port that can be made to emulate a Microsoft® Serial Mouse, and all the features are controlled from the infra-red remote control. This section details how to setup and use this feature.

Hardware setup

Setup of this feature requires the connection of an RS232 cable. Either:

- use a (null-modem) serial cable to link from the unit's RS232 connection to the first spare COM port on your PC (usually COM2, but use COM1 if it's available);
- or, disconnect your mouse from your PC and use an RS232 sharer cable to link from your PC to the unit - plugging the mouse back into the RS232 sharer unit.

CS-500A/600A setup

Make sure that RS232 mode is set to Mouse (and not 'Control') within the Advanced menu of the On-screen Display. (This is the default.)

Using the mouse emulator

The CS-500A/600A uses the computer's standard mouse driver saving the need to load additional software, just turn your computer on with unit attached as described above.

If you are using an RS232 sharer cable, both the existing mouse and the unit will share the same COM port and software driver.

If you are using a separate COM port for the unit, your PC may recognize that a Mouse is attached when booting up. If it doesn't, run "Add New Hardware" from the Control Panel to automatically install the "Standard Serial Mouse" driver.

- You can now use the four arrow buttons to move your mouse pointer around the screen.
- L.CLICK (left click) has the same function as a single left click of a standard mouse button.
- D.CLICK (double click), has the same function as a double left click of a standard mouse button.
- R.CLICK (right click), has the same function as a single right click of a standard mouse button.

Toggling Zoom/Pan and Mouse modes

Both the Pan feature and Mouse emulation feature can be used at the same time, and you can toggle the arrow-key usage by pressing the PAN button on the remote control.

- If you find the arrow-keys not controlling the mouse pointer, simply press PAN once to de-select PAN mode.

Similarly, to re-activate PAN mode (to slide a zoomed image around the screen), press PAN again

RS232 Control

Setup

All of the functions of the CS-500A/600A can be controlled from the Computer or an external control system, using the RS232 port on the unit.

Using an appropriate cable and software, it is easy to communicate with the unit, but before the communications can be established first set the computer's serial port to:

- 8 bit data, no parity, 1 stop bit
- Either no flow control, or hardware (RTS/CTS) flow control
- Set the Baud rate on the computer and the CS-500A/600A to the same value (usually 9600).

Sending commands

Commands are sent over the RS232 in one of two ways:

- Send the 'adjust name' followed by = and a *number* (plus a carriage return) to alter any setting you see displayed on the lower line of the LCD display. E.g. If you were using a terminal emulator program, you could type the following command to immediately set flicker reduction to 6 lines:-

  Flicker Red = 6

- Send just the 'adjust name' (plus a carriage return) to retrieve back the current value for a setting. E.g. Typing the following returns the correct value back from the unit (e.g. '6'):-

  Flicker Red

Responses to commands

The response from the CS-500A/600A can be one of three things:

- ? if something is not understood, e.g. an adjust name is mis-spelt;
- > if the command has been executed;
- nnnnn (i.e. a five digit number from 0 to 99999, followed by a CR and LF) if a setting value is returned.

Notes on sending commands

- Settings that are one of two values (e.g. NTSC or PAL), have to be sent as 0 or 1.
- You only have to send a maximum of 4 characters in order for the command name to be recognized - e.g. "Flicker Red = 6" could be shortened to "Flic = 6".
- Spaces and line-feeds (ASCII code 10) are completely ignored.

- You must always send a carriage-return (ASCII code 13) at the end of your command or value request.
- The unit's response should at most be within 40ms of the receipt of the carriage-return character. But of course delays due to slow baud rates will play a greater part than this.
- The unit's input buffer is limited to 32 bytes, so do not send any more characters (including CR, LF, etc.) than this.
- For more information on controlling the different functions see the relevant sections earlier in this manual.

