



## **Knox Video DC-100 / VS-100 Video Processor Operation Manual**

# KNOX VIDEO DC-100 / VS-100 OPERATION MANUAL

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## **1 DISCLAIMER**

This product is intended for professional and/or home use. This product is not intended for use in a medical environment and does not have the required certifications for such use. Similarly, use aboard any aircraft or spacecraft while in flight or as an adjunct to any surface, airborne or marine navigation system or any offshore marine activity, including control of any watercraft, or any use similar to those specifically herein mentioned is prohibited. Use in the aforementioned circumstances would require additional testing and certification.

You have not become the owner of any software - you have merely purchased the right to use the software. You may make one copy of the software for your own use. Other copies will be deemed a breach of copyright.

No warranty is made either expressed or implied including but not limited to any implied warranties of merchantability or fitness for a particular purpose. In no event shall the supplier or manufacturer of this product be liable for errors found within, or be liable for any direct, indirect or consequential damages or loss in connection with the purchase or use of this hardware software or manual. The sole and exclusive liability to the supplier and manufacturer regardless of the form of action shall not exceed the replacement cost of the materials described herein.

By using this equipment you have indicated that you have agreed to the terms listed above. If you do not wish to agree or the above terms are contrary to your conditions of purchase you may return the equipment, unused, to your supplier. All trademarks and copyrights are acknowledged. E&OE.

### **1.1 Regulatory Agency Acceptance**

#### **European 'CE' Mark Statement**

Emissions: BS EN 61000-6-3:2001 (Generic Immunity Standard for Residential, Commercial and Light Industrial)

Immunity: BS EN 61000-6-1:2001 (Generic Immunity Standard for Residential, Commercial and Light Industrial)

### **1.2 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 a 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.

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Caution: This equipment is intended for use in the manner prescribed in the Instruction Manual. Any user changes or modifications not expressly approved by Knox Video 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 or describes the proper connection of this equipment for operation that insures FCC compliance.

Direct all inquiries regarding FCC compliance to:

Knox Video Technologies, a part of QuickSet International, Inc.  
8547 Grovemont Circle  
Gaithersburg, Maryland 20877  
Phone: (301) 840-5805  
Fax: (301) 840-2946

### **1.3 Manual Version Information**

Version: 2.0  
Release Date: December, 2007

### **1.4 Manual Copyright Notice**

This Operation Manual is the intellectual property of Knox Video ©2006, 2007. No portion of this manual may be copied or reproduced in any manner or by any means, including, but not limited to electronic and electro-mechanical, without its express written permission.

## **2 IMPORTANT SAFETY INSTRUCTION**

To insure the best from this product, please read this manual carefully. Keep it in a safe place for future reference.

To reduce the risk of electric shock, do not remove the cover from the unit. No user serviceable parts inside. Refer servicing to qualified personnel.

### **2.1 Power and connections**

This unit must be connected to a mains socket outlet with a protective earth connection.

This unit is not disconnected from the AC power source as long as it is connected to the wall outlet. The off state for this unit is called standby mode. In standby mode the unit is designed to consume a reduced quantity of power compared to normal operating modes.

When not using the unit for a long period of time, insure that the AC power cord is disconnected from the wall outlet.

The AC wall outlet should be installed near to the unit and be easily accessible.

Do not plug in or attempt to operate an obviously damaged unit.

### **2.2 Water and moisture**

To reduce the risk of fire and personal injury, operation of this device outdoors and/or exposure to rain, water or excessive moisture is expressly prohibited.

The apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, such as vases, shall be placed on the apparatus.

### **2.3 General care**

Do not force switches or external connections.

When moving the unit, disconnect the serial port connections first then the power cable and finally the interconnecting cables to other devices.

Do not attempt to clean the unit with chemical solvents or aerosol cleaners, as this may damage the unit. Use a clean dry cloth.

### **2.4 Location**

Installation of this unit should be in a cool dry place, away from sources of excessive heat, vibration, dust, moisture and cold.

## **2.5 Ventilation**

Slots and openings in the sides of the unit are provided for ventilation. To ensure reliable operation, avoid obstruction of these openings and ensure the unit is installed in a well-ventilated area.

## **2.6 Intellectual property**

Some IC chips in this product include confidential and/or trade secret property. Therefore you may not copy, modify, adapt, translate, distribute, reverse engineer, reverse assemble or decompile the contents thereof.

## **2 IMPORTANT: CONSIGNES DE SECURITE**

Afin de tirer le meilleur de ce produit, merci de lire attentivement ce manuel. Gardez-le dans un endroit sûr pour pouvoir le consulter à nouveau.

Afin de réduire le risque de choc électrique, ne retirez pas l'unité de sa protection.

Aucune pièce réparable par l'utilisateur à l'intérieur. Référez-vous à des personnes qualifiées.

### **2.1 Alimentation électrique et connexions**

Il faut brancher l'appareil sur une prise du secteur disposant d'une mise à la terre.

Cette unité n'est pas déconnectée de la source de courant électrique tant qu'elle est connectée à la prise murale. Le mode éteint de cette unité est appelé mode de veille. En mode de veille, cette unité est conçue pour consommer une quantité réduite de courant par rapport aux modes normaux d'utilisation.

Lorsque vous n'utilisez pas l'unité pendant une longue période, assurez-vous que le câble d'alimentation électrique est déconnecté de la prise murale.

La prise murale de courant doit être installée près de l'unité et aisément accessible.

Ne branchez pas et n'essayez pas d'utiliser une unité visiblement endommagée.

### **2.2 Eau et humidité**

Pour réduire les risques d'incendie et de dommages corporels, l'utilisation de cet appareil à l'extérieur et/ou son exposition à la pluie, l'eau ou une humidité excessive est expressément interdite.

L'appareil ne doit pas être exposé aux gouttes ou aux éclaboussures et aucun objet contenant de l'eau, comme par exemple un vase, ne doit être posé sur l'appareil.

### **2.3 Entretien général**

Ne forcez pas les boutons ou connexions externes.

Lorsque vous déplacez l'unité, déconnectez d'abord les connexions de ports en série puis le câble d'alimentation et enfin les câbles de connexion avec d'autres appareils.

N'essayez pas de nettoyer l'unité avec des dissolvants chimiques ou des produits nettoyants en aérosol, car cela peut endommager l'unité. Utilisez un chiffon propre et sec.

### **2.4 Emplacement**

L'installation de cette unité doit se faire dans un endroit frais et sec, éloigné de sources excessives de chaleur, de vibrations, de poussière, d'humidité et de froid.

## **2.5 Aération**

Les rainures et les ouvertures sur les cotés de l'unité servent à l'aérer. Pour permettre une utilisation sûre, évitez d'obstruer ces ouvertures et assurez-vous que l'unité est installée dans un endroit bien aéré.

## **2.6 Propriété intellectuelle**

Certaines puces IC dans ce produit contiennent des éléments propriétaires confidentiels et/ou des secrets commerciaux. Vous ne devez donc pas copier, modifier, adapter, traduire, distribuer, démonter, désassembler, ou décomposer leur contenu.

## **2 INSTRUCCIONES IMPORTANTES DE SEGURIDAD**

Para sacar el mejor provecho de este producto, léase este manual con detenimiento. Guárdelo en un lugar seguro para poder hacerle referencia en el futuro.

Para reducir el riesgo de calambre, no quite la cubierta del aparato.

No hay piezas utilizables dentro. Remítase todo mantenimiento a personal cualificado.

### **2.1 Corriente y conexiones**

Esta unidad debe estar conectada a una toma de corriente eléctrica con una conexión a tierra de protección.

Mientras esté conectada a una toma de electricidad, el aparato seguirá conectado a la fuente de corriente CA. A la posición de «off» de este aparato se le denomina posición de espera. En la posición de espera, el aparato está diseñado a consumir una cantidad reducida de electricidad en comparación con los modos de operación normales.

Asegúrese de desconectar el cable de corriente CA de la toma de la pared cuando no va a utilizar el aparato por un periodo largo de tiempo.

La toma CA de la pared ha de estar instalada cerca del aparato y debe ser fácilmente accesible.

No enchufe ni intente operar un aparato que esté evidentemente dañado.

### **2.2 Agua y humedad**

Para reducir el riesgo de fuego o de daños personales, se prohíbe la utilización de este aparato en el exterior y/o su exposición a la lluvia, al agua o a atmósferas de excesiva humedad.

El aparato no debe situarse cerca de zonas en las que haya riesgo de goteo o salpicaduras. Tampoco deben colocarse objetos que contengan agua (jarrones, por ejemplo) en el mismo.

### **2.3 Cuidado general**

No forzar interruptores o conexiones externas.

Al mover el aparato, desconecte las conexiones del puerto en serie primero, luego el cable de electricidad y finalmente los cables interconectados a otros aparatos. No intente limpiar el aparato con disolventes químicos o productos de limpieza aerosol, ya que podrían dañar el aparato. Utiliza un paño limpio y seco.

## **2.4 Ubicación**

Este aparato se debe instalar en un lugar seco y fresco, lejos de fuentes de calor excesivas, la vibración, el polvo, la humedad y el frío.

## **2.5 Ventilación**

El aparato viene provisto de ranuras y agujeros en los lados para la ventilación.

Para asegurar una operación eficaz, se debe evitar la obstrucción de estos agujeros y también asegurar que el aparato se instale en una zona con adecuada ventilación.

## **2.6 Propiedad intelectual**

Algunos chips con circuito integrado de este producto incluyen propiedad confidencial y/o propiedad de secreto comercial. Por lo tanto queda prohibido copiar, modificar, adaptar, traducir, distribuir, usar técnicas retroactivas, desmontar, o recopilar los contenidos del mismo.

