

# Extron® Electronics

INTERFACING, SWITCHING AND DISTRIBUTION



## User's Manual



# *VSC 200/200D*

# *VSC 300/300D*

**Video Scan Converters**

# Precautions

## Safety Instructions • English



This symbol is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.



This symbol is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

### Caution

**Read Instructions** • Read and understand all safety and operating instructions before using the equipment.

**Retain Instructions** • The safety instructions should be kept for future reference.

**Follow Warnings** • Follow all warnings and instructions marked on the equipment or in the user information.

**Avoid Attachments** • Do not use tools or attachments that are not recommended by the equipment manufacturer because they may be hazardous.

## Consignes de Sécurité • Français



Ce symbole sert à avertir l'utilisateur que la documentation fournie avec le matériel contient des instructions importantes concernant l'exploitation et la maintenance (réparation).



Ce symbole sert à avertir l'utilisateur de la présence dans le boîtier de l'appareil de tensions dangereuses non isolées posant des risques d'électrocution.

### Attention

**Lire les instructions** • Prendre connaissance de toutes les consignes de sécurité et d'exploitation avant d'utiliser le matériel.

**Conservier les instructions** • Ranger les consignes de sécurité afin de pouvoir les consulter à l'avenir.

**Respecter les avertissements** • Observer tous les avertissements et consignes marqués sur le matériel ou présentés dans la documentation utilisateur.

**Éviter les pièces de fixation** • Ne pas utiliser de pièces de fixation ni d'outils non recommandés par le fabricant du matériel car cela risquerait de poser certains dangers.

## Sicherheitsanleitungen • Deutsch



Dieses Symbol soll den Benutzer auf wichtige Anleitungen zur Bedienung und Wartung (Instandhaltung) in der Dokumentation hinweisen, die im Lieferumfang dieses Gerätes enthalten ist.



Dieses Symbol soll den Benutzer darauf aufmerksam machen, daß im Inneren des Gehäuses dieses Produktes gefährliche Spannungen, die nicht isoliert sind und die einen elektrischen Schock verursachen können, herrschen.

### Achtung

**Lesen der Anleitungen** • Bevor Sie das Gerät zum ersten Mal verwenden, sollten Sie alle Sicherheits- und Bedienungsanleitungen genau durchlesen und verstehen.

**Aufbewahren der Anleitungen** • Die Sicherheitsanleitungen sollten aufbewahrt werden, damit Sie später darauf zurückgreifen können.

**Befolgen der Warnhinweise** • Befolgen Sie alle Warnhinweise und Anleitungen auf dem Gerät oder in der Benutzerdokumentation.

**Keine Zusatzgeräte** • Verwenden Sie keine Werkzeuge oder Zusatzgeräte, die nicht ausdrücklich vom Hersteller empfohlen wurden, da diese eine Gefahrenquelle darstellen können.

## Instrucciones de seguridad • Español



Este símbolo se utiliza para advertir al usuario sobre instrucciones importantes de operación y mantenimiento (o cambio de partes) que se desean destacar en el contenido de la documentación suministrada con los equipos.



Este símbolo se utiliza para advertir al usuario sobre la presencia de elementos con voltaje peligroso sin protección aislante, que puedan encontrarse dentro de la caja o alojamiento del producto, y que puedan representar riesgo de electrocución.

### Precaucion

**Leer las instrucciones** • Leer y analizar todas las instrucciones de operación y seguridad, antes de usar el equipo.

**Conservar las instrucciones** • Conservar las instrucciones de seguridad para futura consulta.

**Obedecer las advertencias** • Todas las advertencias e instrucciones marcadas en el equipo o en la documentación del usuario, deben ser obedecidas.

**Evitar el uso de accesorios** • No usar herramientas o accesorios que no sean específicamente recomendados por el fabricante, ya que podrían implicar riesgos.

### Warning

**Power sources** • This equipment should be operated only from the power source indicated on the product. This equipment is intended to be used with a main power system with a grounded (neutral) conductor. The third (grounding) pin is a safety feature, do not attempt to bypass or disable it.

**Power disconnection** • To remove power from the equipment safely, remove all power cords from the rear of the equipment, or the desktop power module (if detachable), or from the power source receptacle (wall plug).

**Power cord protection** • Power cords should be routed so that they are not likely to be stepped on or pinched by items placed upon or against them.

**Servicing** • Refer all servicing to qualified service personnel. There are no user-serviceable parts inside. To prevent the risk of shock, do not attempt to service this equipment yourself because opening or removing covers may expose you to dangerous voltage or other hazards.

**Slots and openings** • If the equipment has slots or holes in the enclosure, these are provided to prevent overheating of sensitive components inside. These openings must never be blocked by other objects.

**Lithium battery** • There is a danger of explosion if battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

### Avertissement

**Alimentations** • Ne faire fonctionner ce matériel qu'avec la source d'alimentation indiquée sur l'appareil. Ce matériel doit être utilisé avec une alimentation principale comportant un fil de terre (neutre). Le troisième contact (de mise à la terre) constitue un dispositif de sécurité : n'essayez pas de le contourner ni de le désactiver.

**Déconnexion de l'alimentation** • Pour mettre le matériel hors tension sans danger, déconnectez tous les cordons d'alimentation de l'arrière de l'appareil ou du module d'alimentation de bureau (s'il est amovible) ou encore de la prise secteur.

**Protection du cordon d'alimentation** • Acheminer les cordons d'alimentation de manière à ce que personne ne risque de marcher dessus et à ce qu'ils ne soient pas écrasés ou pincés par des objets.

**Réparation-maintenance** • Faire exécuter toutes les interventions de réparation-maintenance par un technicien qualifié. Aucun des éléments internes ne peut être réparé par l'utilisateur. Afin d'éviter tout danger d'électrocution, l'utilisateur ne doit pas essayer de procéder lui-même à ces opérations car l'ouverture ou le retrait des couvercles risquent de l'exposer à de hautes tensions et autres dangers.

**Fentes et orifices** • Si le boîtier de l'appareil comporte des fentes ou des orifices, ceux-ci servent à empêcher les composants internes sensibles de surchauffer. Ces ouvertures ne doivent jamais être bloquées par des objets.

**Lithium Batterie** • Il a danger d'explosion s'il y a un remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un ype équivalent recommandée par le constructeur. Mettre au reut les batteries usagées conformément aux instructions du fabricant.

### Vorsicht

**Stromquellen** • Dieses Gerät sollte nur über die auf dem Produkt angegebene Stromquelle betrieben werden. Dieses Gerät wurde für eine Verwendung mit einer Hauptstromleitung mit einem geerdeten (neutralen) Leiter konzipiert. Der dritte Stift oder Kontakt ist für einen Erdschluß, und stellt eine Sicherheitsfunktion dar und sollte nicht umgangen oder außer Betrieb gesetzt werden.

**Stromunterbrechung** • Um das Gerät auf sichere Weise vom Netz zu trennen, sollten Sie alle Netzkabel aus der Rückseite des Gerätes oder aus dem Desktop-Strommodul (falls dies möglich ist) oder aus der Wandsteckdose ziehen.

**Schutz des Netzkabels** • Netzkabel sollten stets so verlegt werden, daß sie nicht im Weg liegen und niemand darauf treten kann oder Objekte darauf- oder unmittelbar dagegengestellt werden können.

**Wartung** • Alle Wartungsmaßnahmen sollten nur von qualifiziertem Servicepersonal durchgeführt werden. Im Inneren des Gerätes sind keine Teile enthalten, die vom Benutzer gewartet werden können. Zur Vermeidung eines elektrischen Schocks versuchen Sie in keinem Fall, dieses Gerät selbst zu warten, da beim Öffnen oder Entfernen der Abdeckungen die Gefahr eines elektrischen Schlags oder andere Gefahren bestehen.

**Schlitze und Öffnungen** • Wenn das Gerät Schlitze oder Löcher im Gehäuse aufweist, dienen diese zur Vermeidung einer Überhitzung der empfindlichen Teile im Inneren. Diese Öffnungen dürfen niemals von anderen Objekten blockiert werden.

**Lithium-Batterie** • Explosionsgefahr, falls die Batterie nicht richtig ersetzt wird. Ersetzen Sie nur durch die gleiche oder einen vergleichbaren Batterietyp, der auch vom Hersteller empfohlen wird. Entsorgung der verbrauchten Batterien bitte gemäß den Herstelleranweisungen.

### Advertencia

**Alimentación eléctrica** • Este equipo debe conectarse únicamente a la fuente/tipo de alimentación eléctrica indicada en el mismo. La alimentación eléctrica de este equipo debe provenir de un sistema de distribución general con conductor neutro a tierra. La tercera pata (puesta a tierra) es una medida de seguridad, no puentearla ni eliminarla.

**Desconexión de alimentación eléctrica** • Para desconectar con seguridad la acometida de alimentación eléctrica al equipo, desenchufar todos los cables de alimentación en el panel trasero del equipo, o desenchufar el módulo de alimentación (si fuera independiente), o desenchufar el cable del receptáculo de la pared.

**Protección del cables de alimentación** • Los cables de alimentación eléctrica se deben instalar en lugares donde no sean pisados ni apretados por objetos que se puedan apoyar sobre ellos.

**Reparaciones/mantenimiento** • Solicitar siempre los servicios técnicos de personal calificado. En el interior no hay partes a las que el usuario deba acceder. Para evitar riesgo de electrocución, no intentar personalmente la reparación/mantenimiento de este equipo, ya que al abrir o extraer las tapas puede quedar expuesto a voltajes peligrosos u otros riesgos.

**Ranuras y aberturas** • Si el equipo posee ranuras o orificios en su caja/alojamiento, es para evitar el sobrecalentamiento de componentes internos sensibles. Estas aberturas nunca se deben obstruir con otros objetos.

**Batería de litio** • Existe riesgo de explosión si esta batería se coloca en la posición incorrecta. Cambiar esta batería únicamente con el mismo tipo (o su equivalente) recomendado por el fabricante. Desachar las baterías usadas siguiendo las instrucciones del fabricante.

# Quick Start — VSC 200/200D/300/300D

## Installation

### Step 1

Install feet on the bottom of the scan converter (1A), or mount the scan converter in a rack (1B).

### Step 2

Turn off power to the input and output devices, and remove their power cords.

### Step 3

Attach the input and output devices to the scan converter:

Input cabling (3A):

1. Connect the local monitor to its corresponding (Mac or VGA) 15-pin input/loop-out (loop-through) connector. (For 13W3, use the VGA/13W3 cable provided with the VSC 300/300D.)
2. Connect the computer to the scan converter's other input connector. (For 13W3, use the Mac/13W3 cable that is provided with the VSC 300/300D.)

If no local monitor is installed, set the 75 ohm/Hi Z switch to **75W** (3C).

Output options (3B) are:

Composite video (connected to VIDEO) and only any one of the following:

S-video (connected to S-VIDEO)

Digital (connected to D1; VSC 200D/300D)

Component (connected to R/R-Y, G/Y, and B/B-Y)

RGsB (connected to R/R-Y, G/Y, and B/B-Y)

RGBS (connected to R/R-Y, G/Y, B/B-Y, and H/HV)

RGBHV (connected to R/R-Y, G/Y, B/B-Y, H/HV, and V)

Scaled VGA (connected to VGA OUT; VSC 300/300D)

### Step 4

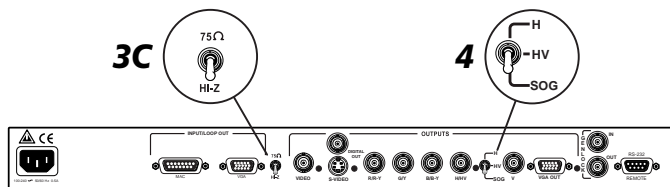
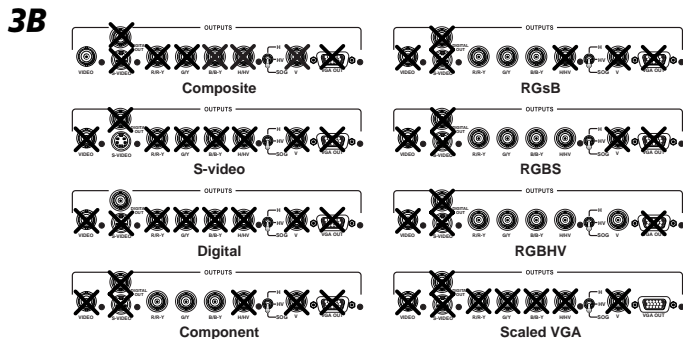
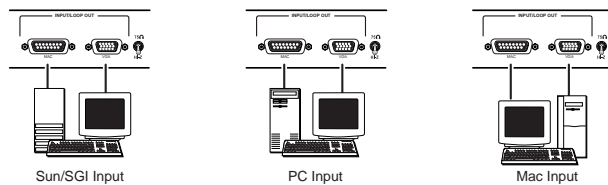
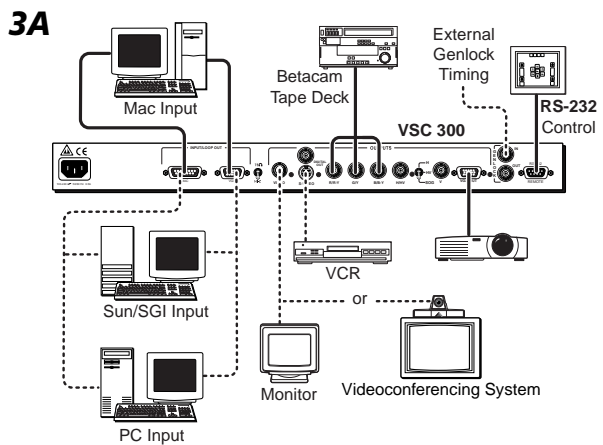
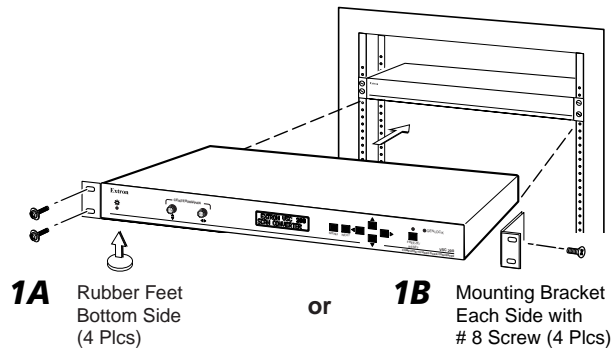
For RGsB, RGBS, or RGBHV output, set the sync selection switch (4). (H = RGBHV, HV = RGSB, SOG = RGsB.)

