ANALOG DEVICES

RGB to NTSC/PAL Encoder with Termination Switch

Advanced Datasheet

AD723

FEATURES

Composite Video Output: both NTSC and PAL
    Chrominance and Luminance (S-Video) Outputs
Triple Switch to Enable RGB Termination
TV-Presence Monitor/Reporting (supports PC98 SIPC)
Y-Trap to Eliminate Cross Color Artifacts
No External Filters or Delay Lines Required
Current Output: 75 Ω Reverse Shunt
Low Power +3V operation
    Power Down to <100 µA
Compact TSSOP

APPLICATIONS

RGB/VGA to NTSC/PAL Encoding
    Personal Computers
    Video Games

ORDERING GUIDE

| Model	Operating Temperature Range	Package
AD723ARS	-40°C - +85°C	24 Lead TSSOP

PRODUCT DESCRIPTION

The AD723 RGB to NTSC/PAL Encoders converts red, green and blue color component signals into their corresponding luminance (baseband amplitude) and chrominance (subcarrier amplitude and phase) signals in accordance with either NTSC or PAL standards. These two outputs are also combined to provide a composite video output. All three outputs are available separately and are optimized for driving 75-ohm reverse-terminated cables.

The AD723 features a logic controlled triple switch which addresses the applications problem of differing load conditions when a RGB monitor is disconnected; when a RGB monitor is not present the R, G and B terminations are enabled by the user. In addition the AD723 monitors and reports the presence of a TV load in support of the PC-98 SIPC standard.

The AD723 can be powered-down to only 100 uA of current consumption for power sensitive applications. In addition the current-out design of the AD723 eliminates the need for the physically large 220uF capacitors required by other analog encoders, supporting the space constraints of portable applications.

An optional luminance trap (YTRAP) provides a means of reducing cross color generated by subcarrier frequency components found in the Y signal.

The AD723 is packaged in a space savings 24 pin TSSOP and operates from a 3V supply.
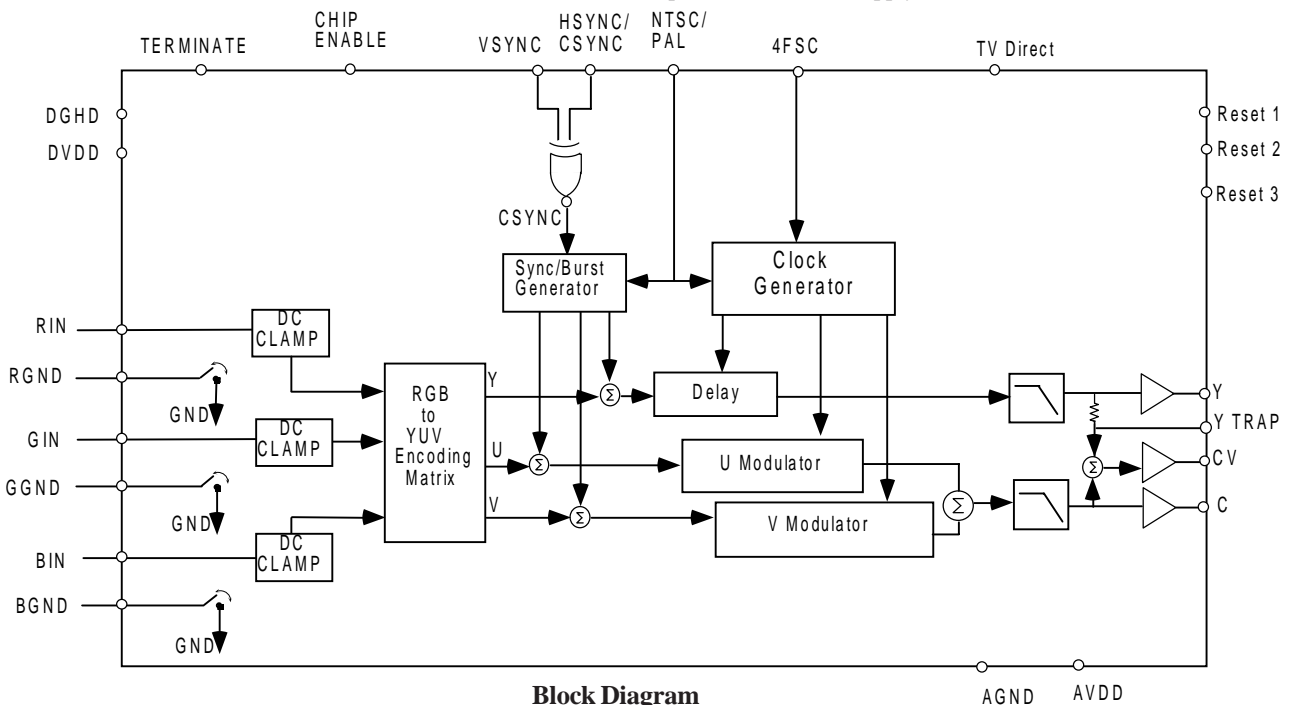

Block Diagram

REV 2
5/5/98

AD723 ADVANCED SPECIFICATIONS: Unless otherwise stated, V_S =+3V, T_A = +25ºC. Outputs are measured with a 75Ω load, shunt reverse termination