## **2 WICHTIGE SICHERHEITSVORSCHRIFTEN**

Lesen Sie diese Bedienungsanleitung bitte sorgfältig, um Ihr Produkt optimal nützen zu können, und bewahren Sie sie zum späteren Nachschlagen an einem sicheren Ort auf.

Entfernen Sie bitte keinesfalls die Abdeckung, um der Gefahr eines Stromschlags vorzubeugen.

Im Inneren des Geräts befinden sich keine Teile, die vom Benutzer gewartet werden können. Lassen Sie Wartungsarbeiten nur von Fachpersonal durchführen.

### **2.1 Stromversorgung und anschlüsse**

Das Gerät muss an eine geerdete Netzsteckdose angeschlossen werden.

Solange das Gerät mit einer Steckdose verbunden ist, bleibt die Stromversorgung aufrecht. Der Ausschaltzustand des Geräts wird als Standbymodus bezeichnet. Im Standbymodus verbraucht das Gerät weniger Strom als in den üblichen Betriebsarten.

Wird das Gerät über einen längeren Zeitraum hinweg nicht verwendet, ziehen Sie bitte das Stromkabel aus der Steckdose.

Die Steckdose sollte sich in der Nähe des Geräts befinden und leicht zugänglich sein.

Verbinden Sie ein offensichtlich beschädigtes Gerät keinesfalls mit einer Steckdose und versuchen Sie auch nicht, es zu bedienen.

### **2.2 Wasser und feuchtigkeit**

Um die Gefahr eines Brandes oder einer Körperverletzung zu verringern, ist es ausdrücklich verboten, dieses Gerät im Freien in Betrieb zu nehmen und/oder es Regen, Wasser oder hoher Feuchtigkeit auszusetzen.

Das Gerät darf keinen Tropfen oder Spritzern ausgesetzt werden und es dürfen keine mit Flüssigkeiten gefüllte Behälter, wie Vasen, auf das Gerät gestellt werden.

### **2.3 Allgemeine pflege**

Wenden Sie bei der Handhabung von Schaltern und Anschlüssen keine Gewalt an.

Beim Umstellen des Geräts entfernen Sie zuerst die seriellen Anschlüsse, dann das Stromkabel und zum Schluss die Verbindungskabel zu anderen Geräten.

Versuchen Sie keinesfalls, das Gerät mit chemischen Lösungsmitteln oder Sprayreinigern zu reinigen, da dies das Gerät beschädigen könnte. Verwenden Sie ein sauberes, trockenes Tuch.

### **2.3 Aufstellung**

Das Gerät sollte an einem kühlen, trockenen Ort aufgestellt werden, fern von übermäßiger Wärme, Vibrationen, Staub, Feuchtigkeit und Kälte.

### **2.5 Belüftung**

Seitliche Schlitze und Öffnungen sorgen für die Belüftung des Geräts. Um die ordnungsgemäße Belüftung zu gewährleisten, dürfen diese Öffnungen nicht verdeckt werden. Sorgen Sie außerdem dafür, dass das Gerät an einem gut belüfteten Ort aufgestellt wird.

### **2.6 Gewerbliches eigentum**

Einige integrierte Schaltkreise in diesem Produkt enthalten vertrauliche

Informationen und/oder Betriebsgeheimnisse. Sie dürfen daher diese Inhalte nicht kopieren, modifizieren, adaptieren, übersetzen, verteilen, rückentwickeln, rückassemblieren oder dekompileieren.

## **2 BELANGRIJKE VEILIGHEIDSINSTRUCTIES**

Lees deze handleiding zorgvuldig door om het beste uit uw product te halen. Bewaar het op een veilige plek voor raadpleging in de toekomst.

Haal nooit het omhulsel van de eenheid af, dit om de kans op een elektrische schok te verminderen. Maak het apparaat nooit open: er bevinden zich geen door de gebruiker in te stellen onderdelen in het apparaat. Laat service en onderhoud over aan een gekwalificeerde technicus.

### **2.1 Elektriciteit en aansluiting**

Dit toestel moet worden aangesloten op een netcontactdoos met een aardsluitingsbeveiliging.

Deze eenheid is niet van de wisselstroom voedingsbron gescheiden wanneer de stekker nog in het stopcontact zit. Wanneer de eenheid uitstaat, staat deze nog in de stand-by modus. In de stand-by modus vergt de eenheid minder stroom dan in de normale "aan" modus.

Wanneer u de eenheid voor langere tijd niet gebruikt, zorg er dan voor dat de stekker van het wisselstreamsnoer uit het stopcontact is getrokken.

Het wisselstroom stopcontact moet dichtbij de eenheid geïnstalleerd worden en makkelijk toegankelijk zijn.

Als de eenheid duidelijk beschadigd is moet u deze nooit op het lichtnet aansluiten of bedienen.

### **2.2 Water en vocht**

Om het risico op brand en persoonlijk letsel te beperken is het gebruik van dit apparaat buiten en/of blootstelling aan regen, water of overdadige hoeveelheden vocht uitdrukkelijk verboden.

Het apparaat mag niet worden blootgesteld aan druppels of bespatting en er mogen geen objecten die gevuld zijn met vloeistoffen, zoals vazen, op het apparaat geplaatst worden.

### **2.3 Algemeen onderhoud**

Forceer schakelaars of externe aansluitingen nooit.

Bij verplaatsing van de eenheid, de seriële poortaansluitingen eerst loskoppelen, dan de voedingskabel en als laatste de snoeren naar andere apparaten. Probeer de eenheid nooit met chemische oplosmiddelen of schoonmaakmiddelen in een spuitbus schoon te maken, omdat dit de eenheid kan beschadigen. Gebruik een schone droge doek.

## **2.4 Plaatsing**

Deze eenheid moet geïnstalleerd worden op een koele droge plaats, uit de buurt van bronnen van extreme hitte, vibraties, stof, vocht en kou.

## **2.5 Ventilatie**

De sleuven en openingen aan de zijkant van de eenheid zijn voor ventilatie. Zorg er voor dat de eenheid op een goed geventileerde plek geïnstalleerd wordt zodat deze betrouwbaar werkt.

## **2.6 Intellectueel eigendom**

Sommige IC chips in dit product bevatten vertrouwelijke informatie en/of fabrieksgeheimen. U mag daarom de inhoud hiervan niet kopiëren, wijzigen, aanpassen, vertalen, verspreiden, nabouwen, of decompileren

## **3 DEVICE SUMMARY**

### **3.1 Device Capabilities**

The Knox Video series uses the proprietary CORIO<sup>®</sup>2 Engine to perform its functions, being the second generation of the successful CORIO<sup>®</sup> products. The CORIO<sup>®</sup>2 technology is a powerful toolset for any application requiring high quality video signal conversion or image manipulation.

All units feature a single video processing and scaling engine, with some unit's also featuring video mixing, keying and fader capabilities.

These functions allow the flexibility for handling a wide range of inputs and outputs, depending on the unit used.

All units are at one in the home and broadcast & display environments. The Knox Video series offers a range of high-level image processing functions – with each model designed to fulfill a particular need.

The following is a summary of the main types of product available in the Knox Video series, as marked on the front of each unit:

#### **DC-100 Down Converter**

Down converting an image is when a computer PC or HD input is inputted to the unit. The input signal is then converted into a suitable signal which can then be displayed for use on a video screen or television, such as composite video.

#### **VS-100 Video Scaler**

This unit allows for a standard television video signal, such as Composite Video, to be input into the unit and then converted for use on a computer display. When using this function you can switch back to the computer image by pressing a button. This is known as bypass mode.

### **3.2 Device Features**

#### **General Topography**

4:4:4 RGB / YUV sampling provides full bandwidth color which allows precise keying where included in the units 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 Knox Video 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<sup>®</sup> 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. The Video Scaler units employ pixel adaptive motion compensation to de-interlace fast moving images, and automatic 3:2 Pull-down efficiently de-interlaces video from 24 fps NTSC film.

### **Simple Control**

The unit can be controlled in various ways. One option is to control it from the front panel using the transparent (soft) keys on the front of the unit. Another option would be to control the unit from an infra-red remote control. It can also be controlled via RS-232 using the Windows Control Panel.

The Windows Control Panel is available for download from our Internet site and affords complete control of the unit and adds Scripting to facilitate long, complex sequence of commands.

### **Upgradeability**

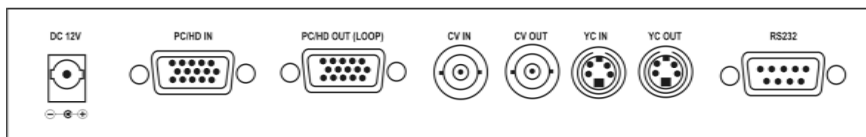
All Knox Video units benefit from firmware upgradeability, thus reducing product obsolescence by allowing the installation of the latest version of firmware. This not only applies to the software used to control the unit, but also to the range of resolutions stored inside the unit, the addition of new features, and upgrades to the heart of the image processing hardware – the CORIO<sup>®</sup>2 scaling engine

## 4 PRODUCT IMAGES

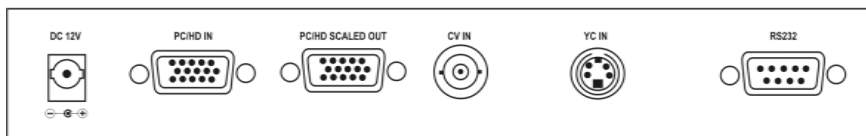
Your product should look like one of the units below.

Each unit has a different main function (Down Converter or Video Scaler) and a subsequently different ability to process video signals.

### 4.1 DC-100



### 4.2 VS-100



## 5 FRONT PANEL CONTROLS

The range of buttons on the front of the unit provides the user with quick access for selecting a variety of inputs and features.

The MENU button, ↓ button, and ↑ button set on the front panel provide the user with a way of navigating the on-screen-display (OSD) menu system. The RS232 interface and infra-red remote control also provide further ways of controlling the unit, which are detailed in a later section.