### Step 5

Plug all of the devices into a grounded AC source, and turn on the input and output devices.

### Step 6

Use the LCD menu screens to configure the scan converter (see the next page).



## Quick Start — VSC 200/200D/300/300D, cont'd

### Using the LCD Screen

The scan converter's LCD screen informs you of status changes, allows you to configure the scan converter, and provides access to menus that allow you to adjust the image. The screen normally cycles through two default screens continuously. The first displays the scan converter model, and the second displays the output frequencies. If the video scan rate is out of range, the default cycle screens change to "Signal Out of Range" followed by the output frequency screen.

The Menu button allows you to exit the default screens and advance from one menu to the next. The Next button allows you to step through the adjustment/selection screens within a menu. The front panel cursor buttons (Up, Down, Left, and Right) can be used from the menu screens to make adjustments and set parameters. The menu sequence is:

Menu button: **Zoom/size/pan controls**

Next button: Zoom — Adjust the magnification of an image.

Next button: Size — Adjust the horizontal and vertical dimensions of the image.

Next button: Centering/pan — Shift the horizontal and vertical position of the image.

Menu button: **Filter controls**

Next button: Horz. filter — Select from any of 4 (VSC 200/200D) or 8 (VSC 300/300D) filters. Select the filter that improves the image detail the most.

Next button: Vertical filter — Select from any of 5 (VSC 200/200D) or 10 (VSC 300/300D) filters. Select the filter that reduces the amount of image flicker the most.

Menu button: **Configuration controls**

Next button: Output res. — Select an output resolution (VSC 300/300D only):

NTSC/PAL, 15 kHz	Macintosh, 832 x 624	XGA, 1024 x 768
VGA, 640 x 480	Plasma, 852 x 480	HDTV, 720p
SVGA, 800 x 600		

Next button: Output — Select the format used by the output device: SVID (S-video), RGB (RGsB, RGBs, RGBHV), or YUV (component video; R-Y, G, B-Y).

Next button: Standard — Select NTSC or PAL.

Next button: Encoder filter — Select from any of 3 encoder filters. Select the filter that provides the sharpest overall image.

Next button: Phase adjust — Adjust the horizontal phase and subcarrier phase. Press Up or Down to adjust the horizontal phases. Press Left or Right to adjust the subcarrier phases. See "Setting Up Genlock and Vertical Interval Switching" on page 3-6.

Next button: System reset — Erase all user preset memory. (Resetting does not affect factory presets.) Press Up and Down simultaneously to continue to the *confirm reset* screen, or press Next to cancel the system reset.

Next button: Confirm reset — Confirm that you want to perform a system reset. Press Up and Down simultaneously to perform the system reset, or press Next to cancel the system reset.

### Front Panel Controls

**Centering/pan controls** — Shifts the physical position of the displayed image vertically and horizontally if the default cycle or the *centering/pan* screen is active.

**Freeze/reset** — Locks the output display to the current image if the default cycle is active. When the freeze function is active, the freeze LED is lit. To freeze the image, press the Freeze/reset button once. To unfreeze the image, press the Freeze/reset button again.

If the zoom, size, or *centering/pan* screen is active, pressing the Freeze/reset button resets the adjustments for all three of the screens.

If the *horizontal filter*, *vertical filter*, or any *output resolution* screen is active, pressing the Freeze/reset button resets the setting of only the active screen.

**Executive mode** — Makes the LCD menus unavailable. To enable executive mode, press Up and Down simultaneously. To disable executive mode, press Up and Down simultaneously again.

When executive mode is enabled, the centering/pan controls and the RS-232 port remain active.

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VSC 200/200D/300/300D

# 1

## Chapter One

### Introduction

Features

# Introduction

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This manual contains installation, configuration, and operation information for Extron's VSC 200, VSC 200D, VSC 300, and VSC 300D scan converters.

The VSC 200 and VSC 300 down-convert computer video to NTSC or PAL format, which can be recorded, used for videoconferencing, or viewed on an NTSC or PAL monitor or other display device. The VSC 300 also outputs VGA/SVGA for display on a PC or Mac monitor.

An optional digital module adds a digital video output. The VSC 200D and the VSC 300D models include the module, and the VSC 200 and VSC 300 models can be upgraded to include the module. The upgrade can be performed as a field upgrade, or the scan converter can be returned to Extron for upgrade.

## Features

**Autoscanning** — Automatically recognizes and converts the incoming computer image. The VSC 200/VSC 200D supports up to 1280 x 1024 resolution, 70 kHz horizontal and 120 Hz vertical scan rates. The VSC 300/300D supports up to 1600 x 1280 resolution, 100 kHz horizontal and 120 Hz vertical scan rates.

**NTSC and PAL output** — The scan converters are compatible with any display or recording device that uses the NTSC or PAL standard.

**VGA/Mac input** — Accepts 15-pin D and HD connectors, allowing easy connection to most computers. The passive local monitor output allows you to display the same image on the local monitor as is displayed or recorded on an external device.

**13W3 compatible** — Using the VGA/13W3 cable and Mac/13W3 cable that are provided with the VSC 300/300D, a 13W3 computer and local monitor can be attached.

**High quality zoom control** — Uses increased pixel clocking for variable zoom, providing better quality of the displayed image.

**Horizontal and vertical controls** — Provides controls for sizing and centering the image. This provides increased flexibility for panning across the image while zooming.

**Horizontal and vertical filtering** — The VSC 200/200D provides four levels of horizontal and five levels of vertical filter control. The VSC 300/300D provides eight levels of horizontal and ten levels of vertical filter control. These user-selectable filtering controls reduce flicker and ensure that no picture detail is dropped during scan conversion.

**High quality color sampling** — Uses 24-bit sampling and provide 8 bits per color, for a total of 16.8 million colors.

**Memory presets** — Uses approximately 130 memory locations to store presets that include size, zoom, pan, centering, and filter control settings for various scan rates. The user can specify 30 of these presets, and the remainder were set at the factory. The scan converter automatically loads the control settings from the preset associated with the scan rate of the input video signal.

**RS-232 control** — Provides control for third-party remote control of features and functions that can be programmed by using Extron's Simple Instruction Set™ (SIS™) or Extron's control software for Windows.

**Outputs** — Outputs NTSC and PAL video as composite, Y/C (S-video), component (R-Y, B-Y, Y), and RGBHV. The VSC 300 and VSC 300D also output scalable SVGA/VGA.



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**Genlock** — Allows the integration of the scan converted images into a professional broadcast environment. Genlocking provides for seamless vertical interval switching of converted high resolution sources with other video sources.

**Digital video output** (optional) — Available as standard on the VSC 200D and VSC 300D, or can be added to the VSC 200 and VSC 300 via the VSC 200/300 D1 Module.

**LCD menu display** — Informs you of status changes, allows you to configure the scan converter, and provides access to menus that allow you to adjust the image.

# Introduction, cont'd

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VSC 200/200D/300/300D

# Chapter Two

## Installation

Front and Rear Panels

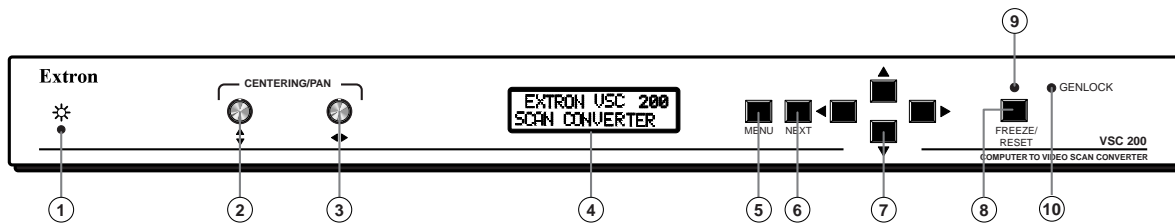
Installation Overview

Cable Connector Pin Assignments

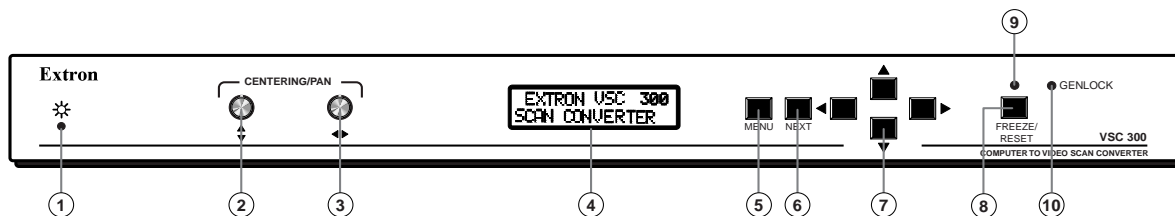
# Installation

## Front and Rear Panels

### Front panel features



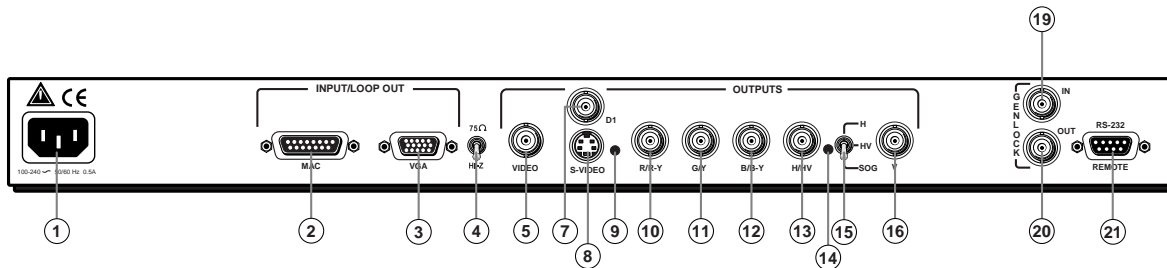
**Figure 1 — VSC 200/200D front panel**



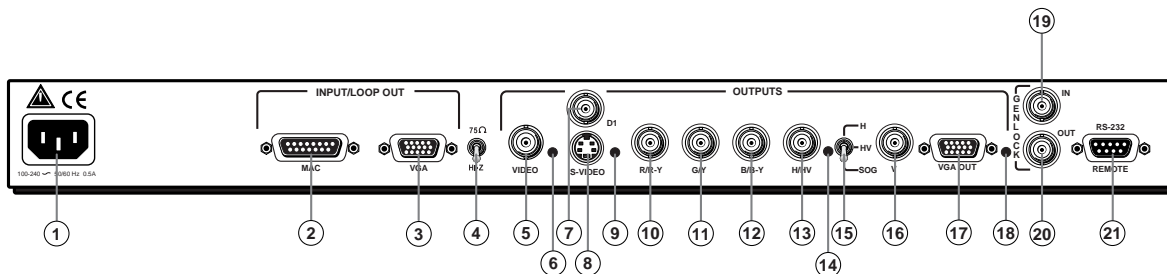
**Figure 2 — VSC 300/300D front panel**

- ① **Power indicator LED** — Lights to indicate that the scan converter is receiving power.
- ② **Vertical centering/pan control** — Allows you to pan or center the image vertically. See “Front panel controls” on page 3-4 for more information.
- ③ **Horizontal centering/pan control** — Allows you to pan or center the image horizontally. See “Front panel controls” on page 3-4 for more information.
- ④ **LCD** — Displays status information and menu screens. See “Front Panel Operation” on page 3-2 for more information.
- ⑤ **Menu button** — Steps through the LCD menus. See “Using the LCD Menus” on page 3-2 for more information.
- ⑥ **Next button** — Steps through LCD screens within a menu. See “Using the LCD Menus” on page 3-2 for more information.
- ⑦ **Cursor buttons** — Allow you to adjust the image and select video parameters. See “Using the LCD Menus” on page 3-2 for more information.
- ⑧ **Freeze/reset button** — Freezes/unfreezes the displayed image, or resets the zoom and size values. See “Front panel controls” on page 3-4 for more information.
- ⑨ **Freeze LED** — Lights to indicate the that the freeze feature is active.
- ⑩ **Genlock LED** — Lights to indicate that a valid reference signal is present on the genlock input BNC. See “Setting Up Genlock and Vertical Interval Switching” on page 3-6.

