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AC082A

Dual System Video Converter

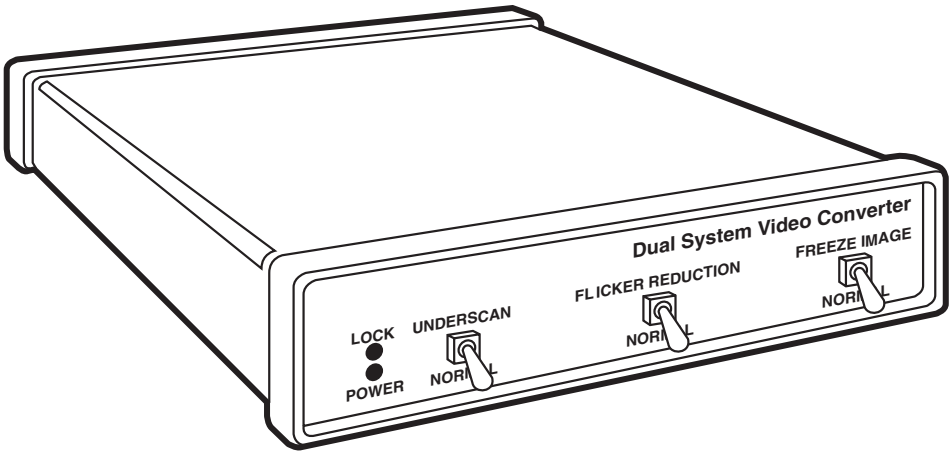

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Table of Contents

Chapter **Page**

1. Specifications 3

2. Introduction 4

3. Installation 5
   - 3.1 Initial Steps 5
   - 3.2 Hooking Up Video Output 5
   - 3.3 Selecting Your Video Standard 6
   - 3.4 Final Preparations 6

4. Operation 7
   - 4.1 Indicators 7
   - 4.2 Front-Panel Controls 7
   - 4.3 Operational Parameters 8

5. What to Expect from Converted Computer Images 9

6. Troubleshooting 11

Appendix A: S-Video, the Improved Quality Video Standard 12

Appendix B: Connector Pinouts 13

1. Specifications

Video Input Standards — VGA or Mac®

Video Output Standards — VGA or Mac; NTSC or PAL: Composite video, S-Video, RGBS

Modes Supported —
All VGA: 200, 350, 400, and 480 line
Mac: 640 x 480
Up to 16.8 Million Colors (24-bit Color)

Controls —
(1) rear-mounted slide switch: NTSC/PAL
(3) front-mounted toggle switches: Underscan, Flicker Reduction, Freeze Image

Indicators — LEDs: (1) Power, (1) Lock

Connectors —

Computer Input:	HD-15S
Computer Output: (buffered pass-through of input)	HD-15S
Composite Video Output:	RCA® Phono Jack
S-Video Output:	4-Pin Mini-DIN Jack
Expansion/RGB Output:	HD-26S

Power —
Separate Universal AC Power Supply
Input: 95 to 250 VAC, 47 to 63 Hz
Output: 5 VDC @ 3.8 A
Regulatory Approvals: UL®, CSA, and TUV

Size —

Converter:	Width:	7.25" (18.4 cm)
	Height:	1.5" (3.8 cm)
	Depth:	6.25" (15.9 cm)
Power Supply:	Width:	2.75" (6.9 cm)
	Height:	1.5" (3.8 cm)
	Depth:	4.75" (12.1 cm)

Weight — 2.9 lb. (1.3 kg) (includes power unit)

2. Introduction

Overview

The Dual System Video Converter will enable you to convert your computer monitor signal into a form suitable for VCR recording, conventional TV or video monitor display, or integration into a multimedia production system.

The Dual System Video Converter is a plug-and-play unit. After you have connected it to your equipment, you are ready to go.

By adding the Sync Genlock (available separately), you can have full studio timing capability, providing control over both subcarrier and horizontal timing.

