

# D4E Serial Digital Encoder

## User Manual



**AJA**  
AJA VIDEO SYSTEMS INC

December 5, 2003 P/N 101634-00

## Trademarks

---

AJA, Io, and Kona are trademarks of AJA Video, Inc. All other trademarks are the property of their respective holders.

## Notice

---

Copyright © 2003 AJA Video, Inc. All rights reserved. All information in this manual is subject to change without notice. No part of the document may be reproduced or transmitted in any form, or by any means, electronic or mechanical, including photocopying or recording, without the express written permission of AJA Inc.

## FCC Emission Information

---

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. Changes or modifications not expressly approved by AJA Video can effect emission compliance and could void the user's authority to operate this equipment.

## Contacting Support

---

To contact AJA Video for sales or support, use any of the following methods:

443 Crown Point Circle, Grass Valley, CA. 95945 USA

Telephone: +1.800.251.4224 or +1.530.274.2048

Fax: +1.530.274.9442

Web: <http://www.aja.com>

Support Email: [support@aja.com](mailto:support@aja.com)

Sales Email: [sales@aja.com](mailto:sales@aja.com)

When calling for support, have all information on the product (serial number etc.) at hand prior to calling.

## Limited Warranty

---

AJA Video warrants that this product will be free from defects in materials and workmanship for a period of **five** years from the date of purchase. If a product proves to be defective during this warranty period, AJA Video, at its option, will either repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product.

In order to obtain service under this warranty, you the Customer, must notify AJA Video of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. The Customer shall be responsible for packaging and shipping the defective product to a designated service center nominated by AJA Video, with shipping charges prepaid. AJA Video shall pay for the return of the product to the Customer if the shipment is to a location within the country in which the AJA Video service center is located. Customer shall be responsible for paying all shipping charges, insurance, duties, taxes, and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. AJA Video shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than AJA Video representatives to install, repair or service the product, b) to repair damage resulting from improper use or connection to incompatible equipment, c) to repair any damage or malfunction caused by the use of non-AJA Video parts or supplies, or d) to service a product that has been modified or integrated with other products when the effect of such a modification or integration increases the time or difficulty of servicing the product.

THIS WARRANTY IS GIVEN BY AJA VIDEO IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED. AJA VIDEO AND ITS VENDORS DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. AJA VIDEO'S RESPONSIBILITY TO REPAIR OR REPLACE DEFECTIVE PRODUCTS IS THE WHOLE AND EXCLUSIVE REMEDY PROVIDED TO THE CUSTOMER FOR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES IRRESPECTIVE OF WHETHER AJA VIDEO OR THE VENDOR HAS ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES.

## Introduction

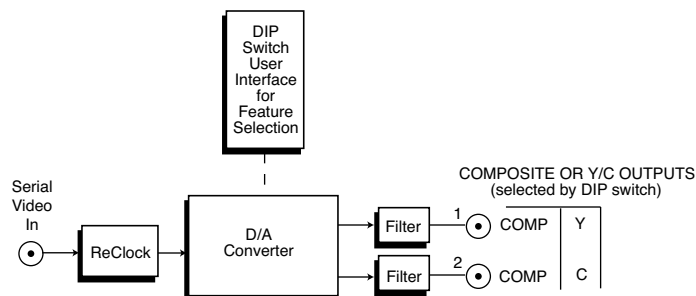
The D4E SDI Encoder provides the lowest cost all-digital conversion of Component Serial Digital (SDI) to analog NTSC or PAL Composite or Y/C (S Video). The D4E is useful for monitoring, level and phase checking, dubbing, or desktop video applications. The D4E automatically adapts to NTSC or PAL video standards and outputs analog NTSC (525 line input) or PAL (625 line input).

The D4E encodes the full dynamic range of input component video—values below black and above white are not clipped. In the NTSC mode, the 7.5 IRE pedestal can be disabled by external DIP switch selection. Narrow/wide H/V blanking are also configurable via DIP switches.