## Rear panel features



**Figure 3 — VSC 200/200D rear panel**



**Figure 4 — VSC 300/300D rear panel**

- ① **AC power connector** — Standard AC power connector attaches the scan converter to any power source from 100VAC to 240VAC, operating at 50 Hz or 60 Hz.
- ② **15-pin D connector** — Mac input/loop out (loop through) computer video connector.
- ③ **15-pin HD connector** — VGA input/loop out (loop through) computer video connector.
- ④ **75 ohm/Hi-Z switch** — Provides termination for computer video input. Set the switch to **75Ω** if no local monitor is attached to the scan converter. Set the switch to **Hi-Z** if a local monitor is attached.
- ⑤ **Composite video output connector**
- ⑥ **Composite video LED (VSC 300/300D only)** — Lights to indicate that the composite video output is active.
- ⑦ **Digital video output (ITU-R BT.601) connector (VSC 200D/300D only)** — Follows composite video out: If composite video is active, digital video is active.
- ⑧ **S-video output connector**
- ⑨ **S-video LED** — Lights to indicate that the S-video output is active.
- ⑩ **R/R-Y output connector** — Red video output (RGB) or R-Y video output (component video).
- ⑪ **G/Y output connector** — Green video output (RGB) or Y video output (component video).
- ⑫ **B/B-Y output connector** — Blue video output (RGB) or B-Y video output (component video).
- ⑬ **H/HV output connector** — Horizontal sync output (RGBHV) or composite sync output (RGS).

## Installation, cont'd

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- ⑭ **RGB/R-Y, Y, B-Y LED** — Lights to indicate that the RGB or component video output is active.

**NOTE** *Component video (R-Y, Y, B-Y) is referred to as YUV in the front panel LCD menus.*

- ⑮ **Sync selection switch** — Allows you to choose how the sync output signals for RGSB/RGBS/RGBHV are routed:
  - H** — If the switch is set to **H**, the scan converter outputs separate horizontal and vertical sync signals; only horizontal sync is routed through the H/HV output connector.
  - HV** — If the switch is set to **H/V**, the scan converter outputs a composite sync signal (H and V combined) on the H/HV output connector.
  - SOG** — If the switch is set to **SOG** (sync on green), the scan converter outputs a composite sync signal on the green video signal via the G/Y output connector.
- ⑯ **V output connector** — Vertical sync output (RGBHV).
- ⑰ **15-pin VGA output connector (VSC 300/300D only)** — Scaled VGA output.
- ⑱ **VGA LED (VSC 300/300D only)** — Lights to indicate that the VGA output is active.
- ⑲ **Genlock input connector** — Genlock reference signal input.
- ⑳ **Genlock output connector** — Passes the genlock reference signal to the next device. If the signal is not passed to another device, connect a 75-ohm termination adapter.
- ㉑ **RS-232 connector** — 9-pin D female connector that allows you to attach a computer or controlling device for remote control of the scan converter.

## Installation Overview

To install the scan converter, follow these general steps:

- 1 If desired, mount the scan converter in a rack (see “Mounting the scan converter” on page 2-5). Otherwise, install the rubber feet (see “Tabletop/desktop placement” on page 2-6).
- 2 Turn off power to the input and output devices, and unplug the power cables from them.
- 3 Attach the input device and the output device to the scan converter. See “Cabling” on page 2-6.
- 4 Set the configuration switches.
- 5 Plug the scan converter, input device, and output device into a grounded AC source.
- 6 Turn on the input and output devices.
- 7 Use the LCD menu screens to configure the scan converter. See “Front Panel Operation”, page 3-2.
- 8 The image from the input device should appear on the output device. If it does not, double check steps 3 and 4 and make adjustments as needed. See chapter 5 for additional assistance.
- 9 Optimize the image for your display environment. See “Optimizing the image” on page 3-5.

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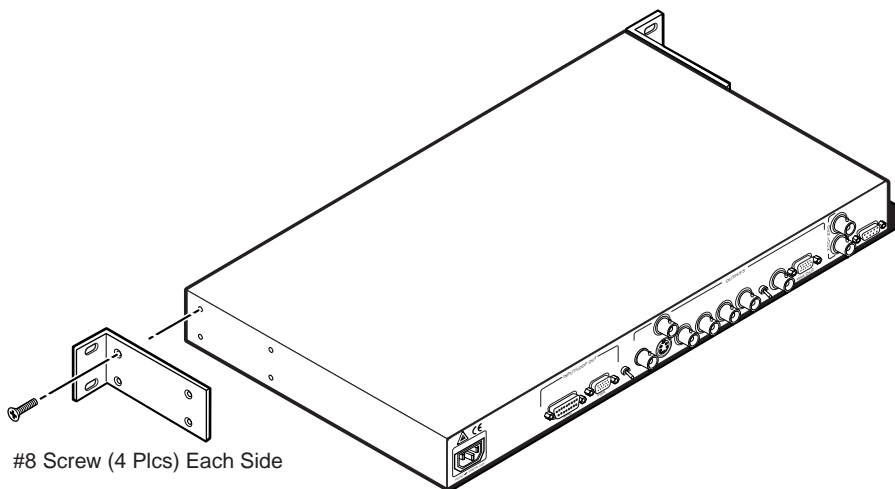
## Mounting the scan converter

The scan converter ships with four uninstalled rubber feet. If you are going to rack mount the unit, do so before cabling the unit, and do not install the rubber feet. If you are not rack mounting the scan converter, skip to “Tabletop/desktop placement” on page 2-6.

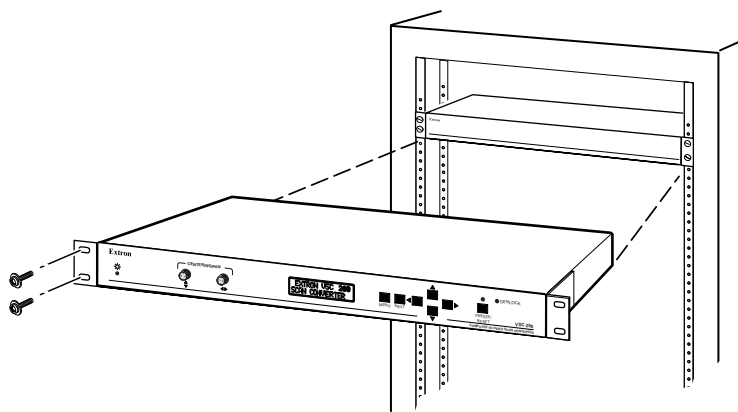
### Rack mounting

To rack mount the scan converter, do the following:

1. Attach the mounting brackets (supplied with the scan converter) on either side of the scan converter, as shown in figure 5. Use four screws per mounting bracket.



**Figure 5 — Installing mounting brackets**



**Figure 6 — Mounting the scan converter**

2. Using two screws per mounting bracket, attach the scan converter to the rack as shown in figure 6.

# Installation, cont'd

## Tabletop/desktop placement

For tabletop or desktop placement, install the self-adhesive rubber feet/pads (provided) onto the four corners of the bottom of the enclosure.

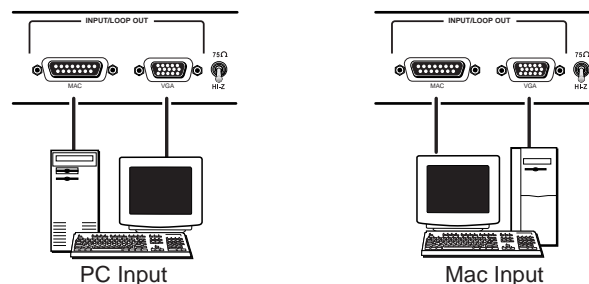
## Cabling

The scan converter connects to a source computer, such as a Macintosh or VGA-type personal computer or a Sun workstation, and to an output device, such as a video recorder, videoconferencing system, CRT monitor, or LCD projector. Figure 10 shows the entire system as it looks after it is hooked up.

1. For a Mac or VGA-type PC, connect the local monitor to its corresponding (Mac or VGA) 15-pin input/ loopout connector on the scan converter's rear panel, using the monitor's video cable.

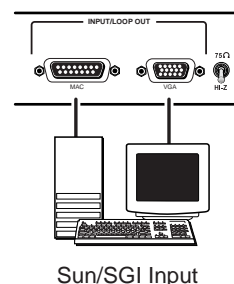
For a Sun workstation, connect the 13W3 end of the VGA/13W3 cable (provided with the VSC 300/300D) to the local monitor, and connect the VGA end to the HD 15-pin input/loopout connector (VGA).

2. For a Mac or VGA-type PC, connect the computer to the scan converter's other input connector, using the included Mac-VGA cable. See figure 7 and the pin assignment information on page 2-9.
  - If the source computer is a Macintosh, plug the VGA (15-pin HD) end of the Mac-VGA cable into the scan converter, and plug the other (15-pin D) end into the computer's video output connector.
  - If the source computer is a VGA-type PC, plug the Mac (15-pin D) end of the Mac-VGA cable into the scan converter, and plug the other (15-pin HD) end into the computer's video output connector.



**Figure 7 — Mac-VGA cable local monitor connections**

For a Sun workstation, connect the 13W3 end of the Mac/13W3 cable (provided with the VSC 300/300D) to the computer, and connect the Mac end to the 15-pin D connector (Mac; figure 8).



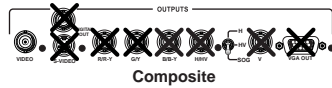
**Figure 8 — Sun workstation local monitor connections**



If a local monitor will not be used, set the 75 ohm/Hi Z switch to 75  $\Omega$ .

**NOTE** *If no input signal is present, by default the output display is blank. However, using RS-232 commands, you can set the scan converter to display NTSC/PAL composite video color bars when no input signal is present. See the command/response table on page 4-4 for details.*

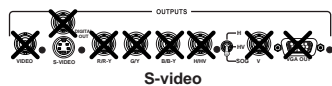
3. Connect a composite video display or recording device to the composite video output connector.



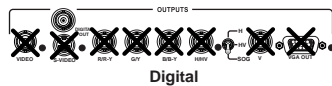
4. Select the format of the second output using the output configuration menu. If RGB video, set the sync selection switch.
5. Connect a cable from the input of the second video display or recording device (projector, monitor, VCR, etc.) to the appropriate rear panel output connectors on the scan converter.

**NOTE** *Only one of the following is available at a time.*

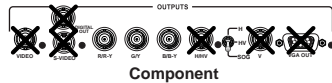
**S-video** — Connect a coax cable to the S-video connector.



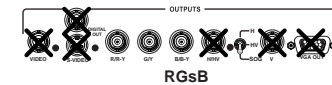
**Digital video (VSC 200D and 300D only)** — Connect a coax cable to the D1 connector.



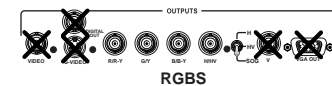
**Component video** — Connect coax cables to the R/R-Y, G/Y, and B/B-Y connectors.



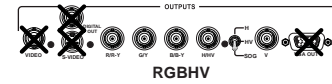
**RGsB** — Connect coax cables to the R/R-Y, G/Y, and B/B-Y connectors.



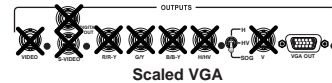
**RGBS** — Connect coax cables to the R/R-Y, G/Y, B/B-Y, and H/HV (composite sync) connectors.



**RGBHV** — Connect coax cables to the R/R-Y, G/Y, B/B-Y, H/HV, and V connectors.



**Scaled VGA** — Connect a 15-pin HD cable to the scan converter's 15-pin HD connector (VSC 300/300D only).

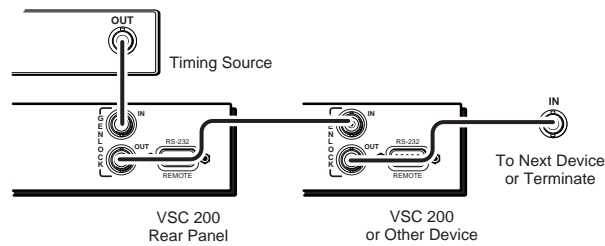


**WARNING** *Connect cables for only one output in addition to the composite video output. Do not connect cables to the outputs that will not be used for your application. Connecting cables to more outputs will overload the circuits and yield weak signals.*

## Installation, cont'd

6. Connect the coax cable from the genlock device (or the genlock output of another device that shares the genlock signal) to the Genlock In connector. If no genlock device will be used, do not attach cables to these connectors.

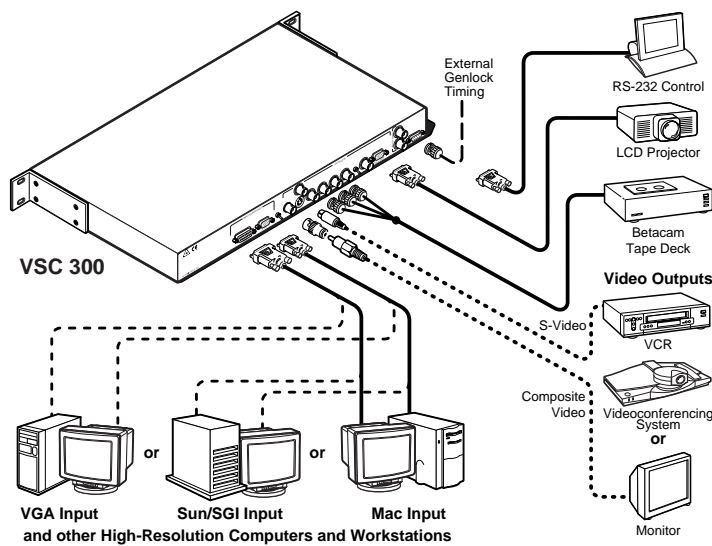
If another device in the system will use genlock, connect the device to the Genlock Out connector (figure 9). Otherwise, attach a termination adapter to the Genlock Out connector. If the genlock signal is connected to several devices in a daisy chain configuration, the last device must provide genlock termination. See "Setting Up Genlock and Vertical Interval Switching" on page 3-6.