Package Contents

- Dual System Video Converter
- Universal input power supply
- AC line cord for North America or Continental Europe
- 6-foot (1.8-m) VGA computer input cable
- 6-foot (1.8-m) Mac computer input cable
- 8-inch (20.3 cm) Macintosh® monitor adapter cable
- 12-foot (3.7-m) composite video output cable
- 12-foot (3.7-m) S-Video output cable
- This manual

Optional Accessories

- Sync Genlock
- 12-foot (3.7-m) BNC adapter cable, Sharp® projector cable, or SCART cable: for the Converter's RGB/Expansion output
- RF Modulator for North America channels 3 and 4

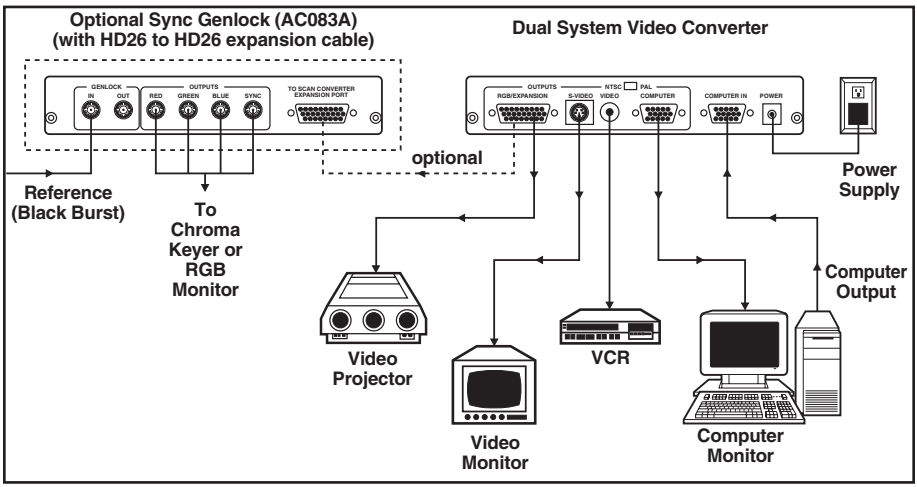

Figure 1. The Dual System Video Converter allows you to output your computer monitor signal to three video devices.

3. Installation

3.1 Initial Steps

1. Disconnect your monitor (if it is connected) from the monitor port on your computer.

2. Connect one end of the provided 6-foot cable to the monitor port on your computer. Connect the other end in to the connector on the rear panel of your Converter labeled COMPUTER IN. See **Figure 2**.

3. If you want your monitor to continue to display, connect it to the output connector labeled COMPUTER on the rear panel of the Converter. See below for a description of this output.

   Note for Macintosh users: Attach one end of the 8-inch Macintosh adapter to the Converter, the other to your cable that connects to your monitor. Do ***not*** use your cable to connect your Mac computer to the COMPUTER IN connector on the Converter.

4. Attach the power supply provided with the Converter to the connector labeled POWER. Plug the AC-line cord into an outlet to provide power to the Converter. The front-panel red POWER indicator should light. (If you ever need an AC-line cord specific to another country, please call your sales representa-tive in that country.)

3.2 Hooking Up Video Output

Now connect one or more of the Converter's four output ports to your video equipment: All outputs are available at the same time. Unused outputs do not have to be terminated.

COMPUTER: This output is a pass-through of the COMPUTER IN input. You can connect a standard computer monitor (or a multi-sync monitor if your system supports it) to this output.

VIDEO: Feed this single composite-video output signal into the "video" input jacks on ordinary TVs, monitors, VCRs, or profes-sional video equipment by using the included composite-video cable. This signal cannot be fed into the "antenna" input of a television or VCR.

S-VIDEO: Called S-Video, S-VHS, or Y/C, this output is an advanced form of video which carries the bright-ness and color parts of images on two separate signals. It is compatible with the Hi-8 and Beta-ED standards. Feed it into compatible equipment by using the included S-Video cable and you'll get a better-quality picture than the VIDEO output can provide.

RGB/EXPANSION: This premium-quality output, which can be used by some video projectors and monitors, consists of separate red, green, blue, and sync signals. Feed the signal into compatible equipment by using our optional RGBS cable with BNC connectors, European SCART connectors, or connectors for Sharp LCD projectors. Call Black Box to order these cables.

3.3 Selecting Your Video Standard

Use the NTSC/PAL slide switch on the back of your Converter to choose which standard you'll use for the VIDEO, S-VIDEO, and RGB outputs. NTSC is the video standard for the USA, Canada, Mexico, Japan, and parts of South America. PAL is used throughout most of Europe, the Middle East, Southern Asia, and the Pacific Rim.

3.4 Final Preparations

Turn on your computer. The green indicator labeled LOCK on the Converter's front panel should light, showing that the Converter is receiving a proper signal from the computer. (Refer to the next chapter for an explanation of this indicator.) Make sure the FREEZE IMAGE switch on the front panel is in the NORMAL position, so that your computer-image sequences will flow smoothly.