Restricting RS232 commands to certain units

If you have a number of units all connected to the same PC's serial port (i.e. running in parallel), then you can use the RS232 ID feature to restrict certain commands to go to only certain CS-500A/600A units. The following points outline this method:

- Make each 'RS232 ID' setting unique to each unit, unless you want two or more units to respond to the same commands, in which case make them the same ID value. The default value is 0.
- Send the command 'ID Restrict nnn' where nnn is the number of the unit you wish to control (from 0 to 255).
- Follow this with whatever commands you wish to send. Units where 'RS232 ID' is not identical to the 'ID Restrict' value will not respond to or acknowledge these commands.
- To disable this feature, you have to make the RS232 ID the same on all units (recommended value 0), and of course set 'ID Restrict' to this value.

Changing Baud Rates

Details on how to change the Baud rate are in the Advanced Features section of this manual, but the relationship between number and baud rate is given in the table below.

Any odd number up to 191 can be selected, but only certain Baud rates are generally used. The most common ones are outlined in the table below. For numbers not included in the table, the baud rate associated with those numbers can be found by using the following equation:

$$Baud = \frac{230400}{Number + 1}$$

so if the number displayed on the CS-500A/600A is 23 then

$$Baud = \frac{230400}{23 + 1} = 9600$$

No.	Baud Rate
1	115200
3	57600
5	38400
7	28800
11	19200

No.	Baud Rate
15	14400
23*	**9600***
47	4800
95	2400
191	1200

*23, Baud rate = 9600 is the default setting.

Table of available adjustments

Adjustment	Values*	Comment
ADC Ref.	100 to 200	Adjusts maximum input RGB voltage.
Adj. Osc.	-200 to 200	Fine-adjusts subcarrier frequency when not genlocking.
Auto Set	0 or 1	Set to 1 to initiate AutoSet
Baud Rate	0 to 191	Actual baud rate = 230400/(n+1)
Buttons	Off, On	Off=disable front-panel
CSync In Frq	0 to 140	Alter to suit incoming sync frequency when using a composite sync input.
CV Filter	0 to 40	Applies a variable filter to Composite Video signals.
DAC Ref.	40 to 120	Brightness level
Flicker Red.	2, 4, 6	Lines of flicker reduction
Genlock	Off, On	On=Unit will synchronize its output with incoming reference video signal. (CS-600A series only.)
H Phase	-18 to 18	Sets the unit's Horizontal phase, relative to reference signal. (CS-600A series only.)
H. Soften	Off, On	On=Soften image horizontally.
ID Restrict	n	Restricts RS232 control only to those units which have RS232 ID already set to this value.
Image Freeze	Off, On	On=Image Frozen. Do not adjust any other settings when this is active.
Infra Red	Off, On	On=Infrared remote control is enabled.

Locked	Off, On	On=Disables all front-panel buttons and infra red remote control functions
Overscan	Off, On	On=Overscan
Out H-Center:	n	Adjusts image left/right position
Out H-Width:	n	Adjusts image width
Out V-Center:	n	Adjusts image up/down position
Out V-Height:	n	Adjusts image height
Output Sig	YUV, RGB	Selects appropriate output signal type.
Pan X Pos:	n	Adjusts Pan left/right position when in Zoom mode (higher value = Panned to the right).
Pan Y Pos:	n	Adjusts Pan up/down position when in Zoom mode (higher value = Panned to the bottom).
Reset	Off, On	On=does a reset to user settings. Automatically goes back to Off.
RGB Term.	Off, Auto	Auto=try to detect if monitor is attached, and terminate RGB appropriately.
RS232	Mouse, Control	If you change this to Mouse, RS232 commands will no longer function!
RS232 ID	0 to 255	Sets the unit's RS232 identification, where multiple units are controlled from one serial port.
SC/H Phase	0 to 7	Selects subcarrier to H-sync phase when not genlocking.
SC Ph. Shift	0, 180	Coarse-adjusts the final subcarrier phase shift. (CS-600A series only.)
SC Phase	-150 to 150	Fine-adjusts the unit's color subcarrier phase relative to reference signal, when synchronizing to external source. (CS-600A series only.)
Sense	1 to 3	Adjusts the AutoSet feature's sensing level
Sound	Off, On	Turns the internal speaker on or off.
Store Settings	-, *	Sets the current settings as the power-on default.
Sync In	0 to 3	0=VGA HV, 1=Grn+sy, 2=Pin 13, 3=Pin 15
Sync Out	0 to 3	0=-CS-CS, 1=+CS+CS, 2=-HS-VS, 3=+HS+VS