### 5.1 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
MENU	Press once to show the on-screen display (OSD). Hold in to cancel the OSD. Hold in for longer to store the current settings.
ZOOM ↓	Jumps to the 'Zoom' menu item (also steps Zoom between 100%, 150%, 200% and 300% if the OSD is not active)
FREEZE ↑	Freezes the current image (does not affect any background image)
INPUT	Cycles through the inputs on the rear of the unit to use for image conversion – RGB, followed by CV, followed by YC, and back to RGB again.
AUTOSET	Activates Autaset for the current analog RGB input

STANDBY	Hold in to put the unit into Standby (power-save) mode. Hold in briefly to come out of Standby mode.
---------	---

## 5.2 MENU ↓ and ↑ buttons

The on-screen display (OSD) is controlled from the front panel by using these buttons. MENU will activate the OSD, whilst the ↓ and ↑ arrowed keys will allow different menu items to be selected and adjusted – this is detailed in a later section.

## 5.3 Special button combinations and functions

Various button combinations are available to perform certain functions:



*These buttons combinations only work when the unit is switched on and active i.e. with the STANDBY/ON LED off.*

### 5.3.1 Locking front panel buttons & IR remote control

This can be performed by pressing STANDBY/ON and FREEZE at the same time. All front panel buttons and IR remote 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.

### 5.3.2 Restore power-on settings

Should your current settings not allow you to see the on-screen display (OSD), restoring the last-saved settings might be useful. This can be done by pressing STANDBY/ON and MENU at the same time until a single beep is heard.

### 5.3.3 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 MENU buttons in together until at least 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).*

#### **5.3.4 Switching units between different resolutions (NTSC, PAL and Default)**

Down converters will default to outputting NTSC after a Factory Reset, whilst Video Scalers will default to outputting XGA (1024x768 @ 60Hz). Should your display or output device not support the default resolution, or if you wish to have quick access to an alternate resolution, the following methods below can be used. When you are happy with the output resolution selected, press and hold the MENU button in to store the current settings.

Please note that these changes will have no immediate effect if LOCK or MIX buttons are illuminated, as this means that the output resolution is locked to the Lock source.

#### **5.3.5 Forcing NTSC output resolution**

Press and hold the MENU and ZOOM buttons together, then release.

#### **5.3.6 Forcing PAL output resolution**

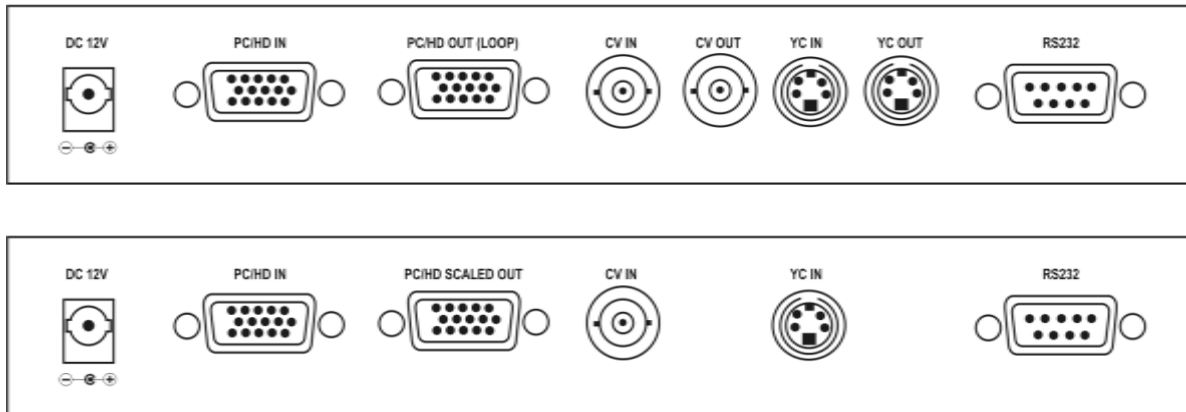
Press and hold the MENU and FREEZE buttons together, then release.

#### **5.3.7 Forcing default output resolution**

Press and hold the MENU and INPUT buttons together, then release. The default output resolution depends on the type of unit you have – see above.

## 6 VIDEO INPUTS AND OUTPUTS

The units have different video inputs and outputs depending on your model, and with the PC/HD output being either scaled, or just as a loop-through from the PC/HD input.



### 6.1 Computer & Video inputs

The PC/HD input can accept:

- Analog RGBHV
- RGsB (sync on green)
- RGBS (composite 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. On some units such as Video Scalers, the PC/HD input is there just to pass a PC signal through to the monitor in 'bypass' mode.

CV and YC inputs can accept either standard NTSC or PAL inputs – for example, from a video camera, VCR, DVD player, gaming device, etc. PAL and NTSC detection is automatic.

### 6.2 Computer & Video outputs

The units have a number of different outputs depending on the function of the unit – see earlier front and rear panel diagrams to see what is available on your unit.

The PC/HD output can use:

- Analog RGBHV
- RGsB (sync on green)

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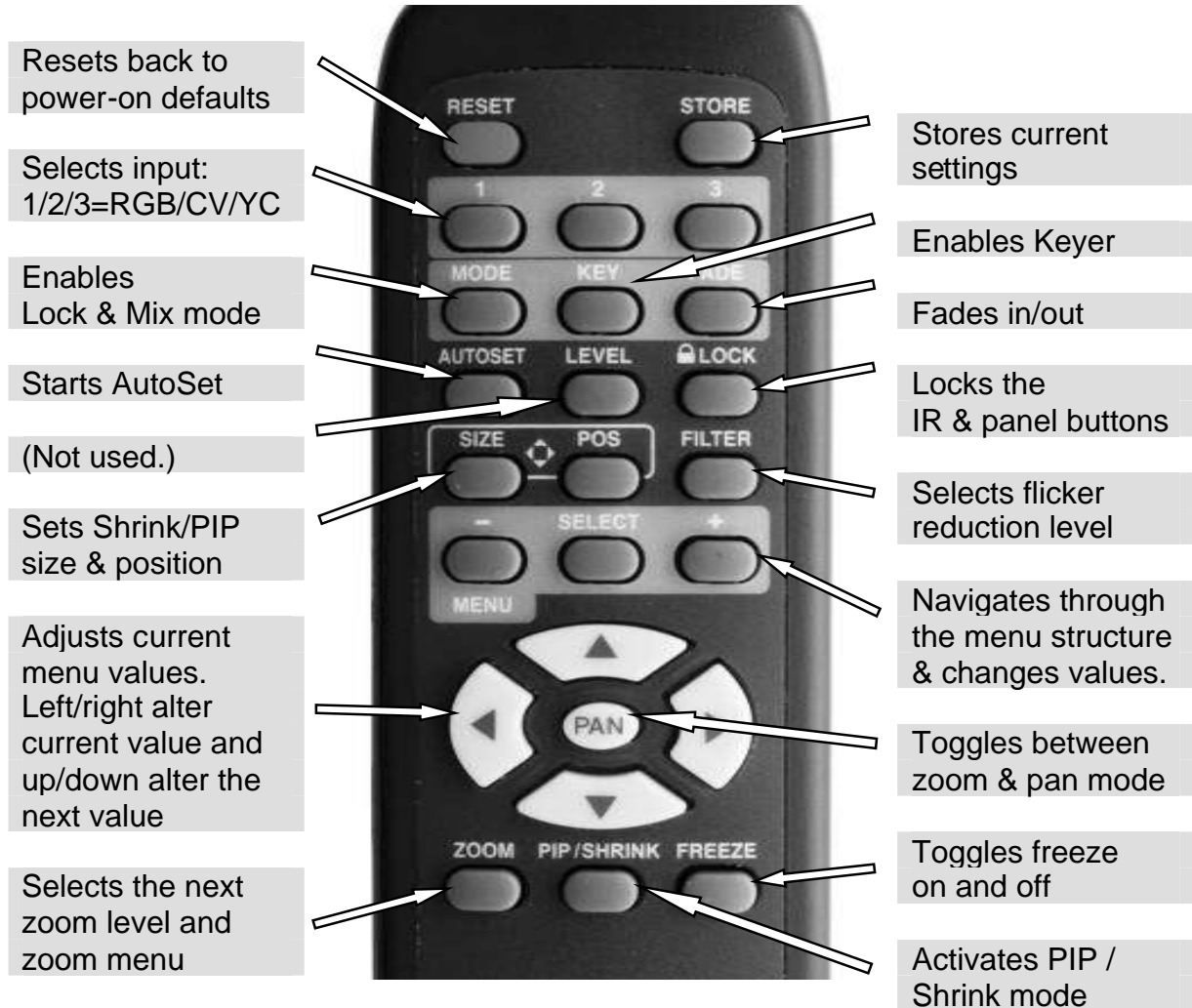
RGBS (separate sync at TTL levels)  
YUV/YPbPr (including tri-level).

However, please note that on some units such as Down Converters, the PC/HD output is there just to loop the PC image through to the PC monitor. On Video and PC/HD Scalers, bypass mode (with the unit in Standby) will feed PC/HD input to the PC/HD output directly.

CV and YC outputs always function simultaneously and can be set to either standard NTSC or PAL – see 'Adjust outputs' for more information

## 7 INFRA-RED REMOTE CONTROL

Your unit is compatible with an optional infra-red remote control as shown below:



The transmit range of the remote control depends on many factors, but is designed to be fairly directional. Therefore you should always aim it directly towards your unit.

The IR remote control can be disabled in the System menu. This can be used in situations where multiple units respond to the same remote control or are located close to one another.

## 8 MENU LAYOUT AND SETTINGS ADJUSTMENT

From here on, we'll be looking at the menu structure employed in the series and, more importantly, the individual menu items that allow you to take advantage of the power of the unit.