**Figure 9 — Connecting genlock**

7. If RS-232 control will be used, connect the RS-232 remote control or computer to the RS-232 connector.
8. Connect power cords and turn on all equipment.

Figure 10 shows typical system installation and cable connections.



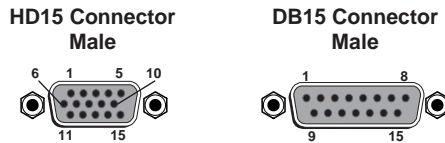
**Figure 10 — Typical scan converter application**

See the next chapter, "Operation", for information on configuring and using the scan converter.

## Cable Connector Pin Assignments

### Mac-HV/VGA cable

Figure 11 shows the pin locations on the 15-pin connectors at opposite ends of the Mac-HV/VGA cable that is used for connecting a computer to the scan converter.



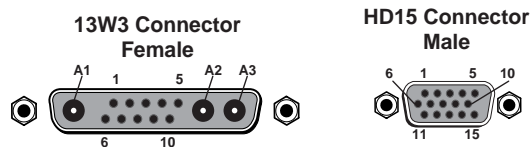
**Figure 11 — VGA (HD15) and Mac (DB15) connector pin locations**

The table below lists signals and their pin assignments for the VGA (15-pin HD) and Mac (15-pin D) connectors of this cable.

VGA Pin	Function	Mac Pin
1	Red video	2
2	Green video	5
3	Blue video	9
4	ID bit	4
5	ID bit	8
6	Red ground	1
7	Green ground	6
8	Blue ground	13
9	Not used	—
10	Composite & vertical sync gnd	11, 14
11	ID bit	7
12	ID bit	10
13	Horizontal sync	15
14	Vertical sync	12
15	ID bit/composite sync	3

### VGA/13W3 cable

Figure 12 shows the pin locations on the 13W3 and 15-pin connectors at opposite ends of the VGA/13W3 cable that is used for local monitor loop-through (VSC 300/300D).



**Figure 12 — 13W3 and VGA (HD15) connector pin locations**

The table on the next page lists signals and their pin assignments for the 13W3 and VGA (15-pin HD) connectors of this cable.

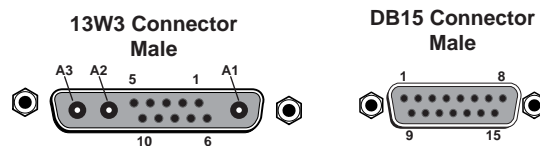
## Installation, cont'd

13W3 Pin	Function	VGA Pin
A1	Red video	1
Gnd	Red ground	*6
A2	Green video	2
Gnd	Green ground	*7
A3	Blue video	3
Gnd	Blue ground	*8
1	ID bit	4
2	Ground	*10
3	ID bit	5
4	ID bit ground	*10
5	Composite sync	13
6	ID bit	11
7	ID bit	12
8	ID bit	14
9	ID bit	15
10	Composite sync ground	*10

\* The ground pins are shorted together, then connected to the shell.

### Mac/13W3 cable

Figure 13 shows the pin locations on the 13W3 and 15-pin connectors at opposite ends of the Mac/13W3 cable that connects the computer to the scan converter (VSC 300/300D).



**Figure 13 — Mac (DB15) and 13W3 connector pin locations**

The table below lists signals and their pin assignments for the 13W3 and Mac (15-pin D) connectors of this cable.

13W3 Pin	Function	Mac Pin
A1	Red video	2
Gnd	Red ground	*1
A2	Green video	5
Gnd	Green ground	*6
A3	Blue video	9
Gnd	Blue ground	*13
1	ID bit	4
2	Ground	*11
3	ID bit	8
4	ID bit ground	*11
5	Composite sync	15
6	ID bit	7
7	ID bit	10
8	ID bit	12
9	ID bit	3
10	Composite sync ground	*14

\* The ground pins are shorted together, then connected to the shell.



VSC 200/200D/300/300D

# Chapter Three

## Operation

Front Panel Operation

Preset Memory

Optimizing the Image

Setting Up Genlock and Vertical Interval Switching

# Operation

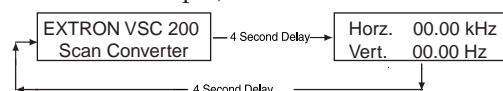
## Front Panel Operation

The front panel includes an LCD screen that displays the current status of the scan converter and the scan rate of the current video input signal. You can also use controls on the front panel to configure the scan converter and control the image display.

**NOTE** Diagrams of the front panels are shown on page 2-2.

### Default screens

By default, the LCD toggles between two screens every four seconds. One screen displays the product name, and the other shows the input frequencies (figure 14 shows an example).

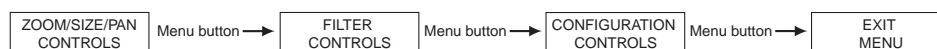


**Figure 14 — Default screens**

### Using the LCD menus

The LCD menus and front panel controls allow you to configure the scan converter and make adjustments to the displayed image.

To access the menus, press the Menu button on the front panel. The *zoom/size/pan controls* menu appears in the LCD screen. If you want to display a different menu, press and release the Menu button until the desired menu appears (figure 15).



**Figure 15 — Selecting a menu**

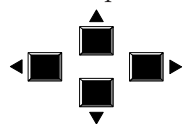
**NOTE** If the signal is out of range, the LCD menus are not available.

After you have selected the desired menu, press the Next button to access the screens that are available within the menu. If you want to display a different screen, press and release the Next button until the desired screen appears (figure 16).

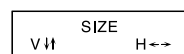


**Figure 16 — Selecting a screen**

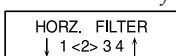
You can press the front panel cursor buttons (Up, Down, Left, and Right) to make adjustments or selections from the menu screens. The menu screens display arrows to indicate the cursor buttons that apply to that adjustment or selection.



For example, the *size* screen indicates that the Up and Down buttons increase or decrease the vertical (V) size, and the Left and Right buttons decrease and increase the horizontal (H) size.



The *horizontal filter* screen indicates that you can press the Up and Down buttons to change the filter selection. The current selection appears in brackets.



You can press the cursor buttons from the default screens to center the displayed output image.

---

### **Zoom/size/pan controls menu**

**Zoom** — Changes the magnification of the image. Press the Up cursor button to zoom in, or press the Down button to zoom out.

**Size** — Increases or decreases the vertical and horizontal dimensions of the displayed image. Press the Up cursor button to increase the vertical size of the image, or press the Down button to decrease the vertical size. Press the Left cursor button to decrease the horizontal size of the image, or press the Right button to increase the horizontal size.

**Centering/pan** — Shifts the physical position of the displayed image vertically and horizontally. Press the Up cursor button to shift the image up, or press the Down button to shift it down. Press the Left cursor button to shift the image to the left, or press the Right button to shift the image to the right.

### **Filter controls menu**

**Horizontal filter** — Applies one of the available filters to improve the detail of the image. The VSC 200/200D provides four levels, and the VSC 300/300D provides eight levels, of horizontal filter control. Press the Up or Down cursor buttons to move through the filters. Choose the filter that provides the most improvement to the image detail.

**Vertical filter** — Applies one of the available filters to decrease flicker in the image. The VSC 200/200D provides five levels, and the VSC 300/300D provides ten levels, of vertical filter control. Press the Up or Down cursor buttons to move through the filters. Choose the filter that provides the greatest reduction of flicker while maintaining image sharpness.

### **Configuration controls menu**

**Output resolutions (VSC 300/300D only)** — Specifies the resolution used by the output device. Press the Up or Down cursor buttons to move through the resolutions:

- NTSC/PAL, 15.75 kHz
- VGA, 640 x 480
- SVGA, 800 x 600
- Macintosh, 832 x 624
- Plasma, 852 x 480
- XGA, 1024 x 768
- HDTV, 720p

**NOTE** *For any choice other than NTSC/PAL, only the VGA 15-pin HD output connector can be used.*

**Output** — Specifies the format used by the output device. Press the Left or Right cursor buttons to move through the formats:

- SVID (S-video)
- RGB (RGsB, RGBS, or RGBHV)
- YUV (component video; R-Y/G/B-Y)

**Standard** — Specifies the video standard used by the output device. Press the Left or Right cursor buttons to move through the standards:

- NTSC
- PAL

## Operation, cont'd

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**Encoder filter** — Applies one of the encoder filters to improve the overall image sharpness. Press the Left or Right cursor buttons to move through the filters:

- STD
- KIL3.58
- HI

**Phase adjust** — Adjusts the signal's horizontal phase (the phasing between the horizontal sync pulses of the video output and the genlock sync pulses) and subcarrier phase (the phasing between the color burst signal of the video output and the genlock color burst signal). Press the Up or Down cursor buttons to adjust the horizontal phase, or press the Left or Right cursor buttons to adjust the subcarrier phase. See "Setting Up Genlock and Vertical Interval Switching" on page 3-6 for more information.

**System reset** — Erases all user preset memory. This has no effect on the factory preset memory. Press the Up and Down cursor buttons simultaneously to reset the system, and the *confirm reset* screen appears. Or, press the Next button to cancel the system reset.

**Confirm reset** — Allows you to confirm that you want to erase all user preset memory. Press the Up and Down cursor buttons simultaneously to reset the system, or press the Next button to cancel the system reset. If you press the Up and Down buttons, the user preset memory is erased.

**NOTE** *If you previously issued an RS-232 command to enable NTSC/PAL composite video color bars, performing a system reset will disable the color bars. To re-enable the color bars, issue the RS-232 command again (see the command/response table on page 4-4 for more information).*

### Front panel controls

**Centering/pan controls** — Shift the physical position of the displayed image vertically and horizontally if the default cycle or the *centering/pan* screen is active.



**Freeze/reset** — Locks the output display to the current image if the default cycle is active. When freeze mode is active, the freeze LED is lit. To freeze the image, press the Freeze/reset button once. To unfreeze the image, press the Freeze/reset button again. No front panel adjustments can be made until freeze mode is inactive.

If the *zoom*, *size*, or *centering/pan* screen is active, pressing the Freeze/reset button resets adjustments for all three of the screens.

If any other screen is active, pressing the Freeze/reset button resets the setting for only the active screen.

**Executive mode** — Makes the LCD menus unavailable. This is useful for situations in which many end users operate the scan converter, and you want to prevent them from changing the adjustments you have made. To enable executive mode, press the Up and Down cursor buttons simultaneously while the default cycle is active. To disable executive mode, press the Up and Down buttons simultaneously again.

When executive mode is enabled, the centering/pan controls, Freeze/reset button, and RS-232 port remain active.



## Preset Memory

The scan converter preset memory contains 130 locations that store scan rates and associated size, zoom, pan, centering, and filter controls. The 30 user presets can be changed or erased. The remaining locations are factory-loaded, permanent presets that cannot be changed or erased.

When a video input is connected, the scan converter automatically scans the user presets and then the factory presets, looking for a match to the input scan rate. If a match is found, the stored settings become the active settings. If no match is found, a user preset is created automatically using the default settings. If the user preset memory is full, the new user preset overwrites the oldest user preset.

If a user preset is active and changes are made to the zoom, size, pan, or filter controls, the changed settings are stored automatically in the preset memory for the active scan rate. If a factory preset is used and changes are made to the zoom, size, pan, or filter controls, a new user preset that includes the new settings is created.

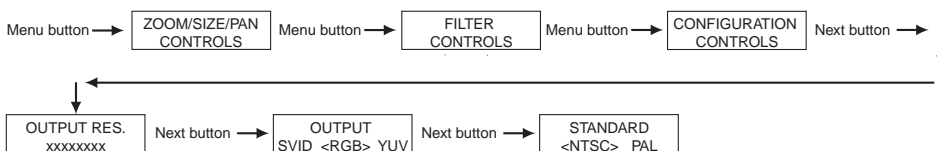
To reset all user presets, perform a system reset (see page 3-4).

**NOTE** *Preset memory does not include selections from the configuration controls menu. The scan converter uses only the most recently applied configuration controls selections.*

## Optimizing the Image

Follow the procedures in this section, in sequence, after you have installed the scan converter. This will help you configure the scan converter for the best settings for your display environment.

1. Select the output standard:
  - a. Press and release the Menu button until the *configuration controls* menu appears.
  - b. Press and release the Next button until the *standard* screen appears.
  - c. Press the Left or Right cursor button to select NTSC or PAL.



**Figure 17 — Selecting the output standard**

2. Size the image to fill the screen:
  - a. Press and release the Menu button.
  - b. Press and release the Next button.
  - c. Press the Left or Right cursor buttons until the image fills the width of the screen. Press the Up or Down cursor buttons until the image fills the height of the screen.