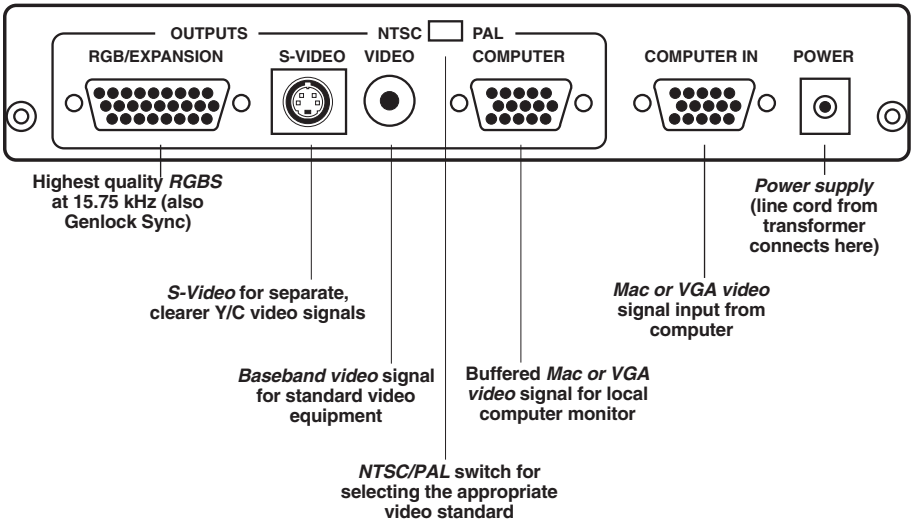

Figure 2. Rear panel of the Dual System Video Converter.

4. Operation

Operating your Dual System Video Converter is very simple. There are few controls to adjust and no hidden DIP switches to set. The Converter will feel warm when operating. This is normal. To avoid overheating, do not place any object on top of the Converter.

4.1 Indicators

The red POWER indicator lights up when your Converter is receiving DC power. If this light is glowing dimly or not at all, there might be something wrong with the external power supply. See **Chapter 6**.

The green LOCK indicator lights when the Converter is receiving a valid computer signal through the COMPUTER IN connector on its rear panel. Which video-display mode the Converter will use depends on the monitor attached to the COMPUTER port (see **Section 4.3**).

4.2 Front-Panel Controls

UNDERSCAN: When this switch is in the NORMAL position, images that the Converter outputs in Composite, S-Video, and RGBS formats will fill the entire viewable screen area. Because some monitors "overscan" their screens, some desirable parts of your images could be cropped off of the screen. If this is the case, flip this switch to the UNDERSCAN position to shrink the images, both horizontally and vertically, approximately 10% in size.

FLICKER REDUCTION: When this switch is in the NORMAL position, the Converter sends images using fully interlaced Composite, S-Video, and RGBS video signals. However, thin horizontal lines in the images might appear to "flicker" on and off at a very fast rate. This annoying flicker, if present, can be virtually eliminated by setting this switch to the FLICKER REDUCTION position. There is a trade-off with this feature: you might notice a slight loss of vertical resolution, detail, or brightness.

FREEZE IMAGE: You might want to freeze an image on the screen without altering or discontinuing your software application. If this switch is moved to the FREEZE IMAGE position, the image on the Composite, S-Video, and RGBS outputs is frozen. It will remain frozen until you move the switch back to the NORMAL position, at which time whatever image is currently being received through COMPUTER IN will be displayed.

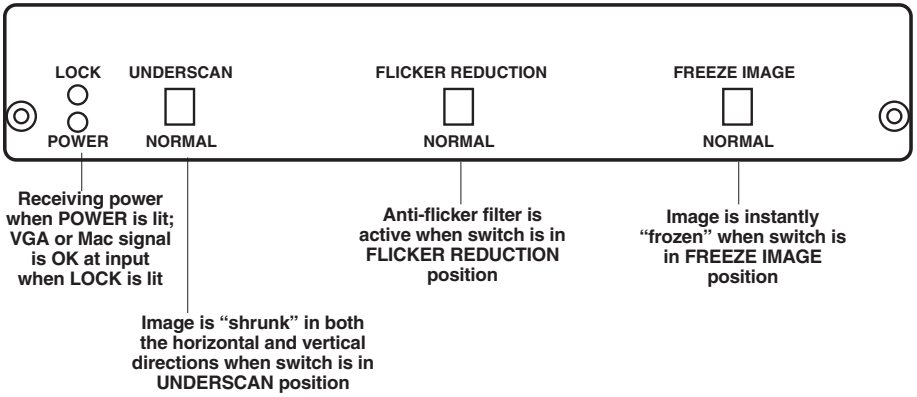

Figure 3. The front panel of the Dual System Video Converter.