You'll be using the MENU ↓ and ↑ buttons and the on-screen display (OSD) to view the options and settings available to you. The OSD can be activated by pressing the MENU button once. Holding the MENU button in for a short while will then close the OSD.

Whilst the OSD is active, use the ↓ and ↑ buttons to change where you are in the menu. Go into a sub menu by pressing the MENU button once. To exit a sub menu, scroll using the ↓ or ↑ button to the end of the sub-menu to reveal Exit. Push in the MENU button to exit the sub menu.

You can edit a value in brackets '[' ]' by pressing the MENU button once (you'll note that the brackets surrounding a particular parameter's value will begin to flash). Change the value by using the ↓ and ↑ buttons to decrease and increase the value respectively. Then finalize your adjustment by pressing the MENU button once more.

A few menu items have multiple parameters within an individual menu selection. In those cases, you can adjust one item, and then move to the next, etc.



*Holding the MENU button in for a few seconds stores all changes in memory. Unless you intentionally change it again later, the adjustment will remain even after power is removed from the unit.*

### 8.1 The High Level Menu Structure

Menus are arranged so that a particular general function has a menu name on the top line and beneath that either a sub-menu or one or more related individual settings are displayed.

In some cases the functionality is global – meaning it has an effect on the unit as a whole (such as changing the output resolution). In the majority of cases, the function is related to a specific operational area of the unit, detailed by the text in the top line.

There are two screens that appear before the Group Menus (sub-menus) are accessed.

(Model number)  
Knox Video Technologies

The first is the 'welcome' display shown above indicating the model of the unit.

www.knoxvideo.com  
SW: 65. PT: 12, BT: 13

Moving to the next menu item displays the firmware information screen (the numbers on your unit will be different to those shown). The SW number refers to the version of firmware loaded into the unit, this can be upgraded from the support website.

The PT and BT numbers refer to Hardware version information and are of interest to the Technical Support Group should you ever need assistance.

At the end of all Group Menus will be an 'Exit' item. Simply select this to exit the existing menu structure and return to the previous one in the hierarchy.

## 8.2 Group Names and Descriptions

Menu Group Name	Group Description
Adjust outputs	Controls output parameters
Adjust windows	Controls characteristics of the scaled window
Adjust keyers*	Controls the keying ability of the unit
Adjust sources	Controls signal source input parameters
Adjust resolutions	Controls unit's input/output resolution table (hidden by default - only visible when advanced menus are switched on)
System	Controls global system parameters for the unit

\*Note that not all units have this menu item

## 8.3 Items Associated with the Adjust outputs group

This menu group allows adjustments to be made that specifically affect the output of the unit, including output resolution and locking/overlaying onto a computer or video source.

800 x 600 60Hz  
Lock mode [Off] [RGB1]

This menu item allows the lock mode to be selected and the lock source to be defined. The top line of the display shows the current detected resolution of the

selected lock source (RGB1 in this example). The lock mode can be either Off, Genlock or Lock & Mix, with the operation of these shown in the following table:

Lock mode	Description
Off	The output resolution of the Output is defined by the setting for Output Resolution and there will be no background source visible.
Genlock	The output video will be “Genlocked” to the selected lock source. The output signal will be synchronous to the input sync and adjustable but there will still be no lock source visible.
Lock & Mix	The output video will be locked to the selected source, the syncs will be locked (but with an additional internal video processing delay) and the background for the output will be that of the Lock source (unless foreground and background are swapped).

In both Genlock and Lock & Mix modes the source selected for the lock input determines the resolution of the Output image. The output resolution for the entire image can be no different than the resolution of the lock source. All synchronization signals are re-generated within the unit so they may look slightly different when compared on an oscilloscope to the original source.



*Before turning the Lock feature on, you first must select a valid Lock source. Some units may not have all Lock sources available, depending on hardware limitations – see Specifications for details of limitations on your unit.*

*If the Lock source you choose is not valid, then Genlock or Lock & Mix will be temporarily disabled, until the Lock source becomes valid again. When disabled, the resolution previously specified in ‘Output res’ becomes the output resolution.*

1024 x 768 60Hz Output res.	[28]
--------------------------------	------

Your unit can handle a very wide array of inputs and convert them all to a single output signal with defined characteristics. This output resolution will remain in place until changed or it may be overridden by the lock mode and source.

The top line of the display will show the current output resolution selected. Some units will have a limited number of output resolutions depending on their function (e.g. Down Converters are more limited than Video Scalers).

1024 x 768 60Hz HDCP (Active) On
-------------------------------------

HDCP is handled only on certain units with DVI outputs, so this menu may not appear on your own unit. HDCP is a ‘High-bandwidth Digital Content Protection’

system, which can ensure that a high definition video signal cannot be received by units not equipped with a HDCP receiver.

This menu lets you see the current status of the output and whether HDCP is supported or active, and also lets you turn off the output's HDCP encryption system. Note, however, that turning HDCP off at the output will also prevent HDCP-encrypted signals from being received by the unit – see the table below.

By default, HDCP on the output is turned On - so that if your attached DVI display is HDCP-compliant, then your output will be encrypted (regardless of whether the input to the scaler is encrypted). Note that you don't have to attach a display to the output of the scaler – another unit can be connected instead, in which case that unit is known as a 'repeater'.

Please also see the HDCP menu item in 'Adjust sources', as this controls availability of HDCP at the DVI input. The status message given in brackets has the following meaning:

Status message	Description	Effect
Unavailable	The device attached is not capable of supporting HDCP.	As the DVI output cannot be HDCP encrypted, then a HDCP-encrypted source cannot be selected for scaling.
Supported	The device attached is capable of HDCP, but the output is not currently encrypted.	As the DVI output is not HDCP encrypted, then a HDCP-encrypted source cannot be selected for scaling.
Active	The device attached is capable of HDCP, and the output from the unit is encrypted.	As the DVI output is HDCP encrypted, then a HDCP-encrypted source can be selected for scaling. Note that no other output connector (SDI, CV, YC, YUV or RGBHV) will function – since they are not encrypted.
Rep. supprt	The repeater unit (e.g. scaler) attached is capable of HDCP, but the output is not currently encrypted.	As the DVI output is not HDCP encrypted, then a HDCP-encrypted source cannot be selected for scaling.
Rep. active	The repeater unit (e.g. scaler) attached is capable of HDCP, and the output from the unit is encrypted.	As the DVI output is HDCP encrypted, then a HDCP-encrypted source can be selected for scaling. Note that no other output connector (SDI, CV, YC, YUV or RGBHV) will function – since they are not encrypted.

Adjust outputs Output type [RGBHV]
Adjust outputs Anlog= [RGBHV] Dig= RGBHV

This menu may appear as either of the above – depending on whether the analog and digital outputs are controlled separately.

This menu item allows you to select the type of signal output your unit will provide. Types of output vary depending on the resolution selected and include various

types of component signals YUV or tYUV (tri-level YUV) and the full range of RGB type signals RGBHV, RGBS and RGsB (Sync on green).

Note that this value is remembered for each resolution – so you can set 1024x768 60Hz to RGBHV and 1280x720 60Hz to tYUV and both will be remembered separately. This value is not affected by a Factory reset – but is reset by a firmware update.

Adjust outputs Optimize for SDI [On]
---

This menu item is only available on certain units with an SDI output and when locking to a CV or YC input. An internal de-jitter circuit ensures that the SDI output has a low jitter over the full 10Hz to 100kHz range, even though the CV or YC input may have a high jitter. However, this is not always compatible with a CV/YC output where the colour sub-carrier should not be de-jittered and needs to follow a Lock source's input – hence it should be turned Off if the CV/YC outputs are going to be used.

Adjust outputs Stand. [NTSC-M/PAL-BDGHJ]
---

This menu item is only available when the Output resolution is set to PAL or NTSC. With this you can change the output type to the PAL or NTSC standard with the further option of changing the output to the additional PAL & NTSC standards such as PAL-M or PAL-N. SECAM is also available as an output on some units, provided the 'Output res' is set to PAL / 50Hz.

Adjust outputs Luma/chr BW [Med] / [Med]
---

This menu item is only available on certain units when the Output resolution is set to PAL or NTSC. With this you can change the output filtering system to increase or decrease the image sharpness. In general, high sharpness can result in increased colour disturbance.

Adjust outputs Back Y/U/V [ 16] [128] [128]
--

Sets the value of the fixed background color, which is present when PIP is used with no Lock source background displayed. This menu item is only available for units with overlay, keying and fading abilities.

#### 8.4 Items Associated with the Adjust windows group

This menu group allows adjustment to be made to window specific parameters such as the window source, its position, size and zoom level.

**Info:**

*Window size adjustment can be performed in a number of different ways according to whether 'Aspect adjust' is set to Simple, Advanced or Pixel. The main part of this text assumes Simple mode – see later for a detailed description of the other modes.*

Adjust windows Window to adjust	[A]
------------------------------------	-----

This menu item only appears on units with multiple windows or PIPs. It is used to select which one you want to modify. Alternatively, use one of the dedicated buttons on the front panel to choose the window to adjust.

NTSC / 60Hz Source	[ YC1]
-----------------------	--------

The source display screen allows the input source for the currently selected window to be changed. The top line of the display shows the detected characteristics of the signal. Valid Input sources match those available on the front of the unit.

**Info:**

*Certain units do not have full flexibility of Window source and Lock source when Genlock or Lock & Mix are active (in the Adjust outputs menu group). See the Specifications for your unit to see if any limitations are present.*

Adjust windows Window enable	[ On]
---------------------------------	-------

Available on certain units only, this quickly enables or disables the window being adjusted.

Adjust windows Zoom level %	[ 100]
--------------------------------	--------

Changing this option, sets the amount of picture magnification you wish to use for the window Source. You are provided with the options to zoom the image from 100% to 1000% (10x zoom).