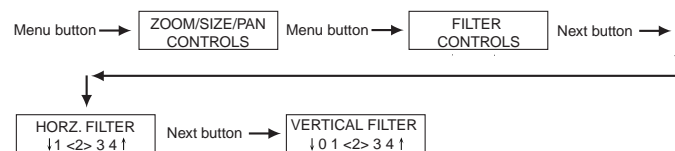
**NOTE** *Turn the rotary knobs to keep the image centered while sizing it.*



**Figure 18 — Sizing the image**

## Operation, cont'd

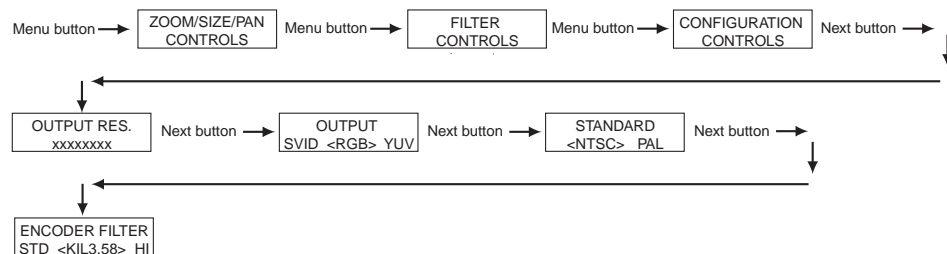
3. Select the filters:
  - a. Press and release the Menu button until the *filter controls* menu appears.
  - b. Press the Next button.
  - c. Press the Up or Down cursor buttons to select the horizontal filter that provides the most improvement to the image detail. You can use an alternating pixel pattern to perform this adjustment.
  - d. Press the Next button.
  - e. Press the Up or Down cursor buttons to select the vertical filter that provides the greatest reduction of flicker while maintaining image sharpness. You can use an image pattern of horizontal lines, such as a crosshatch, to perform this adjustment.



**Figure 19 — Selecting the filters**

**NOTE** *If the filters are set before the image size is adjusted, you must set the filters again after adjusting the image size.*

4. Select the encoder filter:
  - a. Press and release the Menu button until the *configuration controls* menu appears.
  - b. Press and release the Next button until the *encoder filter* screen appears.
  - c. Press the Left or Right cursor buttons to select the encoder filter that provides the sharpest overall image. You can use a text pattern to perform this adjustment.



**Figure 20 — Selecting the encoder filter**

## Setting Up Genlock and Vertical Interval Switching

A genlock (black burst generator) device can be connected to the scan converter to synchronize it with other system components for seamless vertical interval switching between sources.

### Vertical interval switching setup

For vertical interval switching (to allow clean switching between signals from several devices during the vertical blanking period of each signal), a composite sync signal can be applied at the Genlock In connector, and also passed to another device via the Genlock Out connector.

If the genlock connectors are used only for vertical interval switching, no horizontal or subcarrier phase adjustments are required, and the genlock LED does not light.

## Genlock setup

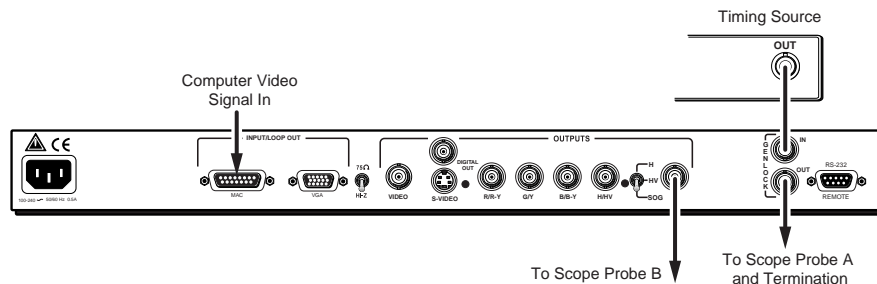
Genlock differs from simple vertical interval switching in that an external device (a black burst generator) generates a reference sync signal for the system, and every device that uses that signal has its output signal's horizontal and subcarrier phases adjusted to exactly match that of the generator to allow precise timing and full synchronization. Genlocked systems produce cleaner switches between inputs than do those without this type of synchronization.

An oscilloscope is required for genlock setup, and a vectorscope is recommended. Waveform monitors of types other than a vectorscope may give the appearance that timing is adjusted correctly when it is 180 degrees out of phase, which will result in incorrect colors or picture artifacts.

**NOTE** *All equipment in the system must be powered up and turned on for at least 15 to 20 minutes before genlock setup adjustments can be made and before the equipment is used in a genlocked application.*

To synchronize the scan converter's video output with a genlock signal, follow these steps:

1. Power up and turn on all the devices that will use the genlock signal. The devices must be on for at least 15 to 20 minutes before proceeding with any adjustments.
2. Connect the active timing source signal to the Genlock In connector on the rear panel (figure 21).



**Figure 21 — Cable connections for genlock setup**

3. Connect the active computer video input signal to the appropriate input as explained in step 2 of the cabling section on page 2-6. Ensure that the input is properly terminated either by connecting a local monitor to the other input/loopout (loop through) connector, or by setting the 75 ohm/Hi Z switch to 75Ω. The Genlock LED lights to indicate that the scan converter is receiving an acceptable genlock (black burst) sync signal via the Genlock In connector.
4. Connect oscilloscope ("scope") probe A to the Genlock Out connector. This will provide the scope's reference signal. In order to avoid altering the genlock signal, use the cabling configuration that will be used in the installation. Either connect the genlock signal cable from the scope to the next device in the system to be timed, or provide 75 ohm termination at the scope's genlock output.
5. Connect scope probe B to the scan converter's composite video output connector. Ensure that the *standard* screen of the *configuration controls* menu is set to the desired standard (NTSC or PAL; see page 3-3).

## Operation, cont'd

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6. Using the instructions for the scope you are using, set the scope to view the signals' horizontal phases. From the *phase adjust* screen of the *configuration controls* menu, adjust the scan converter's horizontal phase control until there is no (0°) difference between the composite video output's horizontal sync phase and the genlock signal's horizontal phase. See "Oscilloscope displays" on page 3-8, and "Configuration controls menu" on page 3-3.
7. Set the scope to view the subcarrier signals. From the *phase adjust* screen of the *configuration controls* menu, adjust the scan converter's subcarrier phase until there is a zero phase difference between the genlock signal and the NTSC/PAL output. The Genlock LED should light.

**NOTE** *If the Genlock LED does not light at this point, either adjust the horizontal or subcarrier phases further, or use a different genlock source.*

*The subcarrier adjustment range is +/- 180 degrees from 0 for a total adjustment range of 360 degrees.*

8. View the horizontal phases again. If the phase difference is not zero, repeat steps 6 and 7 until the settings do not change.

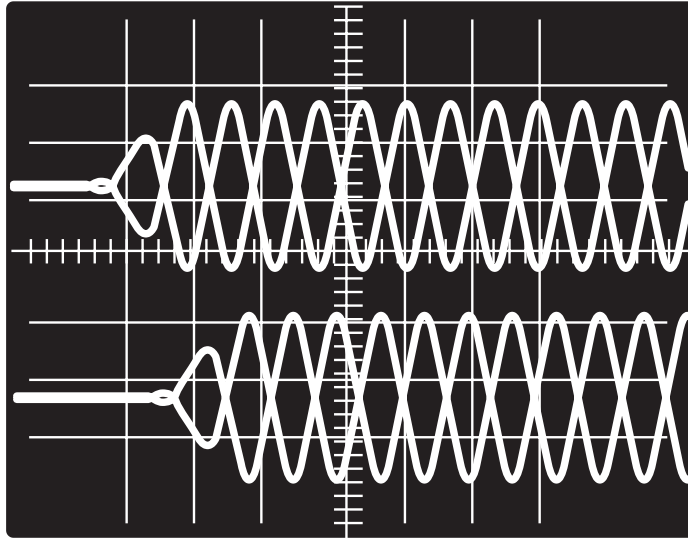
**NOTE** *If the Genlock LED does not light at all when genlock is active and the horizontal and subcarrier phases have been adjusted to match the genlock signal, do not continue with this procedure. A different, more stable or time-base-corrected sync signal must be used for the genlock timing source.*

9. After the settings are stable and the Genlock LED lights, disconnect the oscilloscope, and reconnect the genlock cables and terminator to the proper devices in the system.
10. Check the display for proper colors and for undesirable artifacts in the image. Make adjustments as necessary. After the genlock timing has been adjusted, it should not require readjustment when changing to a new computer video signal input.
11. If other scan converters are part of this genlock daisy chain, connect the oscilloscope to each device, and repeat this procedure.

### Oscilloscope displays

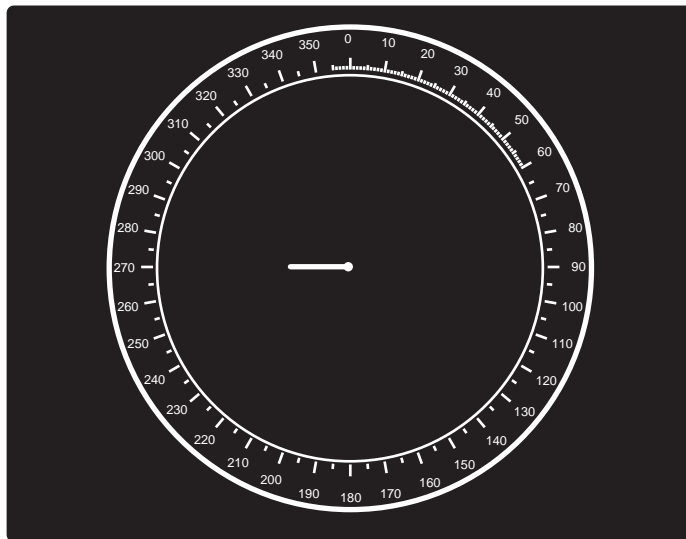
What you see on the oscilloscope while adjusting the scan converter to match the genlock signal depends on the type of signal used, the type of oscilloscope, and the procedure the scope requires. This section shows some examples of oscilloscope displays.

Figure 22 shows the genlock input signal (top) and an out-of-alignment NTSC composite sync output signal (bottom) displayed on a waveform monitor to check for alignment. When the phases are aligned, the wave peaks on the bottom waveform should line up with those in the reference signal above it.



With this method there is no way to know if the signals are 180° out of phase. A delayed sweep on a time-based scope would allow a more accurate display of the input and output signal phase relationships.

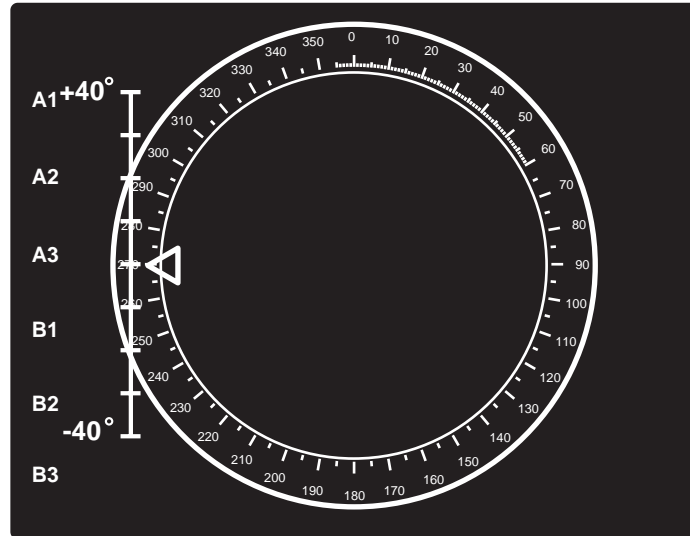
**Figure 22 — Superimposed waveforms**



## Operation, cont'd

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A vectorscope is more accurate than a waveform monitor. Figure 23 shows an example of a vectorscope display when the horizontal phase is adjusted to align it with the burst (genlock) vector. Adjust the horizontal phase until the difference



between the two vectors is  $0^\circ$ . This example shows black burst only (with no color). The burst vector is pointing to the left from the center.

**Figure 23 — Vectorscope screen during horizontal phase adjustment**

Figure 24 shows an example of a view of a vectorscope during adjustment of the color subcarrier phase. The subcarrier phase should be aligned to  $0^\circ$  (indicated in the figure by the triangle).

**Figure 24 — Vectorscope screen during color subcarrier phase adjustment**



VSC 200/200D/300/300D

# 4

## Chapter Four

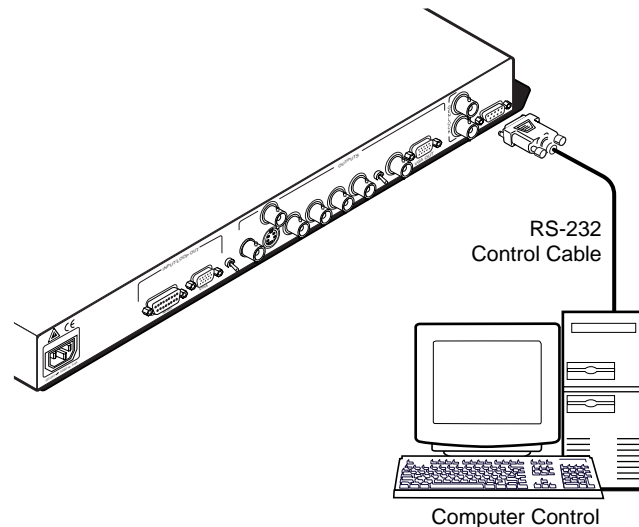
### Serial Communication

RS-232 Programmer's Guide

Control Software for Windows

# Serial Communication

The scan converter's RS-232 connector can be connected to the serial port output of a host device such as a computer or control system. This connection makes software control of the scan converter possible. Figure 25 shows a scan converter RS-232 connection to a host serial port connector.