## Features

- SDI Input, SMPTE 259M
- Lowest-Cost SDI to NTSC/PAL Available
- 2 Composite-Y/C Analog Outputs
- Automatic NTSC/PAL Selection
- Built-In Test Pattern
- Ultra-Miniature Size Mounts Anywhere
- External DIP switch user interface for configuration

## Block Diagram



*D4E SDI to Analog Component and Composite Converter, Block Diagram*

## I/O Connections



*D4E, Side View*

## User Controls

The user interface for the D10CE is a 4-switch DIP accessible through a cut-out in the bottom of the unit. Use the DIP switches to configure output, pedestal, blanking, and enable or disable the test signal output.

Switches 1 through 3 control the format of the output BNC. Switch 4 turns the test signal on and off. The exact function of each DIP switch and what it controls is described on the following pages.

Dip Switch Functions All dip switches are accessible through a cut-out in the bottom of the unit.



DIP Switches

OFF ↔ ON

### Switch 1—Selects Y/C or Composite Output at the 2 Output BNCs

ON	OFF
Selects Y/C (S-video) output at the two BNCs	Selects composite video output at the two BNCs

### Switch 2—Configure Blanking

ON	OFF
<b>WIDE Blanking:</b> Vertical— Line numbers indicate where video starts) line 20, field 1; line 20, field 2 (525 line) line 23, field 1; line 336, field 2 (625 line) Horizontal— Active video line duration ITU-R/SMPTE (710 pixels NTSC, 702 pixels PAL)	<b>NARROW (NAR) Blanking:</b> Vertical— Line numbers indicate where video starts line 13, field 1; line 12, field 2 (525 line) line 10, field 1; line 322, field 2 (625 line) Horizontal— Active video line duration's) ITU-R.470 (720 pixels PAUNTSC)~

### Switch 3—Configure Pedestal For Composite/Sync BNC

ON	OFF
7.5 IRE pedestal for NTSC (also selects BETA 525 levels for YPbPr)	No pedestal (also selects SMPTE levels for YPbPr)

**Note:** There is no effect with 625 input.

### Switch 4—Turn Test Signal Output On or Off

ON	OFF
Output 75% Color Bars (requires a valid SDI input)	Normal Operation—no test signal is output

**Notes:**

1. The D4E is programmed for a 1.3 MHz chroma bandwidth when operating in composite video mode. This provides the best quality video when encoding component digital video. However with lower cost monitors, it may be desirable to reduce the composite chroma bandwidth to 650 KHz to reduce the effects of cross-color artifacts. This option is available from AJA Video as a special order.

2. The encoder D-to-A chip used in the D4E has an 8-bit input for component digital video and 10-bit D-to-A converters for the analog outputs. This configuration is often described as an 8-bit “signal path” and 10-bit “Quantization.” Due to the internal processing of the encoder chip, it is advantageous to use 10-bit D-to-A converters at the output even though the input is 8-bits.

## Installation

---

Typically, D10CE installation consists of the following:

1. disconnect +5VDC from the convertor
2. configure the DIP switch for the desired equipment configuration and video formats
3. connect video equipment to the convertor BNCs
4. apply +5VDC power to the converter (AJA power supply model DWP)

## Specifications

---

Item	Specification
Serial Input	SMPTE 259M 270MB, (SDI)
SDI Cable Equalization	300 meter 8281 typical
Outputs	NTSC/PAL, 2 BNC Or NTSC/PAL Y/C, 2 BNC
Frequency Response	+/- .25dB to 5.5MHz (Y) +/- .25dB to 2.0MHz (Chroma - S-Video) +/- .25dB to 1.3MHz (Chroma - Composite)
2T K factor	< 1% (Y)
Differential Gain	< 1 .5%
Differential Phase	< 1 .5 degree
Y/C delay	10ns maximum
D/A Converters	10 bits
Signal Path	8 bits
Delay (input to output)	1.5us
Output level adjustment	+/- 20% (internal)

<b>Item</b>	<b>Specification</b>
Output level matching	1 .5% or 10mv (All outputs are separately buffered)
Power (AJA power supply model DWP)	5v DC regulated, 2 watt
Size	5.1" x 1.8" x 1" (131 x 44 x 25 mm)