Total Lines	Read only	Returns number of lines in PC image - including vertical blanking lines.
Vert. Freq	Read only	Returns vertical frequency of PC image (to nearest 1Hz).
VGA Bot/4:	n	Tells the unit where the bottom of the image is within the PC signal. (divided by 4).
VGA Left:	n	Tells the unit where the left-hand edge of the image is within the PC signal.
VGA Store	-, *	Stores the VGA settings, so they are used in the future.
VGA Top/4:	n	Tells the unit where the top of the image is within the PC signal. (divided by 4).
VGA Width:	n	Tells the unit how wide the image is within the PC signal.
Video Std	NTSC, PAL	Sets the video standard
Y/C Delay	0 to 3	Adjusts luminance delay relative to chrominance.
Zoom	Off, On	Turns zoom mode on and off

*Where two values are given separated by commas (eg. "Off, On" or "NTSC, PAL"), the first relates to the setting used when '0' is sent to the unit, and the second relates to the setting used when '1' is sent to the unit.

Warranty Policy

LIMITED WARRANTY - TV One warrants the original purchaser that the equipment it manufactures will be free from defects in materials and workmanship for a period of two years from the date of purchase. Should this product, in TV One's opinion, prove defective within this warranty period, TV One, at its option, will repair or replace this product without charge. Any defective parts replaced become the property of TV One. This warranty does not apply to those products which have been damaged due to accident, unauthorized alterations, improper repair, modifications, inadequate maintenance and care, or use in any manner for which the product was not originally intended.

If repairs are necessary under this warranty policy, the original purchaser must obtain a Return Authorization Number from TV One and return the product to a location designated by TV One, freight prepaid. After repairs are complete, the product will be returned, freight prepaid.

LIMITATIONS - All products sold are "as is" and the above Limited Warranty is in lieu of all other warranties for this product, expressed or implied, and is strictly limited to two years from the date of purchase. TV One assumes no liability to distributors, dealers or end-users for any loss of use, revenue or profit.

TV One makes no other representation of warranty as to fitness for the purpose or merchantability or otherwise in respect of any of the products sold. The liability of TV One with respect to any defective products will be limited to the repair or replacement of such products. In no event shall TV One be responsible or liable for any damage arising from the use of such defective products whether such damages be direct, indirect, consequential or otherwise, and whether such damages are incurred by the reseller, end-user or any third party.

Technical Support

Telephone support
859-282-7303

FAX support
Please photocopy this page, fill in as much of the following as possible, and FAX it to:

859-282-8225

Your name/company:	
Your FAX number:	
Unit:	CS-500A series or CS-600A series
Serial number:	CSPS- or CSPG-
Place of purchase:	
Invoice number:	
PC being used with:	
Resolution PC run at:	
Software being used:	
Nature of problem:	

Internet / E-mail support
Internet e-mail: tech@tvone.com

Web site: www.tvone.com

Appendix A - Getting the Most from your unit

The aim of this section is to help you exploit some of these applications and functions to get the best possible results from your unit.

