

## Introduction

The AH8308EC is a third generation hybrid triple (RGB) 8-bit video DAC that provides designers of color display systems with a complete, self-contained, ECL-compatible RGB composite video subsystem in a 40-pin DIP. The AH8308EC features an advanced design that provides a low power (2.5W maximum), highly reliable and low cost video DAC. The small size of the AH8308EC reduces the PC board area by 30% or more for the equivalent function implemented with single channel DACs.

Each of three video DACs within the AH8308EC accepts 8-bit ECL data at an update rate of up to 150 MHz. Common Blanking and Strobe, and Sync (GREEN channel only) controls are provided. Blanking is synchronous with Strobe when activated, and asynchronous when deactivated. The video output for each channel is RS330/343 compatible, providing a 75Ω source impedance and a 1V p-p output signal.

The AH8308EC is a cost-effective solution to the requirement for a triple 8-bit composite video DAC in applications ranging from engineering workstations, to CAD/CAM systems, to medical imaging and other high-end graphics systems.

## Features

- Three 8-bit Video DACs in One 40-Pin DIP
- 150 MHz Update Rate
- ECL Compatible
- Synchronous Blanking
- RS343/330 Composite Video Output Compatible
- Low Power Dissipation — 2.0W

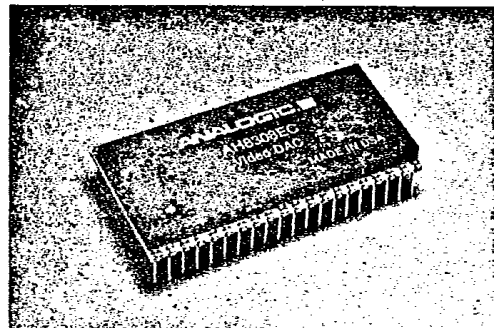
## Applications

- Color Graphic Workstations
- CAD/CAM Systems
- Medical Imaging Systems
- "Quick Look" Display Systems
- Image Processing Systems

## Operation

Each of the three DAC inputs is presented with an 8-bit data word corresponding to the intensity required for each CRT electron gun. After allowing for the data setup time, a high-to-low transition on the STROBE input causes the three 8-bit data words to be latched into the DACs. After the DAC propagation delay, each video output will produce a voltage corresponding to the data loaded into its DAC.

During the blanking interval, the BLANKING control line is activated by a logic 1. At the next STROBE pulse, the three DAC input registers are reset to 0000 0000 and the DAC outputs are driven to the blanking level. When the SYNC line is then activated (logic 1), the output of the GREEN channel is driven further negative to the sync level. When BLANKING (and SYNC) are deactivated at the end of the retrace interval, all three DAC outputs will remain at the Blanking level until the next STROBE pulse, when data present at the DAC inputs will be latched into their respective input registers, and will subsequently appear at the DAC outputs after the DAC propagation delay.