**Figure 25 — Scan converter RS-232 to host connection**

The RS-232 connector on the scan converter is a 9-pin D female connector with the following pin assignments:

Pin	Description
1	Not used
2	Transmit data
3	Receive data
4	Not used
5	Signal ground
6	Not used
7	Not used
8	Not used
9	Not used

The protocol is 9600 baud, 8-bit, 1 stop bit, no parity, and no flow control.

## RS-232 Programmer's Guide

The scan converter accepts SIS (Simple Instruction Set) commands through the RS-232 port. SIS commands consist of one or more characters per command field. They do not require any special characters to begin or end the command character sequence. Each scan converter response to an SIS command ends with a carriage return and a line feed (CR/LF = ↵), which signals the end of the response character string. A string is one or more characters.



---

## VSC-initiated messages

When a local event such as a front panel operation occurs, the scan converter responds by sending a message to the host. The VSC-initiated messages are listed below (underlined).

(C) Copyright 1998-1999, Extron Electronics, VSC 200/300, Vx.xx ↵

The copyright message is initiated by the scan converter when it is first powered on. Vx.xx is the firmware version number.

Reconfig ↵

The Reconfig message is initiated by the scan converter when the resolution of the input signal is changed and when the front panel LCD menus are exited, indicating that there may have been a change to the adjustments or parameters.

The scan converter does not expect a response from the host, but, for example, the host program might request a new status.

## VSC error responses

When the scan converter receives an SIS command and determines that it is valid, it performs the command and sends a response to the host device. If the scan converter is unable to perform the command because the command is invalid or contains invalid parameters, the scan converter returns an error response to the host. The error response codes are:

E09 — Invalid function number (too large)

E10 — Invalid command

E13 — Invalid value (out of range)

## Using the command/response table

The command/response table is shown on the next page. Lower case characters are acceptable in the command field only where indicated. Symbols are used throughout the table to represent variables in the command/response fields. Symbol definitions are shown at the beginning of the table, as is an ASCII-to-hexadecimal conversion table. Command and response examples are shown throughout the table.

# Serial Communication, cont'd

## Command/response table

### Symbol Definitions:

↵ = CR/LF, • = space

[X1] = Horizontal filtering level VSC 200: 1–4  
VSC 300: 1–8

[X2] = Vertical filtering level VSC 200: 0–4  
VSC 300: 0–9

[X3] = Input 1 = S-video  
2 = RGB  
3 = Component

[X4] = Output 1 = NTSC  
2 = PAL  
3–8 Scaled output resolutions (VSC 300 only)  
3 = 640x480  
4 = 800x600  
5 = 832x624  
6 = 852x480  
7 = 1024x768  
8 = 720p

ASCII to HEX Conversion Table										Esc 1B	CR 0D	LF 0A
Space	20	!	21	"	22	#	23	\$	24	% 25	& 26	' 27
(	28	)	29	*	2A	+	2B	,	2C	- 2D	2E	/ 2F
0	30	1	31	2	32	3	33	4	34	5 35	6 36	7 37
8	38	9	39	:	3A	;	3B	<	3C	= 3D	> 3E	? 3F
@	40	A	41	B	42	C	43	D	44	E 45	F 46	G 47
H	48	I	49	J	4A	K	4B	L	4C	M 4D	N 4E	O 4F
P	50	Q	51	R	52	S	53	T	54	U 55	V 56	W 57
X	58	Y	59	Z	5A	[	5B	\	5C	] 5D	^ 5E	_ 5F
`	60	a	61	b	62	c	63	d	64	e 65	f 66	g 67
h	68	i	69	j	6A	k	6B	l	6C	m 6D	n 6E	o 6F
p	70	q	71	r	72	s	73	t	74	u 75	v 76	w 77
x	78	y	79	z	7A	{	7B		7C	} 7D	~ 7E	DEL 7F

[X5] = 1 = On, 0 = Off

[X6] = xxx.xx Hrt = Horizontal rate = kHz  
= xxx:xx Vrt = Vertical rate = Hz  
Signal out of range

COMMAND	ASCII	RESPONSE	DESCRIPTION
<u>Horizontal Shift</u>			
Shift Right	{H	Hph+ ↵	Shift image right one step
Shift Left	}H	Hph- ↵	Shift image left one step
<u>Vertical Shift</u>			
Shift Down	{/	Vph+ ↵	Shift image down one step
Shift Up	}/	Vph- ↵	Shift image up one step
<u>Horizontal Size</u>			
Increase Size	{:	Hsz+ ↵	Increase horizontal size by one step
Decrease Size	}:	Hsz- ↵	Decrease horizontal size by one step
<u>Vertical Size</u>			
Increase Size	{;}	Vsz+ ↵	Increase vertical size by one step
Decrease Size	};	Vsz- ↵	Decrease vertical size by one step
<u>Zoom</u>			
Zoom In	{+}	Zom+ ↵	Increase image size by one step
Zoom Out	}+	Zom- ↵	Decrease image size by one step
<u>Horizontal Filter (Detail)</u>			
Specific Value	[X1]D	Dhz[X1] ↵	Select horizontal filter [X1] (Dhz)
Increment Up	{D	Dhz[X1] ↵	Select next higher horizontal filter (Dhz + 1)
Increment Down	}D	Dhz[X1] ↵	Select next lower horizontal filter (Dhz - 1)
<u>Vertical Filter (Detail)</u>			
Specific Value	[X2]d	Dvt[X2] ↵	Select vertical filter [X2] (Dvt)
Increment Up	{d	Dvt[X2] ↵	Select next higher vertical filter (Dvt + 1)
Increment Down	}d	Dvt[X2] ↵	Select next lower vertical filter (Dvt - 1)
<u>Freeze</u>			
Enable	F	Frz1 ↵	Set freeze mode to On (freeze current displayed image)
Disable	f	Frz0 ↵	Set freeze mode to Off

COMMAND	ASCII	RESPONSE	DESCRIPTION
<u>Executive Mode</u>			
Enable	X	Exe1 ↵	Set executive mode to On
Disable	x	Exe0 ↵	Set executive mode to Off
Set Output Mode	[x3]\	Typ[x3] ↵	Set video output type, (S-video, RGB or component)
Set Output Standard	[x4]#	Fnc[x4] ↵	Set video output standard (NTSC or PAL)
<u>Color Bars</u>			
Disable	B	Blk1 ↵	Disable display of NTSC/PAL composite video color bars when no signal is present
Enable	b	Blk0 ↵	Enable display of NTSC/PAL composite video color bars when no signal is present
Query Software Version	Q/q	Verx.xx ↵	Example response: Ver1.23 ↵
Request Part Number	N/n	Nxx-xxx-xx ↵	VSC 200 = 60-274-02, VSC 200D = 60-274-01 VSC 300 = 60-275-02, VSC 300D = 60-275-01
Request Information	I/i	Dhz[x1]·Dvt[x2]·Typ[x3]·Fnc[x4]·Frz[x5]·Exe[x5]·Hrt[x6]·Vrt[x6]·Blk[x5] ↵	

## Control Software for Windows

The VSC and DDS Control Program (Extron part number 29-038-01), which is used by the VSC 200/200D/300/300D, is compatible with Windows® 3.1, 3.11, 95/98, and NT. It provides remote control of input selection.

### Installing the Software

The program is contained on a single 3.5" diskette, and it can run from the floppy drive. However, it is usually more convenient to load and run the program from the hard drive.

To install the software from the floppy disk onto the hard drive, run SETUP.EXE from the floppy disk, and follow the instructions that appear on the screen. The program occupies approximately 1 MB (megabyte) of hard-drive space.

By default, the Windows installation creates a C:\VSC200 directory, and it will place two icons (VSC + DDS Control Pgm and VSC + DDS Help) into a group or folder named "Extron Electronics".

### Using the Software

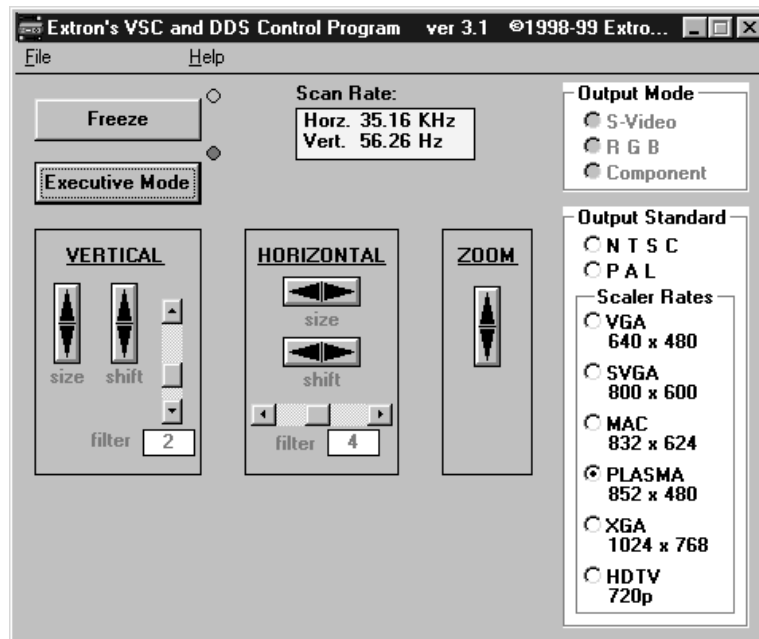
- To run the VSC and DDS Control Program, double-click on the VSC + DDS Control Pgm icon (left) in the Extron Electronics group or folder.



- Click on the comm port that is connected to the RS-232 port of the VSC 200/200D/300/300D.

The Extron VSC and DDS Control Program window appears (see figure 26). It displays the current settings and the detected input scan rate.

## Serial Communication, cont'd



**Figure 26 — VSC and DDS Control Program window**

- Using normal Windows controls, you can perform many of the same adjustments as from the front panel.

For information about program features, you can access the help program in any of the following ways:

- From the Extron Electronics program folder or group, double-click on the VSC + DDS Help icon (shown at left).



- From within the VSC and DDS Control Program, click on the Help menu on the main screen.
- From within the VSC and DDS Control Program, press the F1 key.



VSC 200/200D/300/300D

# 5

## Chapter Five

### Troubleshooting

# Troubleshooting

---

The image should be displayed properly on the screen.

## If the image does not appear

1. Ensure that all devices are plugged in.
2. Make sure that each device is receiving power. If the scan converter does not power on, and the AC power source is functioning correctly, the AC fuse may be blown. See "Replacing the AC fuse" on page B-4.
3. Check the cabling, wiring, and grounding, and make adjustments as needed. Ensure that the sync selection switch and *output* and *standard* screens of the *configuration controls* menu are set for the formats that match the cable configuration and the requirements of the display/recording devices.
4. Verify that the 75 ohm/Hi-Z switch has been set correctly.
5. To test the system setup and output, substitute a video test generator for the computer input.
6. Confirm that the input is receiving a signal with a compatible scan rate (horizontal frequency between 24 kHz and 80 kHz, and a vertical frequency of 50 Hz to 120 Hz, for the VSC 200/200D; horizontal frequency between 24 kHz and 100 kHz, and a vertical frequency of 50 Hz to 120 Hz, for the VSC 300/300D).
7. Call Extron's customer support hotline if needed. Be prepared to discuss the steps you have taken and the equipment involved.

## If the image is not displayed correctly

Symptoms	Solutions
The picture is shifted off the screen edges.	Adjust the centering and sizing controls.
The image is stable, but it has ghosting or blooming.	Change the 75 ohm/high Z video input termination. If that doesn't solve the problem, use a different input cable.
The picture is faint or cuts out, and the signal is weak.	Video input may be double-terminated. If a local monitor or a termination adapter is attached to the local monitor output connector, make sure that the 75 ohm/Hi-Z switch is set to Hi-Z). Disconnect all unused output cables. Do not connect cables to both the S-video and RGB/component outputs at the same time.
The picture appears without color.	Adjust the hue/tint and color controls on the display device. Make sure that the video display/recording equipment is using the same standard (NTSC or PAL) as the scan converter.
In a genlocked system, displayed color is incorrect.	The color subcarrier phase might require readjustment.
The image still is not displayed correctly.	Call Extron's customer support hotline.

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## If the scan converter does not respond to controls

Symptoms	Solutions
The picture does not move on screen when the horizontal and vertical centering controls are rotated, and the filtering settings do not change when the filtering controls are pressed.	The scan converter may be set for Executive mode. Adjustments can be made via RS-232 control, or Executive mode can be turned off by pressing the Up and Down cursor buttons simultaneously for 2 seconds. See page 3-4.
There is no response to commands from the RS-232 controller.	Ensure that the baud rate (9600 baud) and communication protocol are set correctly. See page 4-2.