Hints & Tips

1. Use S-Video in preference to Composite Video, if your equipment has such an input. S-Video keeps the color and brightness in a video signal separate, whereas composite video requires extra filters to separate them electronically - these filters degrade the image.
2. If you need to use Composite Video, don't forget to try altering the CV filter in the Advanced... Engineering... menu. This could greatly improve the image quality, but will usually increase the subcarrier dot crawl that's visible.
3. Don't forget the ZOOM feature. If you have problems reading the small text, then selecting the ZOOM mode will make things much easier, especially if using the Composite Video output. This is particularly useful for presentations.
4. Zoom modes may require a different Flicker Reduction setting. Lowering the Flicker Reduction value may help to increase legibility of small text.
5. The lower the graphics resolution and refresh rate, the better the image quality. All scan converters store the computer image to be converted to video in their own internal memory, and to do so the computer image has to be 'sampled' many times during each scan-line. Each sample stores one pixel of information in the memory. The number of samples taken is proportional to the image quality - i.e. the more samples the better. Higher graphic resolutions take less time to display each scan-line than lower ones, so it means that there will be more samples per line for lower resolution modes because there's more time for more samples to be taken - and hence will give a better image quality.
6. The lower the graphics resolution, the better the 'vertical' image quality. Video monitors have a fixed number of lines available for displaying pictures - for PAL it is 576, for NTSC it is 480, although some of these are off the top and bottom edges of the screen. So the more scan-lines a graphics resolution has (e.g.. an 800x600 resolution has 600 scan-lines), the more difficult it is for your unit to squeeze all these lines into the limited number available on the monitor. So lowering your graphic resolution will help improve image quality. (Remember to run AutoSet after you change the resolution)
7. Cables and Connectors. Using good quality cables and connectors like the ones supplied with your unit and ensure that all connectors are properly connected to help maintain a high picture quality.

8. Designing your Display or Presentation. When setting up an image for display or putting together your presentation, keep in mind that people might have to view it from a distance. Using a font that is well defined, graphics and pictures that are uncluttered will all add to the legibility of your display or presentation. Try to make text well spaced and larger than you normally use. Think about the colors you are going to use, colors that standout from each other are better for viewing from a distance. As mentioned earlier choosing the right screen resolution will also add to the clarity and quality of your display. It is worth spending some time experimenting with different screen resolution and settings which will optimize your unit to its full potential.
9. Freeze function. This function is useful if you wish to change to another image or layout while maintaining an image on your monitor, Lets say that you wish to change from a program that is displaying text to a program that displays a graphic. Before you close the text display program freeze the image on the video monitor that you are using, you are then free to change to the graphic image program. Once this is done you can unfreeze the image on the video monitor which will then display your new image. All that the people watching the video monitor would have seen is the text image followed by the graphics image they will not have seen you close one program then opening another.

Appendix B - Trouble Shooting

If problems are experienced, please go through these help topics to help you resolve the problem - otherwise see the 'Technical Support' page.

The picture on the video display is black and white.

If you are using the S-Video or Composite outputs, then make sure that all these cables are connected correctly. Make sure that the unit is adjusted to the right video standard PAL/NTSC (See page 2 to change this). Ensure that the color controls on your video monitor are all set correctly.

There is no picture on my video monitor.

If you're using the unit with a laptop computer, you may need to tell the laptop that an external display device is connected. Some laptops automatically detect external video connections, but others will need setting up to do so - often in the form of pressing two keys simultaneously on the keyboard.

If the Green Power LED on the unit is off, ensure that the AC Adapter is connected properly and is switched on. If the LED on the unit is on, then check that the monitor output from the computer is connected to the unit's PC IN connector. Check that the output you are using from the unit is also connected at the unit and the video monitor. Check that your video monitor is switched on and set to the correct input (AUX or A/V selected), also make sure that the brightness and contrast are set correctly.

There is no picture on the computer monitor.

Check that the monitor output from the computer is connected to the unit's PC IN connector. Check that your computer monitor is connected to the PC OUT connector on the back of the unit, Check that your computer monitor is turned on and the brightness and contrasts are set correctly.

The display on the video monitor has a huge border around it

You're almost certainly running the unit with a laptop computer, at a resolution lower than the laptop's own screen. When this happens, the laptop fits the smaller resolution into the larger with a border around the edge. Since the laptop's screen is of a fixed resolution, the only two solutions are: 1) change the resolution you're running at to match the laptop's own internal screen; 2) disable the laptop's own screen, so you just see the image on the video monitor.