Parameter	Conditions	Min	Typ	Max	Units
SIGNAL INPUTS (RDIN, GRIN, BLIN)					
Input Amplitude	Full Scale		714		mVp-p
Black Level [1]			0.8		V
Input Resistance [2]	Red, Green, Blue	1			mΩ
Input Capacitance			5		pF
LOGIC INPUTS (SYNC, FSC, ENCD, NTSC)	CMOS logic levels				
Logic LO Input Voltage				1.0	V
Logic HI Input Voltage		2.0			V
Logic LO Input current (DC)			<1		µA
Logic HI Input Current (DC)			<1		µA
SWITCH CHARACTERISTICS					
Input Capacitance	VIN = 0V			6	pF
Switch On Resistance	VIN = 0V		3.5	5	Ω
High Impedance Leakage Current				0.1	µA
VIDEO OUTPUTS [3]					
Luminance (LUMA)					
Roll-off @ 5MHz	NTSC		-5		dB
	PAL		-4		dB
Gain Error			+5		%
Linearity Error			+0.6		%
Sync Amplitude	NTSC		286		mV
	PAL		300		mV
DC Black Level	NTSC		338		mV
	PAL		351		mV
Luminance Trap (YTRAP)					
Output Resistance			1		KΩ
DC Black Level	No load		1.0		V
Chrominance (CRMA)					
Bandwidth,-3dB Passband	NTSC		31.2		MHz
	PAL		1.5		MHz
Color Burst Amplitude	NTSC		286		mVp-p
	PAL		307		mVp-p
Color Signal to Burst Ratio Error [4]			±3		%
Color Burst Width	NTSC		2.51		us
	PAL		2.28		us
Phase Error [5]			±3		Degrees
DC Black Level			650		mV
Chroma Feedthrough	R,G,B = 0		10	40	mVp-p
Chroma/Luma Time Alignment Error			0		ns
Composite (CMPS)					
Absolute Gain Error		-5	±1	5	%
Differential Gain	With respect to Chroma		0.5		%
Differential Phase	With respect to Chroma		2.0		%
DC Black Level	NTSC		338		mV
	PAL		351		mV
POWER SUPPLIES					
Recommended Supply Range	Single Supply		3.0		V
Encode Mode Quiescent Current	Full white				
	Using composite only		45	50	
	Using S-Video (Y,C)		70	75	
	Using all three		85	90	

Notes:
1. On-Chip DC restore requires an external AC-coupling capacitor.
2. Except during DC Restore (back porch) period.
3. Voltages are measured with a 75Ω load, and 75Ω shunt reverse termination.
4. Ratio of chroma amplitude to burst amplitude, difference from ideal.
5. Difference between ideal color-bar phases and the actual values.

AD723 Application
ANALOG RGB ENCODER with ON-CHIP TERMINATION SWITCH
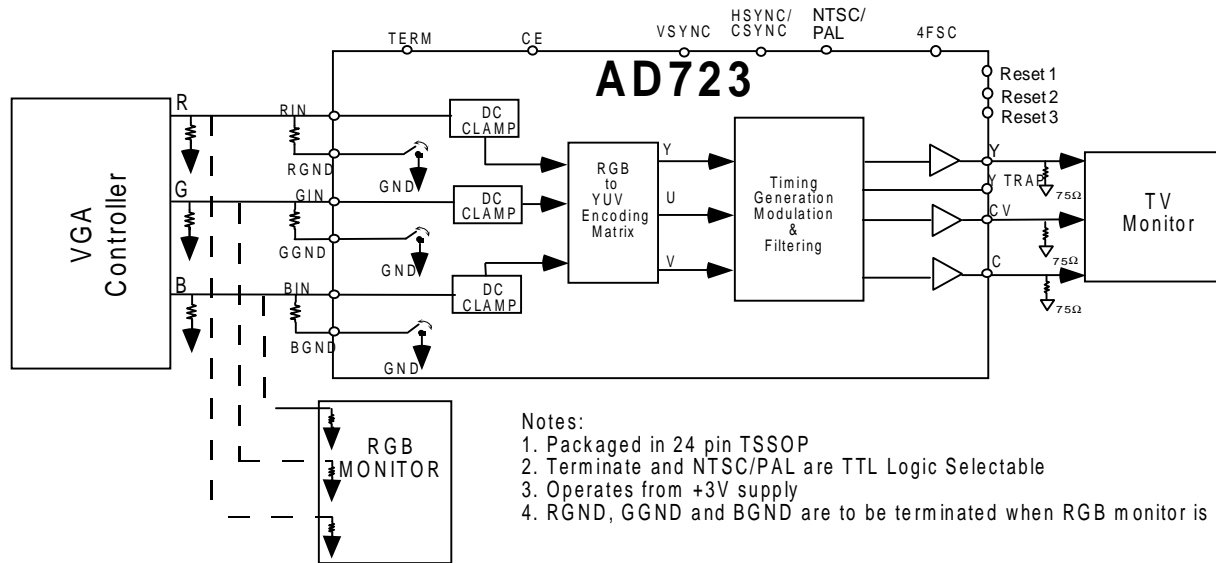
Notes:
1. Packaged in 24 pin TSSOP
2. Terminate and NTSC/PAL are TTL Logic Selectable
3. Operates from +3V supply
4. RGND, GGND and BGND are to be terminated when RGB monitor is removed.