4.3 Operational Parameters

- If the computer input signal is no longer present on COMPUTER IN because the computer has been turned off or the input cable has been disconnected, the image will automatically "freeze" and the LOCK indicator will go off.

- The COMPUTER output will always display what is present on the COMPUTER IN input, regardless of the "display mode" the computer may be in. If COMPUTER IN is at 1024 x 768 resolution, COMPUTER output will also be 1024 x 768. This is *not true* of the Composite, S-Video, and RGBS outputs: images in Macintosh or "super VGA" modes beyond 640 x 480 lines will appear scrambled and out of sync.

- For Macintosh users: The Dual System Video Converter only supports hi-res 640 x 480 mode. Some Mac models boot in hi-res 640 x 480 or low-res 512 x 384 depending on the type of attached monitor. The Converter makes use of this capability: If a low-res monitor is connected to its COMPUTER output, it will force the Macintosh to boot in 512 x 384 mode; but if a hi-res monitor (or no monitor) is connected, it will force 640 x 480. If the Mac is in low-res 512 x 384 mode, the Composite, S-Video, and RGBS outputs will appear scrambled and out of sync. You might consider purchasing the Video Converter (Mac Compatible) (AC076A).

5. What to Expect from Converted Computer Images

We have included this section to give you some insight into what you can and should expect computer images to look like once they are converted to standard video. People are sometimes surprised that computer images converted to video do not look as sharp and vivid as they do on the computer monitor. Although this may be somewhat disappointing, it should come as no surprise.

Color TV and video monitors, and the conventional video standards they use (NTSC and PAL), have been with us since the 1940s and 50s. When high-resolution computer-graphics standards such as VGA or Mac II were introduced less than a decade ago, new display technologies had been developed to achieve higher detail and sharper colors. Although many design improvements have been made to TV monitors and VCRs, they are still limited to basic technologies that are 40 years old.

Scan converters like the Dual System Video Converter were created to bridge the gap between the dissimilar standards of computer video and conventional video equipment. They work, but the trade-off is that you are taking computer images whose sharpness and detail are clearly visible on today's monitors and displaying them on TVs, or recording them on VCRs, that do not have comparable quality.

There are a few things you can do to get the best image possible on your TV/monitor or recorded on video tape. The tips that follow will all contribute to improved quality of your display and/or VCR recording.

- In the world of video, black, white, and all the shades of gray are not processed the same way as "real colors." TVs and VCRs process these shades with a minimum of distortion. When it's possible, consider using grayscale images, because they'll be much sharper than the equivalent colored images.

- The "Christmas Effect" occurs with computer images created by artists who really like the green and red color combination. Nothing looks worse on a TV. Try to avoid saturated colors.

- Sometimes graphics look so impressive on a computer monitor that users assume that the process of conversion to TV can't possibly make the graphics look bad. However, what TVs will actually show, especially if they are displaying a video signal that was "beat up" by a VCR recording, can be ugly. To avoid such surprises, connect a Converter and TV to your computer and view your "televised" graphics *while* you create them, *before* you present them.

- When you make VCR recordings, use either (1) a "Pro" or "Broadcast" grade, name-brand tape, or (2) an S-VHS (Super-VHS) tape (these will play in standard VHS machines). Also, record using the fastest speed (the speed corresponding to the shortest total time per tape—2 hours on a T-120 cassette). You will have less noise and tape jitter in your recording.

- Almost all TVs and video monitors overscan images, resulting in some of the picture being "cropped" off the edges of the picture tube. The Converter's UNDERSCAN mode will shrink images to compensate for this overscan, which will vary in amount from one TV or monitor to another. To ensure that the useful parts of your images are visible on TVs and monitors, keep all text and other informational content at least 5% in from the sides, top, and bottom of your computer monitor.

- The most annoying effect that occurs when a computer image is converted to video is "flicker." This rapid flashing of images' brightness can appear to be pervasive throughout the screen or localized to one particular area. It is most noticeable on thin horizontal lines, particularly on bright lines against a dark background. It is not seen on computer monitors because all the horizontal lines that make up the image are drawn on the screen in one pass from top to bottom, 60 or 70 times a second. When the same image is converted to video, a single line will only be drawn on the screen either 30 (NTSC) or 25 (PAL) times a second. This rate is not rapid enough to make your brain register each *drawing* of the line as the same *continuous* line, so the line appears to flicker. The anti-flicker filter in your Dual System Video Converter employs an advanced design technique to overcome this problem with only a very slight loss in vertical detail.