# Troubleshooting, cont'd

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VSC 200/200D/300/300D

# A

## Appendix A

### Specifications

# Specifications

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## VSC 200/200D

### Video input

Number/signal type .....	1 VGA, 1 Mac RGBHV, RGBS, and RGsB
Connectors .....	VGA ..... 1 15-pin HD female + adapter cables and Mac ..... 1 15-pin D female
Minimum/maximum levels .....	Analog ..... 0V to 2.0V p-p with no offset at unity gain
Impedance .....	75 ohms or High Z (switchable)
Horizontal frequency .....	Autoscan 24 kHz to 81 kHz
Vertical frequency .....	Autoscan 50 Hz to 120 Hz
Resolution range .....	Autoscan 560 x 384 to 1280 x 1024
External sync (genlock) .....	0.3V to 1.0V p-p

**NOTE** *The color subcarrier adjustment range is  $\pm 180$  degrees from 0 for a total adjustment range of 360 degrees.*

### Video processing

Encoder .....	10 bit digital
Digital sampling .....	24 bit, 8 bits per color; 80 MHz
Colors .....	16.8 million
Horizontal filtering .....	4 levels
Vertical filtering .....	5 levels
Encoder filtering .....	3 levels

### Video output

Number/signal type .....	1 RGBHV/RGBS/RGsB or component video, or 1 digital component video (CCIR 601/ITU-R BT.601) (VSC 200D only), or 1 S-video, or 1 NTSC/PAL composite video
Connectors .....	5 BNC female ..... RGBHV/RGBS/RGsB or component video 1 BNC female ..... digital component video — VSC 200D only 1 4-pin mini-DIN female ..... S-video 1 BNC female ..... composite video
Minimum/maximum levels .....	0.0V to 1.0V p-p
Impedance .....	75 ohms

### Sync

Input type .....	Autodetect RGBHV, RGBS and RGsB
Output type .....	RGBHV, RGBS, RGsB (All RGB formats are switch-selectable.)
Genlock connectors .....	1 BNC female ..... genlock input 1 BNC female ..... genlock output (terminate w/75 ohms if unused)
Standards .....	NTSC 3.58 and PAL
Input level .....	1.5V to 5.0V p-p
Output level .....	5V p-p
Input impedance .....	75 ohms
Output impedance .....	75 ohms
Polarity .....	Negative

### Control/remote — scan converter

Serial control port .....	RS-232, 9-pin female D connector
Baud rate and protocol .....	9600, 8-bit, 1 stop bit, no parity

---

Serial control pin configurations	2 = TX, 3 = RX, 5 = GND
Program control .....	Extron's Simple Instruction Set™ – SIS™ Extron's control program for Windows®

## General

Power .....	100VAC to 240VAC, 50/60 Hz, 30 watts, internal, auto-switchable
Temperature/humidity .....	Storage -40° to +158°F (-40° to +70°C) / 10% to 90%, non-condensing Operating +32° to +122°F (0° to +50°C) / 10% to 90%, non-condensing
Rack mount .....	Yes, with included kit
Enclosure type .....	Metal
Enclosure dimensions .....	1.75" H x 17.1" W x 9.5" D (1U high, full rack width) 4.4 cm H x 43.4 cm W x 24.1 cm D
Product weight	
VSC 200 .....	5.6 lbs (2.5 kg)
VSC 200 D .....	5.7 lbs (2.6 kg)
Shipping weight .....	10 lbs (4.5 kg)
Vibration .....	ISTA/NSTA 1A in carton (International Safe Transit Association)
Listings .....	UL, CUL
Compliances .....	CE, FCC Class A
MTBF .....	30,000 hours
Warranty .....	3 years parts and labor

**NOTE** *Specifications are subject to change without notice.*

## VSC 300/300D

### Video input

Number/signal type .....	1 VGA, 1Mac analog RGBHV, RGBS, and RGsB
Connectors .....	VGA ..... 1 15-pin HD female + adapter cables Mac ..... 1 15-pin D female
Minimum/maximum level(s)....	Analog ..... 0V to 2V p-p with no offset at unity gain
Impedance .....	75 ohms/High Z (switchable)
Horizontal frequency .....	Autoscan 24 kHz to 100 kHz
Vertical frequency .....	Autoscan 50 Hz to 120 Hz
Resolution range .....	Autoscan 560 x 384 to 1600 x 1280
External sync (genlock).....	0.3V to 1.0V p-p

**NOTE** *The color subcarrier adjustment range is ±180 degrees from 0 for a total adjustment range of 360 degrees.*

### Video processing

Encoder .....	10 bit digital
Digital sampling .....	24 bit, 8 bits per color; 80 MHz
Colors .....	16.8 million
Horizontal filtering .....	8 levels
Vertical filtering .....	10 levels
Encoder filtering .....	3 levels

# Specifications, cont'd

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## Video output

Number/signal type .....	1 RGBHV/RGBS/RGsB or component video, or 1 RGB scaled VGA, or 1 digital component video (CCIR 601/ITU-R BT.601) (VSC 300D only), or 1 S-video, or 1 NTSC/PAL composite video
Connectors .....	5 BNC female ..... RGBHV/RGBS/RGsB (including scaled VGA) or component video 1 BNC female ..... digital component video — VSC 300D only 1 4-pin mini-DIN female ..... S-video 1 BNC female ..... composite video
Minimum/maximum levels .....	0.0V to 1.0V p-p
Impedance .....	75 ohms
Scaled VGA resolution .....	640x480, 800x600, 832x624, 852x480, 1024x768 and 720p

## Sync

Input type .....	Autodetect RGBHV, RGBS and RGsB
Output type .....	Autodetect RGBHV, RGBS, RGsB (RGB formats are toggle switch-selectable)
Genlock connectors .....	1 BNC female ..... genlock input 1 BNC female ..... genlock output (terminate w/75 ohms if unused)
Standards .....	NTSC and PAL
Input level .....	1.5V to 5V p-p
Input impedance .....	75 ohms
Output impedance .....	75 ohms
Polarity .....	Negative

## Control/remote — scan converter

Serial control port .....	RS-232, 9-pin female D connector
Baud rate and protocol .....	9600, 8-bit, 1 stop bit, no parity
Serial control pin configurations ....	2 = TX, 3 = RX, 5 = GND
Program control .....	Extron's control program for Windows® Extron's Simple Instruction Set™ – SIS™

## General

Power .....	100VAC to 240VAC, 50/60 Hz, 30 watts, internal
Temperature/humidity .....	Storage -40° to +158°F (-40° to +70°C) / 10% to 90%, non-condensing Operating +32° to +122°F (0° to +50°C) / 10% to 90%, non-condensing
Rack mount .....	Yes
Enclosure type .....	Metal
Enclosure dimensions .....	1.75" H x 17.5" W x 9.4" D (1U high, full rack width) 4.4 cm H x 44.4 cm W x 23.9 cm D
Product weight .....	5.7 lbs (2.6 lbs)
Shipping weight .....	11 lbs (5.0 kg)
Vibration .....	ISTA/NSTA 1A in carton (International Safe Transit Association)
Listings .....	UL, CUL
Compliances .....	CE, FCC Class A
MTBF .....	30,000 hours (demonstrated)
Warranty .....	3 years parts and labor

**NOTE** Specifications are subject to change without notice.



VSC 200/200D/300/300D

# Appendix B

## Reference Information

Upgrades and Repairs

Part Numbers

# Reference Information

## Upgrades and Repairs

You can perform the following upgrades and repairs to the scan converter:

- Installing the VSC 200/300 D1 Module (VSC 200/300 only; see below).
- Replacing the AC fuse (see page B-4).
- Installing a firmware update (see page B-5).

Before completing any of these procedures, follow the instructions in “Internal access”, below.

## Internal access

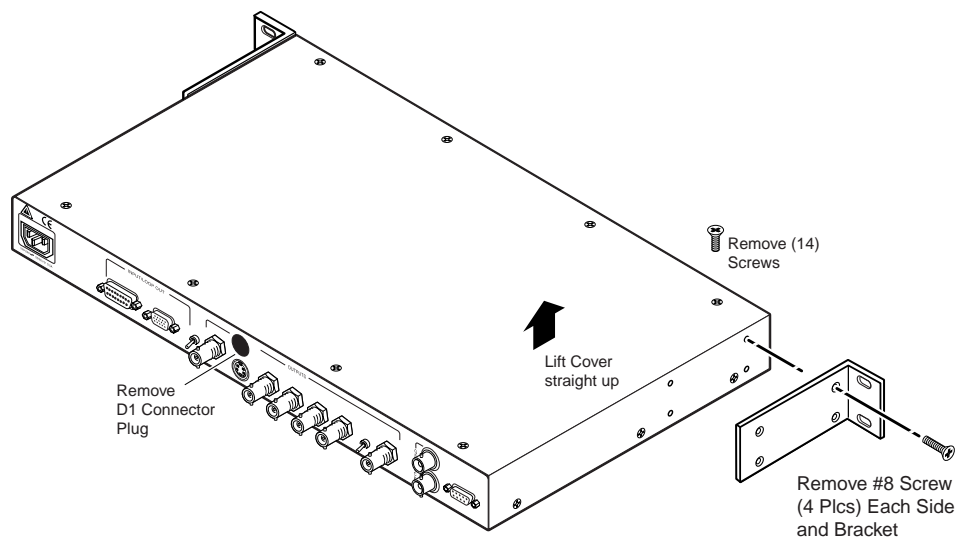
Upgrades and fuse replacement require access to the internal areas of the scan converter. To access the internal areas, do the following:

1. Remove the power cable from the scan converter.



*Do not open the cover of the scan converter without unplugging the power cord.*

2. If the scan converter is rack mounted, remove the input and output cables from it, remove the unit from the rack, and remove the rack mount brackets (see figure 27). If the scan converter is not rack mounted, you do not need to remove the input and output cables.



**Figure 27 — Removing the cover**

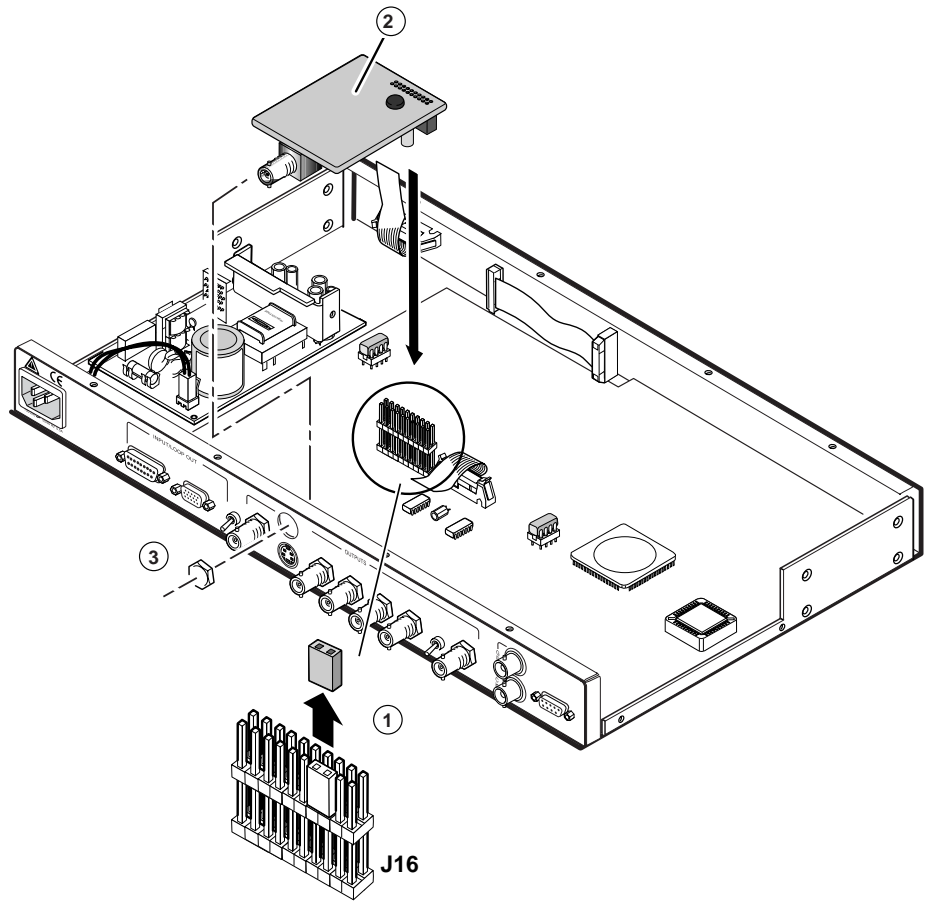
3. Remove 14 screws from the sides and top of the cover (figure 27).
4. Remove the cover by slightly lifting each side alternately until the cover is free.

Reverse this procedure to reinstall the cover.

## Installing the Digital Module (D-1) upgrade kit

After following the instructions in “Internal access” to remove the cover, do the following to install the upgrade kit:

1. Remove the jumper on pins 6 and 8 of connector J16 (see exploded view 1 in figure 28).
2. Locate the D1 plug directly above the S-video connector on the rear panel (see figure 27). Remove the plug by pushing it out from the inside.



**Figure 28 — Installing the Digital Module upgrade kit**

3. Remove the nut from the circuit card BNC connector and set it aside. Insert the D-1 circuit card BNC connector through the hole that was created in the rear panel in step 2.
4. Carefully align the D1 circuit card 20-pin female connector with the J16 pins on the VSC 200/300 motherboard (see exploded view 2 in figure 28). With the pins aligned, press down gently on the D-1 circuit card. Very little pressure is required to plug the connector onto the J16 pins. Check the alignment of the D-1 circuit card connector and VSC J16 pins if necessary.

**NOTE** *Do not force the connection, or you might damage the D-1 circuit card or the VSC 200/300 motherboard.*

5. Lay a straight edge across the top of the front and rear panels. If the circuit card is seated properly, the rubber spacer on the D-1 circuit card is flush with the top of the case.
6. Install and tighten the BNC nut that was set aside in step 3 (see exploded view 3 in figure 28).
7. Reinstall the cover of the scan converter.
8. If rack mount brackets were removed earlier, reinstall them.
9. Attach the power cord to the scan converter and to the AC power source. Make sure the scan converter is working correctly.