The unit does not respond to the Infrared remote control.

Ensure that there are batteries in the remote control unit are correctly inserted and that they have enough charge left. Make sure that there is no obstruction in front of the unit's Infra Red window.

Ensure that Infra Red control is enabled, as it is possible to disable this in the Advanced menu.

There is excessive flicker on the video monitor.
Try using a different flicker mode. Turning the contrast down and the brightness up on the video monitor can have a large effect on flicker.

The video monitor image is distorted.
This often occurs where some of the areas of the image are very dark and others are very bright. These extreme changes in the image are difficult for your video monitor to deal with. Try adjusting the contrast and brightness settings on your video monitor to rectify the problem. On some TVs (usually old ones), this effect is unavoidable as they may not be designed with computer images in mind, and therefore show 'bowing' at the sides for some graphic images. The only solution is to adjust the brightness and contrast on your video monitor - the unit is not at fault and cannot correct problems with your video monitor.

If the problem still persists it may be due to the screen size settings, try adjusting the image and its position on the screen.

Some colors come out incorrectly on the video monitor.
Try altering the color, contrast and brightness settings on your video monitor. These are usually set up for viewing TV programs which is very different from viewing computer graphics.

If you are using the RGB video output from the unit make sure that the cable is correctly attached to both the unit and the monitor.

If you have altered the ADC Ref. value to too low a value, then this may make yellow appear very washed out and even white. In some circumstances, it can cause flashes within solid green areas. Do a Factory Reset to restore the original settings (see earlier in this manual on how to do this).

How can I reduce smearing?
Smearing usually occurs on Composite Video connections, and is generally unavoidable - unless you can switch to using S-Video or RGB connections (see connection details on page 4). It occurs because the brightness and color information is transmitted as one signal, and the two parts have to be 'bandwidth-limited' to avoid them interfering with each other. Using good quality video cable will help towards reducing this affect.

S-Video will give far less smearing than composite video, but RGB will be better still.

How do I use the unit with a VCR?
Connect one of the unit's video outputs (probably the Composite Video) to the VCR's input. Note that you won't be connecting to the antenna connector on the VCR, but to one of the VCR's auxiliary (AUX) inputs, so you have to therefore tell the VCR which input to use - often it's channel 0, or AUX 1, AUX 2, etc.

The recorded image is poor.
Standard VHS videos are not very good at recording the fine detail present in computer graphics. S-VHS decks offer much better quality, whilst professional decks will be even better. Color smearing is usually the first thing that causes a problem, but this is because

your video isn't capable of recording the picture in its full resolution - it is not a fault with the unit or your video. Try lowering the computer screen resolution - this will bring the image more in-line with what your video is used to dealing with.

The mouse emulation isn't working.

Check that the RS232 cable is connected correctly to both the RS232 port on the back of the CS-500A/600A and to the serial port that the computer uses for the mouse.

Check that the unit is setup for the mouse and not for serial control instead. Check that the infra red remote control has good batteries installed and that the unit is configured to work from the remote.

The CS-500A/600A uses the standard Microsoft® Serial Mouse driver, it will not work with other mouse drivers. If problems arise, it is recommended that the computer be started up with its normal serial mouse connected, once the computer has finished booting up and the mouse confirmed working it can be swapped over with the CS-500A/600A RS232 cable.

Genlocking is unstable - CS-600A series only

The unit is designed to synchronize itself to a stable reference source - i.e. one using a crystal as an oscillator timebase. A video player, unless fed through a timebase corrector, will not do this and may therefore cause the unit problems. You should also ensure that the correct video standard (PAL or NTSC) is selected for the incoming reference signal.

The unit won't overlay a picture

It's not designed to! 'Genlock' technically means to lock to a generated video signal (which our unit will do), not to overlay two video signals together (which it won't).