Adjust windows H/V zoom pan %	[ 50] [ 50]
----------------------------------	-------------

Once an image has been 'zoomed', this control allows the image to be positioned within the window so that any portion can be seen, not just the middle.

Adjust windows Image freeze	[Off]
--------------------------------	-------

This menu item allows the image to be frozen or unfrozen – thus keeping a single image on screen indefinitely. Note that images are not stored when power is removed from the unit.

Adjust windows H/V crop % [ 0] 0
-------------------------------------

This allows the scaled image to be cropped at the top/bottom edges, or at the sides. Typically, this is used when performing a picture-in-picture (PIP) function (only available on certain models), where the incoming video signal has a letterbox or pillarbox size (i.e. it has black areas at the top/bottom or sides).

By adjusting the H/V values, you can crop out the black areas to correct the size on the final output screen. Note that it does not change the shape or aspect ratio of the image – but just removes the parts of the image that are not required.

Adjust windows H/V out shift [ 0] [ 0]
---

This positions the selected Window horizontally and vertically on the monitor. This should only be used for 'fine tuning' and should not normally require adjustment – use the Shrink H/V adjustment when your image is less than 100% Shrink value.

Adjust windows Shrink level% [ 50] [On]
--

Shrink Level determines the percentage of the monitor's total available screen space that the selected Window image occupies. Adjustment is provided for a reduction down to 10% of the overall output size. In most cases, this feature is used for picture-in-picture (PIP) when a background image is being used (for units with overlay abilities).

*Note that some units do not have the [On] entry – this is only for units with a PIP button on the front, with turns this entry On and Off. On these units, this feature is 'Off' by default, so that the full image size of 100% is used. Shrink level will need to be turned On before any change to this value has an effect.*

Adjust windows H/V position % [100] [ 50]
--

This menu option determines the position of the shrunken image on the monitor screen. This will move an image that is less than the full screen size left/right or up/down within the monitor's available screen space. It will not let you move the image off the screen, so certain values will appear to have no effect (unless you use a very low Shrink value like 10%).

Adjust windows Aspect change [Normal]
--

This item provides a simple way of changing the output screen aspect ratio, to suit the incoming video signal and final output display size. Use the zoom/shrink functions for occasions when the aspect ratio is an odd format.

Adjust windows Aspect adjust	[Simple]
---------------------------------	----------

See later section for further details on this item.

Adjust windows Temporal interp.	[Off]
------------------------------------	-------

This is a feature only present in advanced units only. It greatly improves the method of frame-rate conversion, by allowing the unit to merge frames together during the process.

When 'Off', the unit will use frame-repetition when converting 50Hz to 60Hz (i.e. it has to duplicate every 5th frame), or frame-dropping when converting 60Hz to 50Hz (i.e. it has to drop every 6<sup>th</sup> frame). When 'On', smooth blending is applied so that frames are not lost, but blended together at the appropriate times.

Adjust windows Flicker Reduction	[Low]
-------------------------------------	-------

The Flicker Reduction menu item will only appear if you have selected a low resolution interlaced output such as PAL or NTSC. If you are using CV or YC outputs, this adjustment may be of interest, particularly when you have line drawings or similar fine detail. You can choose from four possible Flicker Reduction settings. You should use as little Flicker Reduction as possible because the Vertical detail will be softened at the highest setting.

Flicker mode	Function
Off	Disables flicker reduction (sharpest mode).
Low	Suitable for most input sources.
Med.	Enough for most situations such as thin line drawings
High	Highest amount of flicker reduction. Will cause loss of vertical detail in some images.

Adjust windows Image smoothing	[Auto]
-----------------------------------	--------

Image smoothing reduces the jagged-edges sometimes seen within an output image by softening it. It typically improves the quality of a scaled image greatly. There are four possible settings for this adjustment: "Off", "Med.", "High", and "Auto". The "Auto" setting is generally thought to be most desirable and will vary the smoothing process according to the amount of zoom taking place.

Adjust windows Image flip	[Off]
------------------------------	-------

Occasionally, it's necessary to cause the output image to be flipped Vertically, Horizontally or both – most commonly when a video projector is ceiling-mounted, or for special effects.

Adjust windows Max fade level %	[100]
------------------------------------	-------

This Menu item fades the selected layer, and is only available on models with overlay abilities. Adjustment range is from solid to fully transparent.

*Note: This menu item only appears on multi-channel scalars:*

Adjust Windows Layer priority abABZ	[ 3]
--	------

This adjustment selects the order of the window layers. Layers are shown for 'a' and 'b' logo screens, Window 'A', Window 'B' and 'Z' is the Lock Source. The default condition is shown. The number shown is the current layer of the active window, when you adjust the layer number the layer stack indicator 'abABZ' will change to allow visualization of the layer stack. Note that layer 6 the Background Color is not shown as its layer position can not be altered – it will always be the background.

### 8.4.1 Extended scaling controls

The 'Aspect adjust' parameter is used to change the way that scaling of windows is controlled. By default it is set to 'Simple' which allows basic control of the window zoom and shrink sizes and positions – enough for simple tasks.

In 'Advanced' mode, it allows the horizontal (H) and vertical (V) components of the Zoom and Shrink functions to be adjusted independently, thus allowing custom aspect ratios to be created, or to convert from one aspect ratio to another.

In 'Pixel' mode, the user has direct access to pixel and line-accurate scaling functions. This lets the user specify the exact co-ordinates and size of the source image (within the video source), and the position and size of where this is placed in the output video signal.

The table below summarises the different menu items in the different modes – the 'Simple' items have already been described earlier in this section, so only the 'Advanced' and 'Pixel' ones that are different (highlighted in bold) will be detailed here.

Simple	Advanced	Pixel
Zoom level % [100]	<b>Zoom H/V [100]100 1.333:1</b>	<b>In [ 0],0 640,480</b>
H/V zoom pan% [50] 50	H/V zoom pan% [50] 50	<b>Out [ 0],0 640,480</b>
H/V crop % [ 0] 0	H/V crop % [ 0] 0	

Shrink level % [50] Off	<b>ShrnkH/V [50] 50 1.333:1</b>	
H/V position % [50] 50	H/V position % [50] 50	

#### 8.4.2 'Aspect adjust' = 'Advanced'

Adjust windows H/V zoom % [100] [100]1.333:1
---

This item allows the independent setting of the horizontal and vertical zoom values. The third number (1.333 in the example) is the Aspect Ratio resulting from the adjustments, which is automatically calculated for you based on the incoming resolution and the H & V Zoom values.

Most resolutions are 4:3 ratio, thus the third number will be 1.333 (4 divided by 3). Another common aspect ratio is 16:9 (16 divided by 9 = 1.777). PAL and NTSC inputs are physically 4:3 on your video monitor, but their actual pixel/line ratios are different and so will not display as 1.333.

Adjust windows Shrink H/V % [100] [100] 1.333
--

This item allows the setting of different Horizontal and Vertical 'shrink' sizes. The third number (1.333 in the example) is the Aspect Ratio resulting from the adjustments, which is automatically calculated for you based on the output resolution (the actual pixels & lines, not your physical screen size) and the H & V Shrink values.

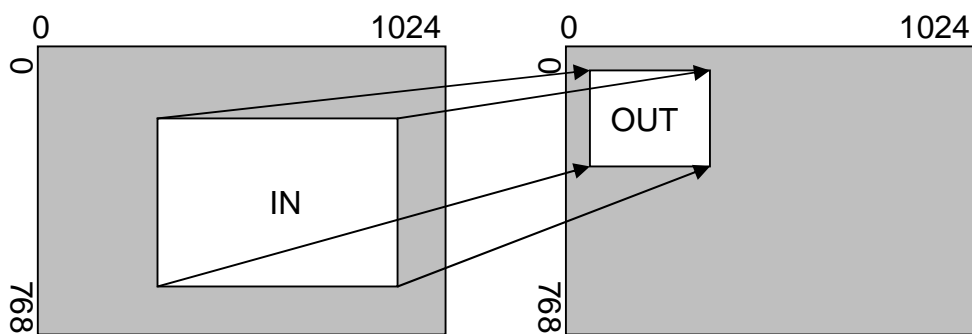
Most resolutions are 4:3 ratio, thus the third number will be 1.333 (4 divided by 3). Another common aspect ratio is 16:9 (16 divided by 9 = 1.777). Therefore, to convert your 4:3 output into a 16:9 output, reduce the vertical (V) Shrink value to 75% and this will simulate a 16:9 output. PAL and NTSC inputs are physically 4:3 on your video monitor, but their actual pixel/line ratios are different and so will not display as 1.333.

#### 8.4.3 'Aspect adjust' = 'Pixel'

Adjust windows In [ 0] , 0 640, 480
Adjust windows Out [ 0] , 0 640, 480

This menu items work together to specify the exact co-ordinates and size of the source image (within the video source) and the position and size of where this is placed in the output video signal.

The diagram below should help to clarify the function of these values:



In the example below, 'In' has been set to 300,150 as its top-left source coordinate, with a size of 750,400. 'Out' has been set to 50,50 (i.e. close to the top left) with a size of 250,300.

The scaler will then ensure that the whole of the source (of size 750 by 400) is scaled to the required output (of size 250 x 300).

### 8.5 Items Associated with the Adjust sources group

The 'Adjust Sources' menu group accesses the parameters associated with the processing amplifiers used for each input (RGB, CV, YC, etc.). They allow you to fine-tune an incoming signal to optimize its color, brightness or even sharpness.

*Not all settings are available for all input types, and not all input types listed here may be available on your unit.*

It is recommended that you Store your settings once you're happy with them in readiness for future use.

Source: RGB1	
Source to adj	[RGB1]

This menu item selects the input connection for which you want to make adjustments to. As in the image above, changes will only be made to the source connected to RGB1. Once the selection has been made, all changes made using the following operating parameters will only apply to the selected input.