**ANALOGIC**

# AH8308EC

## 8-Bit RGB Video D/A Converter

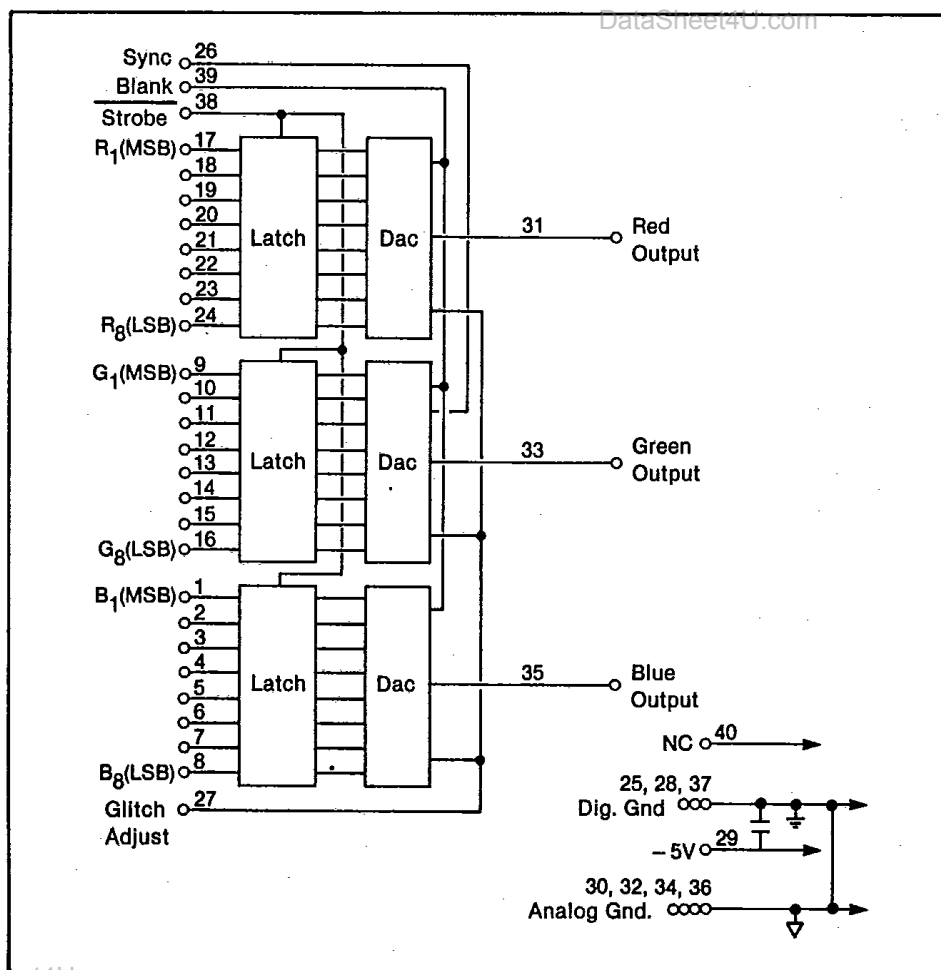


Figure 1. AH8308EC Block Diagram.

(All specifications guaranteed at 25°C unless otherwise noted)

### Output Characteristics (Each Channel)

**Composite Output (GREEN Channel only)**  
0V to -1.00V,  $\pm 3\%$  of full scale into 75 $\Omega$  termination

**Gray Scale Output (all Channels)**  
0V to -0.643V,  $\pm 3\%$  of Gray Scale into 75 $\Omega$  termination

**Recommended Load Impedance**  
75 $\Omega$ ,  $\pm 5\%$ , dc to 50 MHz

**Source (Thevenin) Impedance**  
75 $\Omega$ ,  $\pm 5\%$ , dc to 50 MHz

**LSB Size**  
2.5 mV, nominal

**Rise and Fall Time**  
3 ns typical, 4 ns maximum; 10% to 90%

**Full-Step Settling Time**  
7.5 ns typical to 1 LSB (0.4%)

**Glitch Settling Time**  
5 ns to <1 LSB for worst case transition

**Glitch Area**  
80 pV-s typical

**Cable Drive Capacity**  
75 $\Omega$  characteristic impedance; to avoid appreciable signal loss, total length should have no more than 7.5 $\Omega$  dc resistance

**Composite Sync Level (GREEN Channel Only)**  
-1.00V absolute, -0.286V (-40 IRE Units) relative to Blanking level

**Composite Blanking Level**  
-0.714V

### Transfer Characteristics (Each Channel)

**Resolution**  
8 bits, 256 Gray Scale levels; 2.5 mV per step, nominal

**Coding**  
Binary

**Reference White Level**  
1111 1111 produces 0V absolute; +0.714V (100 IRE Units) relative to Blanking level

**Reference Black Level**  
0000 0000 produces -0.643V absolute; +0.071V (10 IRE Units) relative to Blanking level

**Differential Linearity**  
 $\pm 1/2$  LSB maximum

**Monotonicity**  
Guaranteed

**Offset (Output with 1111 1111 Input)**  
 $\pm 1/2$  LSB maximum, 0°C to +55°C

**Propagation Delay**  
7 ns typical, strobe to output; 50% points

**Control Input Speed (SYNC, and BLANKING)**  
7 ns typical, 10 ns maximum to settle to 10% of final value

**Channel-to-Channel Crosstalk**  
1/2 LSB maximum, dc component 100 pV-s maximum, ac component

### Input Characteristics (Each Channel)

**Logic Levels (all inputs)**

10K Series ECL levels

Logic 0 = -1.75V

Logic 1 = -0.9V

**Loading**

(All inputs)

5 pF; open transistor base; open input is logic "0"

**Data**

**Validity**

Data must be valid 2.0 ns prior to Strobe and remain valid for 1.5 ns after data Strobe