## Reference Information, cont'd

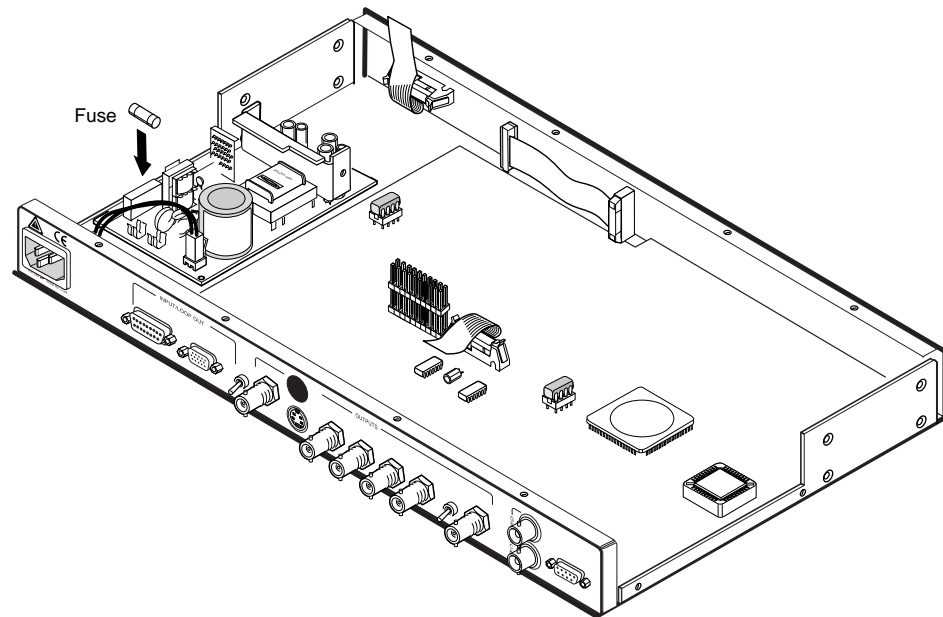
10. If the scan converter is rack mounted, remove the power cable from the scan converter, and reattach the rack mount brackets. Reattach the scan converter to the rack, and reconnect the power cord and input and output cables.

### Replacing the AC fuse

If the scan converter does not power on, and the AC power source is functioning correctly, the AC fuse may be blown. The fuse is located on the internal power supply.

**WARNING** Replace the fuse only with a 5 x 20 mm, 0.5A/250V fast blow fuse.

1. Remove the cover of the scan converter. See "Internal access" on page B-2.
2. Locate the fuse on the power supply, and remove it from its retaining clips (see figure 29).



**Figure 29 — Replacing the fuse**

3. If test equipment is available, you can check the fuse's functionality.
4. Place a new fuse in the fuse retaining clips.
5. Reinstall the cover of the scan converter.
6. If rack mount brackets were removed earlier, reinstall them.
7. Attach the power cord to the scan converter and to the AC power source. Make sure the scan converter is working correctly.
8. If the scan converter is rack mounted, remove the power cable from the scan converter, and reattach the rack mount brackets. Reattach the scan converter to the rack, and reconnect the power cord and input and output cables.



*If you choose to check the power before putting the cover back on, make sure that tools and hands are outside the scan converter, and then connect the power cord to the scan converter and to an AC source. The scan converter should power up normally. Unplug the AC power cord, and follow steps 5 through 8.*



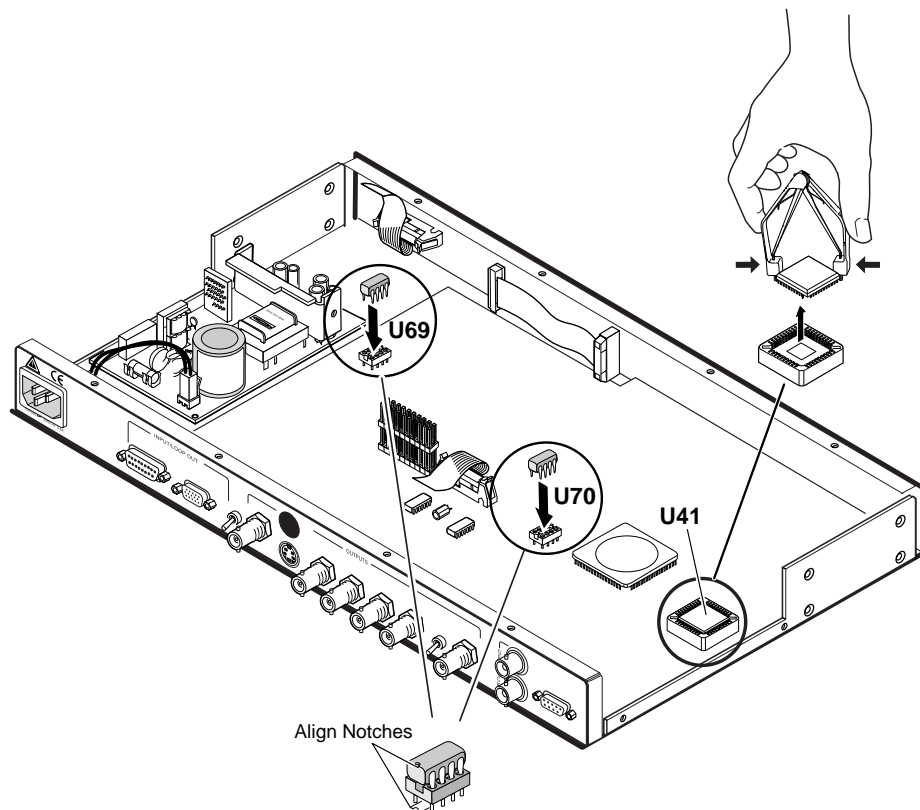
## Installing a firmware update

**NOTE** To install a firmware update, you may need to replace IC (integrated circuit) U41, U69, or U70, or any combination of these. Replacing these ICs may result in loss of presets and other settings.

1. Remove the cover of the scan converter. See “Internal access” on page B-2.

**WARNING** Make sure you are electrically grounded before touching IC chips. Electrostatic discharge (ESD) can damage IC chips, even if you cannot feel, see, or hear the discharge.

2. Locate the ICs to be replaced (see figure 30). The update kit will list the specific ICs.



**Figure 30 — Locating and replacing ICs**

3. Remove the existing chip and set it aside.

To remove IC U41, use the PLCC (plastic leadless chip carrier) IC puller to remove the old IC. Align the hooks on the puller with the slots provided in opposite corners of chip socket U41. Insert the hooks, squeeze gently, and pull the IC straight out of the socket.

To remove IC U69 or U70, use a standard IC removal tool.

4. Install the new chip.

To install IC U41, locate the angled corner of the new chip. Orient the corner to match the angled corner of the socket, and press the IC into place.

To install IC U69 or U70, locate a notch or a printed dot on top of the IC. Align the notch or dot with the notch on the socket or circuit board. Align the IC pins with the holes in the socket, and gently press the IC into the socket.

## Reference Information, cont'd

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5. Reinstall the cover of the scan converter.
6. If rack mount brackets were removed earlier, reinstall them.
7. Attach the power cord to the scan converter and to the AC power source. Make sure the scan converter is working correctly.
8. If the scan converter is rack mounted, remove the power cable from the scan converter, and reattach the rack mount brackets. Reattach the scan converter to the rack, and reconnect the power cord and input and output cables.

### Part Numbers

#### VSC 200/200D part numbers

Extron Part	Part #
VSC 200	60-274-02
VSC 200D	60-274-01
VSC 200/300 D-1 Module	70-065-01
VSC and DDS Control Program	29-038-01
VSC 200/200D/300/300D User's Manual	68-396-01

#### Related part numbers

Extron Part	Part #
*BNC 75 ohm termination plug	26-300-01
*Mac/VGA cable, 6 feet	26-462-01
*S-video cable, 6 feet	26-316-02
RCA (female) BNC (male) adapter	10-264-01
SVHS - BNC adapter	26-353-01
GLI 250 (ground loop isolator, 250 MHz RGBHV)	60-123-01

\* These items are supplied with the VSC 200/200D.

#### VSC 300/300D part numbers

Extron Part	Part #
VSC 300	60-275-02
VSC 300D	60-275-01
VSC 200/300 D-1 Module	70-065-01
VSC and DDS Control Program	29-038-01
VSC 200/200D/300/300D User's Manual	68-396-01

#### Related part numbers

Extron Part	Part #
*BNC 75 ohm termination plug	26-300-01
*Mac/VGA cable, 6 feet	26-462-01
*Mac/13W3 cable, 6 feet	26-465-01
*VGA/13W3 cable, 1 foot	26-466-01
*S-video cable, 6 feet	26-316-02
SY-VGA cable, 6 feet	26-397-01
RCA (female) BNC (male) adapter	10-264-01
SVHS - BNC adapter	26-353-01
GLI 250 (ground loop isolator, 250 MHz RGBHV)	60-123-01

\* These items are supplied with the VSC 300/300D.

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## BNC cables

Extron SHR BNC cables are super high resolution BNC cables. Extron recommends that when using signals with a scanning frequency of 15–125 kHz and running distances of 100 feet or more, high resolution BNC cables should be used to achieve maximum performance.

### Bulk cable

Extron Part	Part #
<b>SHR bulk cable</b>	
Bulk SHR-1, 500'	22-098-02
Bulk SHR-1, 1000'	22-098-03
Bulk SHR-4, 500'	22-099-02
Bulk SHR-5, 500'	22-100-02
BNC SHR crimp connectors, qty. 50	100-075-51
<b>BNC-4 mini-HR bulk cable</b>	
Bulk BNC 4-500' HR	22-032-02
Bulk BNC 4-1000' HR	22-032-03
<b>BNC 5 mini-HR bulk cable</b>	
Bulk BNC 5-500' HR	22-020-02
Bulk BNC 5-1000' HR	22-020-03
<b>BNC 5 plenum mini-HR bulk cable</b>	
Bulk BNC 5-500' HRP	22-103-02
Bulk BNC 5-1000' HRP	22-103-03
<b>Install plenum bulk cable</b>	
Bulk Install Plenum, 500'	22-111-03
Bulk Install Plenum, 1000'	22-111-04

### Assorted connectors

Extron Part	Part #
<b>BNC connectors</b>	
BNC mini-HR crimp connectors, qty. 50	100-074-51
BNC SHR crimp connectors, qty. 50	100-075-51
BNC bulkhead connectors, qty. 50 (for custom wall plates)	100-076-51

### Pre-cut cables

BNC-4 HR cable is used for RGBS cable runs and BNC-5 is used for RGBHV cable runs. Either type can also be used for composite video, S-video, or RGB with sync on green. All Extron BNC cables have male gender connectors at both ends. A plenum version of the BNC-5 HR cable is also available.

Extron Part	Part #
<b>BNC-4 HR cable</b>	
BNC-4-25'HR (25 feet/7.5 meters)	26-210-04
BNC-4-50'HR (50 feet/15.0 meters)	26-210-05
BNC-4-75'HR (75 feet/23.0 meters)	26-210-06
BNC-4-100'HR (100 feet/30.0 meters)	26-210-07
BNC-4-150'HR (150 feet/45.0 meters)	26-210-08
BNC-4-200'HR (200 feet/60.0 meters)	26-210-09
BNC-4-250'HR (250 feet/75.0 meters)	26-210-54
BNC-4-300'HR (300 feet/90.0 meters)	26-210-53

*Continued on the next page*

## Reference Information, cont'd

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### BNC-5 HR cable

BNC-5-25'HR (25 feet/7.5 meters)	26-260-03
BNC-5-50'HR (50 feet/15.0 meters)	26-260-04
BNC-5-75'HR (75 feet/23.0 meters)	26-260-16
BNC-5-100'HR (100 feet/30.0 meters)	26-260-05
BNC-5-150'HR (150 feet/45.0 meters)	26-260-12
BNC-5-200'HR (200 feet/60.0 meters)	26-260-06
BNC-5-250'HR (250 feet/75.0 meters)	26-260-18
BNC-5-300'HR (300 feet/90.0 meters)	26-260-14

**NOTE** *Bulk cable in lengths up to 5000' rolls is available with or without connectors.*

## FCC Class A Notice

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

Note: This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to ensure compliance.

## Extron's Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

### **USA, Canada, South America, and Central America:**

Extron Electronics  
1230 South Lewis Street  
Anaheim, CA 92805, USA

### **Asia:**

Extron Electronics, Asia  
135 Joo Seng Road, #04-01  
PM Industrial Bldg.  
Singapore 368363

### **Europe, Africa, and the Middle East:**

Extron Electronics, Europe  
Beeldschermweg 6C  
3821 AH Amersfoort  
The Netherlands

### **Japan:**

Extron Electronics, Japan  
Daisan DMJ Bldg. 6F,  
3-9-1 Kudan Minami  
Chiyoda-ku, Tokyo 102-0074  
Japan

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions or non-Extron authorized modification to the product.

*If it has been determined that the product is defective, please call Extron and ask for an Applications Engineer at (714) 491-1500 (USA), 31.33.453.4040 (Europe), 65.6383.4400 (Asia), or 81.3.3511.7655 (Japan) to receive an RA# (Return Authorization number). This will begin the repair process as quickly as possible.*

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.



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