*Selection of a CV/YC source will reveal different menu items that allow adjustments beyond those used for RGB sources. The menu discussions that follow relate first to RGB sources, then to CV / YC type sources.*

### 8.5.1 Menu items common to all inputs

Source: RGB1 TL pos. adj. [ 0] [ 0]
--

This menu item allows manual positioning of the Top and Left portion of the image. It is used to ensure that the input signal is captured correctly, eliminating any black borders. These settings are often used to correct the position of a PC signal on an input, or to eliminate any undesired noise at the top or bottom of a PAL or NTSC video source.

Source: RGB1 BR size adj. [ 0] [ 0]
--

This menu item allows manual positioning of the Bottom and Right portion of the image. These settings are often used to correct the position of a PC signal on an input, or to eliminate any undesired noise at the top or bottom of a PAL or NTSC video source.

Source: RGB1 Audio input [ 1]
----------------------------------

This menu item selects the desired Audio input for use with the active video source, allowing an audio-follow-video function. This is only functional for certain units with built-in audio switching, or when used with an optional Audio Switcher (not all units support this function).

In most situations, the Audio input values would be different for each video source – so that when the first video source is selected, so is the first audio source (this is called ‘audio follow video’). The second video source then selects the second audio source, etc. However, there is nothing to prevent all Audio input values being set to the same value, for ‘audio breakaway’.

Source: RGB1 Audio Vol [ 1] Bal [ 0]
---

This menu item adjusts the audio volume and balance for the selected audio channel. This is only functional for certain units when an optional Audio Switcher is attached.

Source: RGB1 On source loss [Blue]
---------------------------------------

(This has replaced ‘De-glitch’ used on previous firmware versions.)  
This option is used to tell the unit what to do if the video source is lost or becomes unstable. Options are:

Option	Description
Show	Shows all picture break-up and instabilities.

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Freeze	Freezes the latest frame – un-freezes as soon as the source becomes stable again.
Blue (default)	Turns the window blue, to represent source loss.
Black	Turns the window black.
Remove	Removes the window, thus showing any background (e.g. a Lock source). This is useful for MIX & PIP scenarios on units with overlay abilities.

If you have a very unstable input, such as a video tape player with a poor (jumping) output signal, you may wish to turn the setting to 'Show'.

Source : RGB1 De-int [M.comp med]
--------------------------------------

An interlaced input consists of two fields separated in time. Both fields are required in order to make up the full resolution input image, but since they are sent one after the other, a moving image will have "motion artifacts" if the two fields are simply combined together. The most common artifact is a blurring at the point of maximum movement within an image. Your unit provides some tools to minimize the effects of de-interlacing of an image.

The following options are available for this menu item:

Mode	Function
Normal	The two interlaced fields are simply combined together. This will often show artifacts on moving images, but can be used when the input is known to be still.
Auto	Automatically selects Film 3:2 or Medium Range Motion Compensation (M. Comp Med.) depending on whether Film Mode is detected or not. For 1080i sources, a special de-interlacing mode is selected to eliminate combing effects.
Film 3:2	Enables 3:2 pull down conversion of the incoming NTSC video. (This option should not be used if the source is not NTSC video).
M. Comp Low M. Comp Med. M. Comp High	Enables Pixel Adaptive Motion Compensation. Three levels are available with 'Low' providing the least compensation for Motion and 'High' providing the most compensation.

Source : RGB1 Diagonal interp. [Off]
---

This menu item allows the user to specify whether the source has diagonal interpolation applied to it when de-interlacing occurs. This reduces 'jagged' artifacts on moving images, however is not suitable for noisy sources where the noise could be mis-interpreted as a diagonal or sloping element of the picture.

### 8.5.2 DVI Source Menu Items

Source: DVI1 HDCP [Inactive] [Off]
---------------------------------------

HDCP is supported on certain units only - and only on the DVI input connector. This menu item lets you change whether HDCP is active on this particular DVI input.

If turned 'Off', then a source that requires HDCP encryption will not send a video signal to your unit.

If turned 'On', and a HDCP-compliant display or device is attached to your unit's DVI output, then HDCP encrypted sources can be used.

The following table summarizes the message given in brackets:

Status message	Description	Effect
Inactive	HDCP is not active at the DVI connector.	HDCP-encrypted material cannot be received by the unit.
Active	HDCP is active at the DVI connector.	HDCP-encrypted material can be received by the unit, but only if a HDCP-compliant display or device is attached to the unit's output.

See 'Adjust outputs' for a description of how the HDCP system works on your scaler.

### 8.5.3 RGB Source Menu Items

Source: RGB1 Autoset status [Inactive]
---

Once the Autoset sense setting has been made, this menu item is accessed and activated. The Autoset sense utility will then correct the pixel phase and then position the Top Left portion of the image and the Bottom Right portion of the image. Once complete it then resume inactive status.

Source: RGB1 Input pixel phase [ 16]
---

Since an image pixel is a very small element of the total image, it's possible for your unit's Analog to Digital converters to wrongly sample the picture on the edge of each pixel thereby losing image resolution and creating image noise. The Input pixel phase adjustment allows you to change the position (from 0 to 31) where the pixels are sampled, relative to the horizontal sync signal.

To make this adjustment, select an RGB source and then provide an image from that source with fine detail, preferably with very sharp vertical lines. Adjust this value until you see the sharpest image. Alternately, adjust this value to give the worst (noisiest/softest) image, and then add or subtract 16 to get the optimum value.

Note that the AUTOSSET function (for RGB inputs only) will attempt to automatically work out the best value for this setting.

Source: RGB1 RGB input type                      [RGBHV]
---

There are several types of signals that are called RGB signals as a generic term. Each has slightly different characteristics that set it apart from similar RGB signals – such as how the synchronization signal is sent. This menu item lets you set the input type to use.

Available options let you select whether the input is standard RGB or YUV (including YPbPr signals with a tri-level sync).

Source: RGB1 RGB contr.                      [100] [100] [100]
---

This menu item lets you adjust the individual RGB or YUV/YPbPr signals, in case one component is at a different contrast to other, or if they all need to be boosted or lowered.

#### 8.5.4 CV & YC Source Menu Items

Of the above Source Menu items, the Autoset sense and Autoset status functions, RGB type and Pixel phase are specific to RGB signals only. The rest of the Source menu items function with RGB, CV or YC type signals. In addition, there are four additional Menu items that are only used with CV or YC type signals and these are explained below:

Source: YC1 Bright [100]                      Contrast [100]
---

Adjust the Brightness and Contrast of the image to your requirement.

Source: YC1 Satur [100]                      Hue [0]
---

Saturation is the amount of color present in the image. Hue is the color “tint” parameter and the adjustment range is +90 degrees through to -90 degrees with 0 being the default.

Source: YC1 Sharpness [0]
------------------------------

Within limits, you can enhance or soften the appearance of detail within an image. The Sharpness values go both negative and positive, with 0 being the default. Note that over-enhancing an image has the side effect of making it appear to be noisy and under-enhancing an image gives the appearance of poor video quality.

Source: YC1 Luma delay [ 0]
--------------------------------

On occasion, a video source will have the color portion of the signal offset from the luminance portion. If you've ever seen a poor quality comic book that has the outline of the cartoon character's head in one place on the page but the flesh tones for the head offset slightly, you are seeing the print equivalent of Luminance to Chrominance Phase Delay.

Fortunately, your unit provides a way for you to make the two signals occur at the same time on the selected image. The adjustment range provides both positive and negative levels of delay with 0 being the default.

### 8.5.5 Testcard Source Menu Items

Source : TC1 Testcard [ 0]
-------------------------------

This item is only available for units supporting Testcards (TC) sources. Used to select the Testcard from memory to use as a source for the Testcard currently selected. The Windows Control Panel can be used to upload user-defined Testcards.

## 8.6 Items associated with the Adjust resolutions group



*The Adjust Resolutions Menu Group only appears when the Advanced Menus function is turned on within the System Menu Group. To turn it on, go to the System Menu Group and then proceed to the item that says "Advanced Menus". Turn the function 'On', exit the Systems menu and return to this menu structure.*

The Resolution Database is used by your unit to identify any incoming video signal and is also used to create an output resolution. It is therefore a very important part of the unit's infrastructure.

### ***Important Cautionary Information***

**DO NOT ADJUST THESE ITEMS UNLESS YOU'RE CERTAIN YOU KNOW WHAT YOU'RE DOING! THE ONLY METHOD TO UNDO CERTAIN CHANGES IS TO UPDATE THE FIRMWARE.**

**TRY USING THE AUTOSET, SHRINK, SHRINK POS, TL & BR ADJUSTMENTS FIRST.**

Making adjustments here risks creating a non-standard resolution that is not displayable on a monitor. The resolutions and values within the database are industry standards and should not normally be altered by the user. That said, there might be times when it is necessary to create a custom resolution with specific parameters. If circumstances require you to make such a change, please read the following specific notes:

1. *Any changes made to this database take effect instantly and are also stored immediately in non-volatile memory.*
2. *Since this database is used for both input and output image processing, altering a resolution that is used for both (e.g. 1024x768 input and 1024x768 output) may give undesired effects.*

800 x 600 60 Hz Image to adjust [ 17]
--

Change the value to select resolution you want to alter.



*Typically, the image number currently being used for input or output would be already be selected otherwise immediate feedback to your changes will not be available via your monitor.*

800 x 600 60 Hz Interlaced [ Off]
--------------------------------------

This adjustment specifies whether the image is interlaced or progressive scan. It toggles simply On or Off, so there are no flashing brackets.

800 x 600 60 Hz H.freq.crse [37.879] kHz
---

**Course Frequency Adjust**

The H freq.crse (Horizontal Sync Frequency - Course) adjustment provides the option for changing the Horizontal Sync timing Frequency in 100 Hz steps.