**Update Rate**

150 MHz maximum

### Common Control Inputs

**Strobe Input**

Data entered on negative-going edge (Timing Reference) on all three channels simultaneously

**Skew**

5 ns maximum variation between channels for data latched into input registers

**Pulse Width**

5.0 ns minimum

**Rise and Fall Time**

<10 ns (10% to 90%)

### Composite Blanking

Logic 1 on Blanking input simultaneously resets all input registers to 0000 0000, and drives all channel outputs to -0.714V; Blanking is synchronous with falling edge of next STROBE pulse; after logic 1 to 0 transition, all channel outputs will remain at the Blanking level until next STROBE pulse, at which time data present at DAC inputs is loaded into the DAC

### Composite Sync

Logic 1 on SYNC input (after Blanking is activated) drives the GREEN channel output further negative to -1.00V; if activated without BLANKING, at next STROBE pulse, control resets all registers to 0000 0000, drives the RED and BLUE channels to Blanking level (-0.714V) and GREEN channel output to -1.00V; when SYNC is released (returned to logic 0), all channel outputs will remain at the Blanking level until the next STROBE pulse which will load the data present at the inputs into the DACs (assuming BLANKING control is inactive)

### Glitch Adjust

**Input Impedance**

7.5 k $\Omega$

**Control Characteristics**

75 pV-s/V applied to Glitch Adjust pin

### Power Supply Requirements

-5.0V

500 mA maximum; 5 mV p-p ripple maximum (-4.75V to -5.5V operating range)

**Power Dissipation**

2.0 watts typical, 2.5 watts maximum

### Environmental and Mechanical

**Operating Temperature Range**

0°C to +70°C

**Storage Temperature**

-25°C to +100°C

**Relative Humidity**

0 to 85%, non-condensing up to +40°C

**Mechanical Dimensions**

2.0" x 1.0" x 0.3"; 40-pin triple width DIP

## Using the AH8308EC

### Power Supply Requirements

The AH8308EC requires a -5V power supply. The output amplitudes specified are nominal values based on a -5.0V supply and will change in direct proportion to the -5.0V supply voltage.

The glitch area will also vary as a function of the -5V supply voltage. The factory trim is normally carried out at -5.0V and may be done at another voltage if specified when ordering.

If other than -5.0V (measured directly at pin 29) is used with a unit trimmed for -5.0V operation, provisions should be made on the PC board for a 10 k $\Omega$  potentiometer connected to the GLITCH ADJUST pin (pin 27) as shown in Figure 2. The pot should be adjusted to reduce the glitch area to a minimum.

### Grounding

There are seven (7) ground pins all tied together internally via ground plane. To reduce ground loops, each ground pin should be used for the function for which it is labelled.

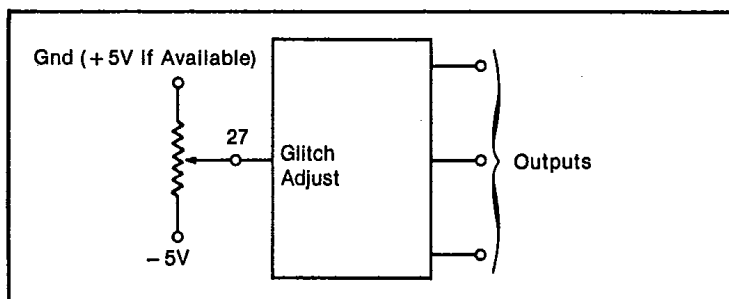
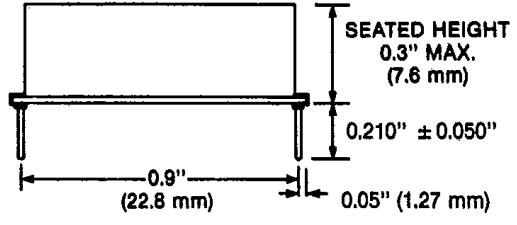
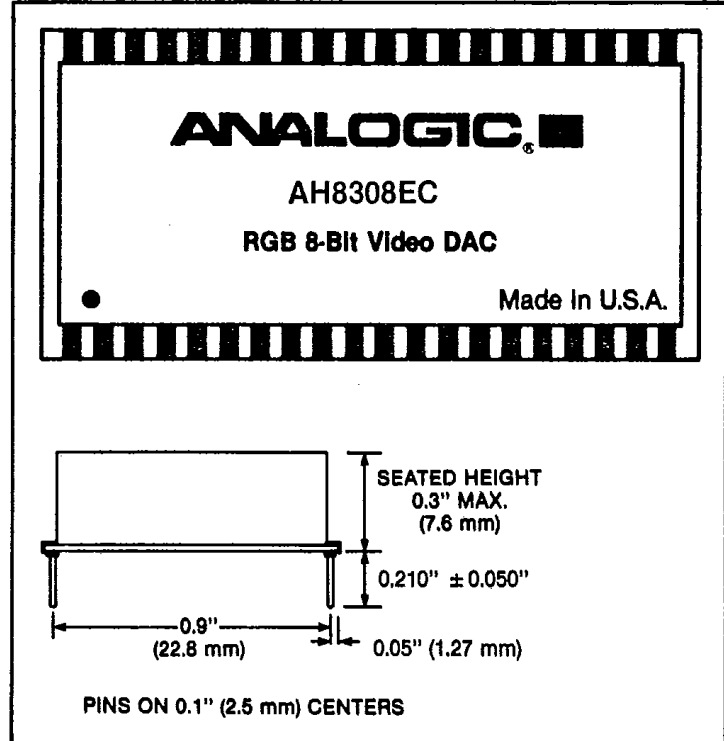