6. Troubleshooting

This chapter lists some concerns that commonly arise during operation of the Dual System Video Converter, as well as some possible causes and remedies.

Nothing works or no computer output.

1. Is the power supply connected and plugged into the AC wall outlet? Check the red POWER LED. If it's on, go to Step 2.

2. Is the wiring from your computer to the Converter and from the Converter to your video equipment properly connected? If it is, go to Step 3.

3. Is the computer sending out a proper video signal? Check the green LOCK LED. If it's on, try connecting your computer directly to a monitor. If the monitor's display looks OK, call technical support or your supplier for further assistance.

No video outputs.

1. Is the FREEZE IMAGE switch in the FREEZE IMAGE position? If not, go to Step 2.

2. Is your video equipment in the proper mode to accept direct video input? If it is, go to Step 3.

3. Is the computer sending out a proper video signal? Check the green LOCK LED. If it's on, try connecting your computer directly to a monitor. If the monitor's display looks OK, call technical support or your supplier for further assistance.

Some of the image is being lost off the sides or top and bottom.

Is the UNDERSCAN switch in the NORMAL position? If not, or if moving it doesn't help, then your TV or monitor has an excessive amount of overscan. If possible, try a different TV or monitor. If this can't be done or still doesn't help, call technical support or your supplier for further assistance.

Appendix A: S-Video, the Improved Quality Video Standard

Most of us are familiar with two forms of TV video: (1) "RF," which is how broadcast and cable TV comes into our homes, and (2) "Composite Video," "Baseband Video," or just plain "Video," which is a single electrical signal (made up of brightness, color, and synchronizing components) used by most VCRs.

A problem arises when your TV, monitor, or VCR has to break either of these signals apart to show it on the screen or record it on tape. A lot of processing is involved and distortions of the image occur.

Several years ago, TV engineers devised a simple scheme which was not only relatively inexpensive to implement but very effective in reducing these distortions. It is called "S-Video," and can be used with your Dual System Video Converter.

In this TV-signal system, there are actually two signals. The "LUMINANCE" ("Y") signal carries the sync and brightness components of the picture, while the "CHROMINANCE" ("CHROMA" or "C") signal carries the color component. By feeding these two signals into your video equipment separately, S-Video eliminates the need for the equipment to do the work of separating the signals internally. The result is a displayed image that has more detail and less color distortion. If you were to compare two otherwise identical images, one displayed using Video mode and the other using S-Video, the difference in the quality of the images would be dramatic.

Almost all of the new larger-screen TVs that have audio/video jacks also have an S-Video jack just like the one on the rear of your Converter. If it is available, use it! You will see a difference.

Appendix B: Connector Pinouts

POWER

Center	+5 VDC In
Outer	Ground

VIDEO IN ("COMPUTER IN")

	VGA	Macintosh
1	Red	Red
2	Green	Green
3	Blue	Blue
4	N/C	ID Bit Lo-Res Out
5	Ground	Ground
6	Red Ground	Red Ground
7	Green Ground	Green Ground
8	Blue Ground	Blue Ground
10	Ground	Ground
11	Ground (ID bit 0)	Ground
13	H-Sync In	Comp Sync In
14	V-Sync In	V-Sync In
15	ID bit 3	H-Sync In

COMPUTER OUTPUT

	VGA	Macintosh
1	Red	Red
2	Green	Green
3	Blue	Blue
5	Ground	Ground
6	Red Ground	Red Ground
7	Green Ground	Green Ground
8	Blue Ground	Blue Ground
9	N/C	ID Bit Lo-Res In
10	Ground	Ground
12	ID bit 1	N/C
13	H-Sync Out	Comp Sync Out
14	V-Sync Out	V-Sync Out
15	ID bit 3	H-Sync Out

COMPOSITE VIDEO OUTPUT
("VIDEO")

Center	Video Out
Outer	Video Ground

S-VIDEO OUTPUT

1	Ground
2	Ground
3	Luminance
4	Chrominance

RGBS OUTPUT
("RGB/EXPANSION")

1	Ground
2	Ground
3	Red
5	Green
7	Blue
15	Composite Sync

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