800 x 600 60 Hz H.freq.fine [37.879] kHz
---

**Fine Frequency Adjust**

The H.freq.fine (Horizontal Sync Frequency) adjustment provides the option for changing the Horizontal Sync timing Frequency in 1 Hz steps. Use this option to fine tune after using the course adjust.

Please note that the internal sync generator may be unable to generate the exact frequency you want.

800 x 600 60 Hz Clks/l [1056] =	40.000MHz
------------------------------------	-----------

This option changes the total number of image pixels on one line of monitor video including the Horizontal sync pulse and blanking time. This is normally in a multiple of 8. It is very important to get this value correct, or many digital display devices, such as TFT monitors, will display an image with an odd moiré effect – such as soft vertical bands spread evenly across the image.

800 x 600 60 Hz Lines/f [ 628] =	60.317 Hz
-------------------------------------	-----------

This menu controls the total number of lines of video present in the image which includes the vertical Sync pulse, the blanking period and the active video. Changing this option affects the final vertical sync frequency.

800 x 600 60 Hz H/V active	[ 800] x 600
-------------------------------	--------------

A video frame includes both the active area, the portion of the image normally containing useful visual information, and a resolution value for a given display standard which only expresses the number of pixels visible in an image. The well-known 800 x 600 computer resolution standard simply means that there are 800 pixels/line visible horizontally and there are 600 lines visible vertically.

This item provides a way to change the number of active pixels and lines.

800 x 600 60 Hz H/V Start	[ 88] x 23
------------------------------	------------

There is a period of time between the end of the Horizontal Sync pulse and the start of Active Video. This portion of the waveform signal is called the “Back Porch”, a term originating with the television broadcasting industry and its RS-170A specification. In practice, this will control where the video image starts on the left side of the monitor without changing the width of the sync pulse itself (another way to control where the image area starts). The two parameters control where the back porch is positioned and they interact to a degree.



*By adjusting these parameters, you control the start of the back porch (with respect to the trailing edge of Horizontal Sync) and also its width. The place where the Back Porch begins with respect to the Horizontal Sync pulse and the width of the Back Porch have a direct bearing on where the active (visible) portion of the image begins. Do not attempt this adjustment without monitoring the results with an oscilloscope.*

800 x 600 60 Hz H/V Sync	[ 128] x 4
-----------------------------	------------

There are standards for all current computer and broadcast resolutions that specify the correct width of both Vertical and Horizontal synchronizing pulses. If you are creating a special, non-standard resolution, you may wish to adjust the pulse width to fit your new requirements. The H/V Sync screen is where that is accomplished.



*Like the H/V Start adjustment, you must use an oscilloscope when making these adjustments so that you know exactly how many milliseconds or microseconds of pulse width you have created. The numbers shown are relative numbers and not an actual time measurement.*

800 x 600 60 Hz Sync polarity	[+H+V]
----------------------------------	--------

Sync can be either negative polarity or positive polarity. To further complicate things, it is possible that you may want to make the Horizontal Sync polarity different from the Vertical Polarity. This control allows you to make that change. You have four possible selections:

- +H+V
- H+V
- +H-V
- H-V

**8.7 Items Associated with the System group**

The final Sub Menu is for adjustments of System parameters. The “System” in this case means the unit’s functions that are generally unrelated to individual inputs, outputs or any of the various production features.

System SW: 16, PT: 12, BT: 13
----------------------------------

This screen is an informational screen. Should you require technical assistance with your unit, the technical support personnel may request that you read the contents of this screen to them during the support call.

The first section, “SW”, is the version of the software that is installed on your unit. You can update software via the User Support web site (procedure to be described later in this manual) and the updates are currently free of charge. “PT” refers to Product Type and “BT” means Board Type. Both of these are hardware

designators and cannot be changed by the user however both designators are important to support personnel.

System SW date:	2006-7-11
--------------------	-----------

This is an information page showing when the currently installed software was released. The information is useful to the user as he or she compares the date to the website information describing the current software release.



*Normally, the user will examine the added features of each new software release and determine if an update is worth doing in their particular operation. The greater period of time between the current date, and the date shown for the currently installed software, the greater the likelihood that there are useful changes and improvements present in the new release.*

System TAC#	27-AA-1C-93-F8-33
----------------	-------------------

The TAC number is a unique identifier for the unit and is for use with the PPF value below.

System PPF#	1A-67-2B-9D-50-4F
----------------	-------------------

The PPF number is for units that support the 'Pay Per Feature' system. Extra features in the unit (such as Mix and Key) may be activated using this menu item by entering in the correct numbers and re-starting the unit.

System Push to store
-------------------------

This screen provides a quick and easy way to store all current operating parameters. The unit will remember the set up you are currently using at the time of data storage and also when you next apply power. To store the current settings, press and release the control button.

System Advanced Menus	[Off]
--------------------------	-------

When turned on, the previously explained Adjust resolutions menu structure is exposed. The default condition is 'Off', to prevent accidental changes.

System Autoset sense	[Medium]
-------------------------	----------

In order for Autoset to work properly, it needs a sufficiently bright full-screen image to examine. The sense level lets you change the brightness threshold for detection of the screen edge between Low, Medium, High and V.high. Medium is the default level, which is recommended for normal use (Windows-type images, etc.)

System OSD on power up	[On]
---------------------------	------

This parameter controls whether the ‘welcome’ screen is displayed or not on power up for units with an on-screen display – it can be disabled as required. This is useful when a unit is installed as part of an overall system.

System LED brightness %	[ 90]
----------------------------	-------

This parameter is available on certain units and controls how bright the LEDs on the front panel appear.

System RS232 baud rate	[57600]
---------------------------	---------

This menu item allows the adjustment of the serial baud rate used for RS-232 communications. The rate can be adjusted to 9600, 19200, 28800, 33600, 38800, 57600 and 115200. (This adjustment is provided for those instances where you wish to use the RS-232 control system for your own purposes.) The default baud rate is 57600.

System Buzzer	[ On]
------------------	-------

The screen labeled ‘Buzzer’ is actually the control for turning the “Beep” “On” or “Off”. Normally this is left in the “On” position to provide positive feedback that your data entries and parameter changes have been accepted.

System CC-300 A/B bus mode	[ Off]
-------------------------------	--------

This menu item changes the function of an attached CC-300 CORIO console unit. When set to ‘On’ any ‘Take’ will result in the A & B windows (‘buses’) being swapped at the end of the Take – so that another ‘Take’ will put them back to as they were before.

System Resolutions	88
--------------------	----

This screen is an informational screen showing the total number of the defined resolutions in the resolution database. Future firmware releases may increase the total number of resolutions defined in the database.

System Logos / T-cards	1 / 4
------------------------	-------

If your units supports Logos or Testcards then this screen will display how many are present in the memory of the units.

System Power cycles	41
---------------------	----

Power Cycles refers to how many times the unit has been powered since it left the factory. This is an informational screen. No action is taken regardless of the value shown here, however some users have an equipment cleaning or specification audit procedure and this information may be useful to those users.

System Firmware updates	11
-------------------------	----

Indicates the total number of times the firmware has been changed over the life of the unit. It is quite possible for this to be more than 1, as a unit undergoes numerous tests during production.

System Hours in Use	877
---------------------	-----

This is another informational display for usage audit purposes.

System Temp.C	30 33 43 45
---------------	-------------

Certain units have built-in temperature sensors, and if yours has such a feature then the above menu item will appear. If the ambient temperature of the internal components becomes excessively high or low, the unit will shut down to prevent harm. This display shows the current value of the ambient temperature at four locations within the case and can be an early predictor of a shutdown before the shutdown actually occurs.

Should you experience problems with your unit, Technical Support may request that you give details of these values.

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System	
Fan speed (rpm)	6000

Certain units have built-in fans to keep the unit cool. The fan speed is monitored and if it deviates from normal parameters too much, this will be taken as an indication of insufficient airflow over critical components and shutdown action will be taken.

## 9 RS232 PORT

### 9.1 Connection

Your unit is fitted with a standard 'D9' plug or socket allowing it to be controlled from a computer or other type of terminal or console with a similar interface. Most computers fitted with an RS232 port, known as a 'COM' port, will have a 'D9' plug on them. To enable connection between the two devices you will require one of two cables as shown below:

D9 connector type on C2 unit	RS232 cable type required for linking to PC
Plug – common on earlier C2 units	'Null-mode' D9 socket to socket
Socket – common on recent C2 units	D9 plug to socket

Should your PC not have an RS232/COM port, it is possible to add an interface card into the PC to add this facility. Another option you could use is a USB to RS232 converter. Both methods will add a COM port to your PC, although you should be aware that these generally do not default to being 'COM1' which is the default most RS232 applications will use.

The default baud rate is 57600 with 8 data bits, 1 stop bit and no parity. This baud rate can be changed in the System menu to suit other programs if need be.

### 9.2 Communications protocol

The standard communications protocol for your unit is text-based and is detailed on our website. Also on our website, you can find the Windows Control Panel for your unit.

The protocol is also bi-directional (unit and computer both send messages to each other), so that you can send changes to the unit, and it will also respond with any changes made via alternate methods (front panel buttons, menu changes and infra-red control). This enables any attached computer to be aware of any changes made to the unit from an alternative source rather than itself.

What this means is that you can easily find out the exact command to send to the unit to tell it to perform a certain function. This can be seen by the data that is sent back to the computer when changing values on the unit. For instance, just by turning FREEZE on, by pressing the FREEZE button, will cause RS232 data to be sent to the computer that represents the command required to set FREEZE on. A second press, to turn FREEZE off, then sends the computer the command required to turn the FREEZE off.

**Note:** Any command you send to the unit will be replied to either with an error code or with the actual changed value. This may be different to the one you sent; for example, if trying to set a value too high or too low.