Figure 2. Glitch Adjust.

B1 (MSB)	● 1	40 ●	N/C
B2	● 2	39 ●	Blanking
B3	● 3	38 ●	Strobe
B4	● 4	37 ●	Digital Ground
B5	● 5	36 ●	Analog Ground (Blue)
B6	● 6	35 ●	Blue Ana Output
B7	● 7	34 ●	Analog Ground (Green)
B8	● 8	33 ●	Green Ana Output
G1 (MSB)	● 9	32 ●	Analog Ground (Red)
G2	● 10	31 ●	Red Ana Output
G3	● 11	30 ●	Analog Ground
G4	● 12	29 ●	- 5V
G5	● 13	28 ●	Digital Ground
G6	● 14	27 ●	Glitch Adjust
G7	● 15	26 ●	Sync
G8	● 16	25 ●	Digital Ground
R1 (MSB)	● 17	24 ●	R8 (LSB)
R2	● 18	23 ●	R7
R3	● 19	22 ●	R6
R4	● 20	21 ●	R5

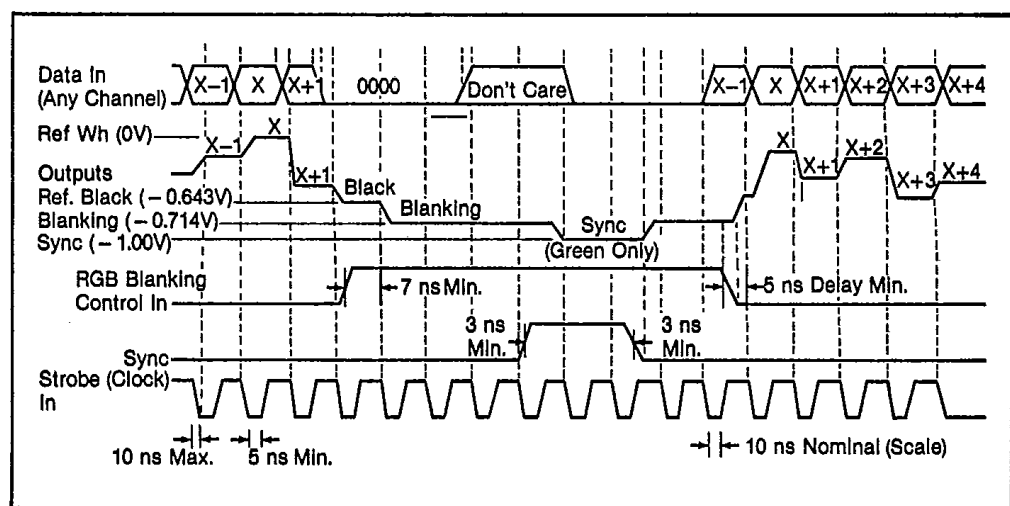


PINS ON 0.1" (2.5 mm) CENTERS

**Mechanical**

All ground pins (25, 28, 30, 32, 34, 36, and 37) are connected via ground plane. However, to reduce loops each ground should be used as it is functionally labelled.

**Pinout**



**AH8308EC Typical Timing**

**Ordering Guide**

150 MHz, RGB 8-bit video DAC.....specify AH8308EC