IF YOU PROBLEM IS NOT LISTED HERE PLEASE SEE THE TECHNICAL SUPPORT SECTION.

Appendix C - Technical Specifications

Input - from computer video card

Signals

- Red, Green and Blue @ 0.7v peak white (0.8v absolute maximum).

Resolutions

- Maximum 1600x1200 with no line dropping.
- 24 bit A/D convertor.
- 15kHz* to 100kHz horizontal scan rate.
- Virtually any vertical scan rate accepted - horizontal scan rate is more important.

Synchronization

- Separate TTL-level HSync & VSync positive or negative going.
- Composite sync (0.3v to 1.0v peak-peak negative, or TTL level negative).
- Sync on green (0.3v negative).
- Non-interlaced sync preferred.

Outputs - to video monitors, etc.

Signals

- Standard VGA output to go back to monitor.
- PAL & NTSC switchable.
- Composite Video: 1 volt peak-peak on BNC.
- S-Video: 1 volt peak-peak on 4-pin mini-DIN.
- RGB 0.7v p-p or Y / R-Y / B-Y switchable on BNCs.
- TTL HSync/Comp.Sync, VSync on BNC, both through 220 Ohm resistor.

Image Scaling & Positioning

- Proprietary scaling method - no line dropping in 6-line flicker red. mode.
- Auto-set feature automatically scales computer image to fit video monitor.
- Underscan & Overscan settings user-adjustable.
- 2x Zoom & panning.
- *Depending on the number of lines per frame, some zoom and image size functions may not be reliable at very low horizontal scan frequencies.

Image filtering

- Horizontal Softening improves recordability
- Proprietary 2, 4 or 6 line flicker reduction.

Control Methods

- Infra-red remote control supplied.
- Control via push buttons & LCD display.
- Control via RS232 port using simple text commands.

Subcarrier lock & sync pulses

- Subcarrier locked to line frequency.
- Adjustable SC/H phase.
- User subcarrier adjustment +/- 100Hz.
- Sync pulse widths conform to video standards.

Studio Genlock - CS-600A Series only

- Independently locks to sync & subcarrier.
- Subcarrier lock range +/- 150Hz NTSC, +/- 200Hz PAL.
- Subcarrier phase adjustment over full 360 degree range.
- Subcarrier lock phase jitter 0.5 degrees.
- Horizontal sync adjustment +/- 0.5us.
- Above values are approximate, and most depend on reference signal.

Power requirements

Desktop and Dual Rackmount Versions:

- Consumes approx. 500mA @ 12v.
- Voltage requirements: minimum smoothed 12 volts DC, maximum 16v DC.
- Requires 'center-pin positive' 2.1mm DC power plug input.
- Reverse polarity protected.
- Internal fuse.

Single Rackmount Versions:

- 100 to 240 VAC @ 50-60Hz,
- Internal fuse.

Please note that the ON/OFF switch on the front of the single rack-mount unit does not disconnect the unit from the AC supply, but is used to turn off the scan converter circuitry. The internal power supply remains active whenever the AC supply is present.

European EMC 'CE' mark statement

EMC standards applied & passed

Emissions: EN 55022 (ITE emissions standards), Class B

Immunity: EN 50082-1 (Generic Immunity standard for residential, commercial and light industrial)

Case grounding

When used, it is assumed that the unit is grounded by normal means (e.g. via the computer video input cable, rack-mount chassis ground, or video output cable to display device). Use of the equipment without any form of grounding may affect radiated emissions, but will not affect the product's safety.

FCC statement

Class A Device: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the Instruction Manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Caution: This equipment is intended for use in the manner prescribed in the Instruction Manual. Any user changes or modifications not expressly approved by TV One Multimedia Solutions could void the user's authority to operate the equipment. Connecting this equipment to external devices requires no specially shielded cabling for FCC compliance. The Instruction Manual shows the proper connection of this equipment for operation that insures FCC compliance.

Direct all inquiries regarding FCC compliance to:

TV One Multimedia Solutions

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