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## 10 COMMON OPERATIONS

This section provides step by step instructions for some common operations.

### 10.1 Operation of the Keyer

Some units come equipped with a very powerful Luminance and Chrominance Keyer. The Keyer can take some time to master and below is a breakdown and series of simple steps to help you master the Keyer's operation

When adjusting the values, please bear in the mind the following:

The Y value is the Luminance value, so 0 is black and 255 is very bright (white).

The U value is the B-Y component. This is the difference between the Blue and the Luminance value. If part of an image is black, grey or white, then its value is 128 (being the mid-point).

The V value is the R-Y component. This is the difference between the Red and the Luminance value. If part of an image is black, grey or white, then its value is 128 (being the mid-point).

#### 10.1.1 Preparation:

1. Enter the Adjust windows menu.
2. Select the Source (this will be the foreground).
3. Exit the Adjust windows menu.
4. Enter the Adjust keyers menu.
5. Ensure the Keyer is Off.
6. Set all Y, U and V min/max values to [0] [255].
7. Set all Y, U and V softness values to 0.
8. Set all Y, U and V invert values to Off.
9. Turn the Keyer On.

At this point your source image will have disappeared, since all colors have been keyed out.

#### 10.1.2 Adjustment:

Knowing which color(s) you want to key out from the image, e.g. black to disappear, perform the following set of steps:

1. Increase the Y Key Min from 0 until just before the required color (Key Color) appears.
2. Decrease the Y Key Max from 255 until just before the required color (Key Color) appears.
3. Repeat steps 1 & 2 for the U and V min/max values as well.

Adjust any of the Softness values to improve the key. If your input signal is slightly noisy or if you want to soften the edges within the image, then this may require you

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to decrease the 'min' values and increase the 'max' values to broaden the range of colors keyed out.

At this point, only the key color should remain transparent.

## **11 TROUBLESHOOTING AND TECHNICAL SUPPORT**

If problems are experienced, please read through the symptom topics below in order to resolve the problem. After doing so, if you still need to, contact Technical Support at <http://www.knoxvideo.com>. Please have the following details of the problem handy:

Whether the problem happens only at specific times or has only just started occurring (and what other things have changed at the same time).

Firmware revision numbers - found in the first item of the System menu:

If the problem relates to a specific source or resolution.

### **11.1 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.

### **11.2 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 AUTASET 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.

### **11.3 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.

**11.4 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.

**11.5 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.

**11.6 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.

**11.7 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.

**11.8 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.

**11.9 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.

**11.10 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.

**11.11 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).

**11.12 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.

## 12 RETURN PROCEDURE

*Before returning your unit for repair, there are several checks you can make yourself to make sure the problem is actually caused by a failure.*

### 12.1 Are you sure there's a fault?

Many 'faults' are due to incorrect set-up or use so a simple checklist is provided below to help you identify potential problems.

Set the unit up with your equipment as described in this manual and run through the checklist. This will hopefully determine whether or not the unit is actually faulty and prevent units from being returned unnecessarily.

Check the Troubleshooting tips of this manual and check out the various FAQ (Frequently Asked Questions) listings on the support website, <http://www.knoxvideo.com>, which shows the latest Hints, Tips and Solutions.

Don't presume it is the unit that is causing the problem. Check that the equipment being used with it is fully working and setup correctly – bypass the unit if possible by connecting the video source directly to the video display.

Check the AC power. Is it present and is the unit turned on? Check that all cables are properly plugged in and are not damaged and then make certain that all equipment connected to the unit is working properly.

Perhaps you have a "frozen" unit and you cannot change an input nor exit from the current task. In that case, a simple 'Factory Reset' of the product may sort the problem out. See earlier section on Front panel buttons to do this. Note that all user-settings will be lost following an engineering reset.

It is also worth ensuring that the latest firmware is installed in the unit – although, again, user settings are lost during a firmware update.

### 12.2 To return a unit for repair

First contact Knox Video using the <http://www.knoxvideo.com> website. Support personnel will determine whether a return to the factory is the appropriate solution. If that's the case, a Return Authorization Number will be issued. You should provide the following information for each unit:

Product type

Serial number of the faulty unit (this is on the underside of the unit)

Full details of fault

Invoice number (if available)

Units should be returned via insured carrier or registered mail (thus allowing a trace to be made if the Processor is lost in transit), with shipping costs and insurance arranged at your own risk and expense. Goods in transit are the responsibility of the sender and the supplier will not be responsible for transit losses.

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Please clearly state the return number on the outside packaging and on any accompanying documentation. This will greatly speed up processing.

***IMPORTANT: DO NOT return a unit for warranty repair without first obtaining a Return Authorization Number. No action will be taken on a unit returned in warranty for repair without a Return Authorization Number.***

## 13 WARRANTY POLICY

LIMITED WARRANTY – With the exceptions noted in the next paragraph, Knox Video warrants the original purchaser that the equipment it manufactures or sells will be free from defects in materials and workmanship for a period of two years from the date of purchase. Should this product, in Knox Video, opinion, prove defective within this warranty period, at its option, it will repair or replace this product without charge. Any defective parts replaced become the property of Knox Video. 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.

Items integrated into Knox Video products that are made by other manufacturers, notably computer hard drives and liquid crystal display panels, are limited to the term of the warranty offered by the respective manufacturers. Such specific warranties are available upon request.

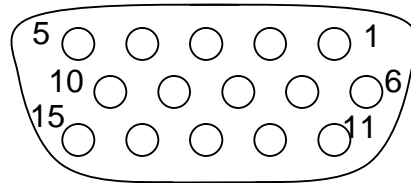
If repairs are necessary under this warranty policy, the original purchaser must obtain a Return Authorization Number and return the product to a location designated by freight prepaid. After repairs are complete, the product will be returned, freight prepaid.

**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. Knox Video assumes no liability to distributors, resellers or end-users or any third parties for any loss of use, revenue or profit.

Knox Video 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 Knox Video with respect to any defective products will be limited to the repair or replacement of such products. In no event shall Knox Video 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.

## 14 CONNECTOR PINOUTS

### 14.1 HD15 connector



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

### 14.2 RS232 / D9 socket

16. N/C
17. TX (Transmit data)
18. RX (Receive data)
19. N/C
20. GND (Signal return)
21. N/C
22. CTS (Clear to send)
23. RTS (Request to send)
24. N/C

### 14.3 4 Pin mini-DIN S-video connector (YC) input

1. Y (Luminance)
2. GND
3. GND
4. C (Chrominance)

## 15 SPECIFICATIONS

See product front and rear diagrams for details of product I/O. Not all units in the series have all the inputs and outputs listed here.

### 15.1 Video Inputs

Input impedance: 75 Ohm

Television standards supported: NTSC and PAL

Composite video via BNC

S-Video (YC) via 4-Pin mini-DIN Connector

CV/YC video decoder: 8-bit Digital

De-Interlacing (NTSC / PAL up-conversion only): pixel-level motion adaptive

Comb filter decoding: adaptive

Film mode (NTSC) 3:2 pull down for up-conversion

CV/YC Video adjustments: contrast, brightness, saturation, hue (NTSC)

CV/YC sub-carrier lock range: +/- 200Hz for NTSC Operation, +/- 250Hz for PAL Operation

### 15.2 Computer Input

Analog RGB/YPbPr via HD15 into 75 Ohm, 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.

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

Scan Rate Detection: automatic

PC Resolutions: any up to 2048x2048

HDTV Resolutions: any up to 1080p

Max horizontal scan rate: 150kHz

### 15.3 Video Outputs (not present on all units)

Output impedance 75 Ohm

Television standards supported: NTSC and PAL

Composite Video 1v p-p via BNC

S-Video (YC) 1v p-p via 4-pin mini-DIN

CV/YC Video encoder: 8/10-bit Digital

### 15.4 Computer Outputs

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

PC Resolutions: any up to 2048x2048 (user adjustable)  
HDTV Resolutions: any up to 1080p  
Vertical Refresh Rate: any to 250Hz

### **15.5 Locking/Mixing**

CV/YC SC/H phase adjustments: +/- 180 degrees (for units with CV/YC output only)  
Keyer: chromakey (YUV) or lumakey (Y)  
Mixer: PC / Video, foreground/background swappable  
PIP: variable window size & position – single-button enabling  
(Not all locking/mixing combinations are available: you cannot overlay one CV or YC source over a different CV or YC source, or one RGB/YUV source over another RGB/YUV source – you are restricted to overlaying CV/YC over RGB/YUV, or RGB/YUV over CV/YC (the exception is where you can overlay one source over itself).

### **15.6 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)  
Sampling rate: 108MHz maximum  
Digital sampling: 24-bit, 4:4:4 format  
Firmware memory: flash, upgradeable via RS-232

### **15.7 Warranty**

See warranty policy for further details..

### **15.8 Regulatory Compliance**

Main unit conforms to FCC, CE, RoHS

### **15.9 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

### **15.10 Power Requirement**

External power supply: 12V DC @1A maximum.

Actual current consumption varies between units.

Internal over-voltage & over-current protection.

Full PSU specification: 12v DC regulated 1Amp PSU with a 2.5mm locking center-pin positive DC power connector. A non-locking 2.5mm DC power connector will also fit.

### **15.11 Control Methods**

The unit can be controlled locally via the front panel buttons and on-screen display (OSD), remotely via the RS-232 interface (as applicable) using a D9 female connector or again remotely via the Infrared remote using the infra-red remote unit.

### **15.12 Accessories Included**

Varies depending on unit – see earlier in manual

### **15.13 Mechanical**

Size (H x W x D): 1.2"x7.9"x3.5" (30x200x90mm)

Weight (Net): 1.3 lbs (580g)

## 16 CONTACT INFORMATION

Should you have any questions or require assistance with this product in areas not covered by this manual, please contact:

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