CXA2075

RGB Encoder

Description

The CXA2075P/M is an encoder IC that converts analog RGB signals to a composite video signal. This IC has various pulse generators necessary for encoding. Composite video outputs and Y/C outputs for the S terminal are obtained just by inputting the composite sync, subcarrier and analog RGB signals.

It is best suited to image processing of personal computers and video games.

Features

- Single 5 V power supply
- Compatible with both NTSC and PAL
- Built-in 75Ω drivers (composite video output, Y output, C output, RGB outputs)
- >30MHz high resolution RGB outputs
- Extended frequency response for better than broadcast quality chroma and luminance resolution.
- Subcarrier input can be sine wave or pulse
- Built-in wideband filter for the C signal and delay line for the Y signal
- Built-in R-Y and B-Y modulator circuits
- Built-in PAL alternate circuit
- Burst Flag Generator circuit
- Half H killer circuit
- Built-in chroma trap circuit
- Eliminated external precision components

Structure

Bipolar silicon monolithic IC

Absolute Maximum Ratings

•Supply voltage	Vcc	14	V
•Operating temperature	T_{opr}	-20 to + 75	˚C
•Storage temperature	T_{stg}	-65 to +150	˚C
•Allowable power dissipation	P_D	CXA2075P 1250	mW
		CXA2075M 780	mW

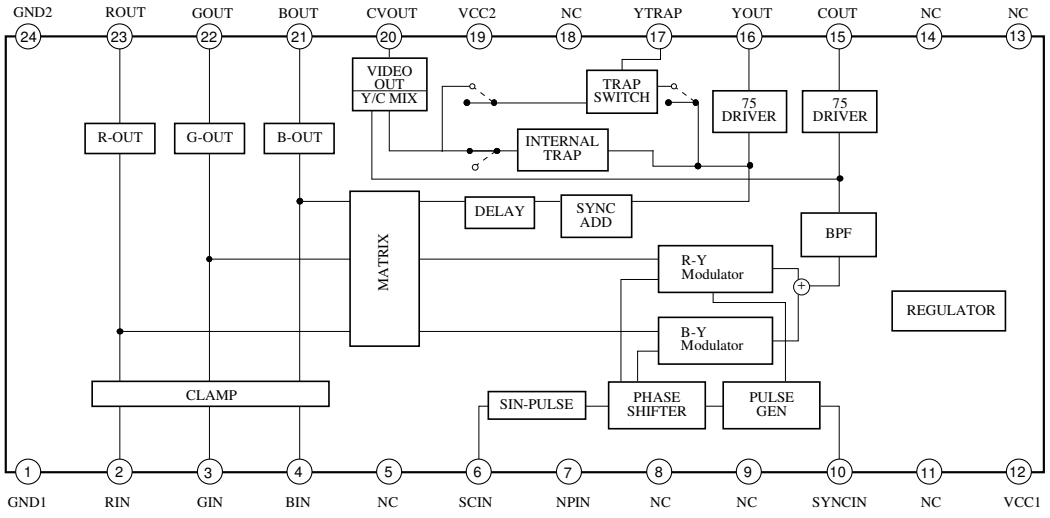
Recommended Operating Condition

•Supply voltage	Vcc 1,2	5.0±0.25	V

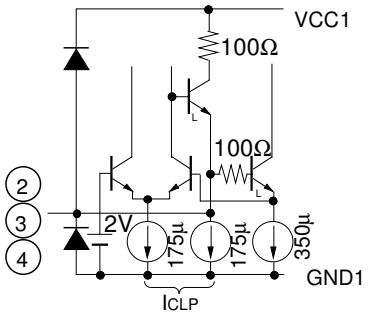
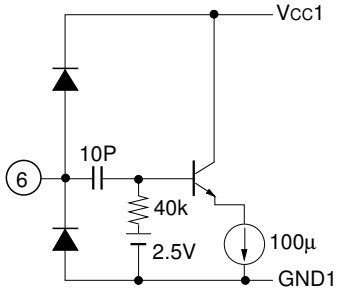
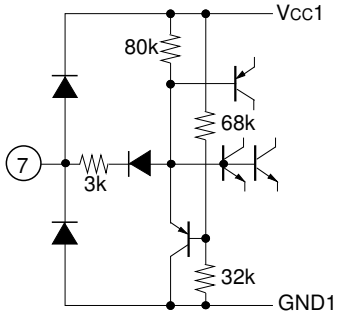
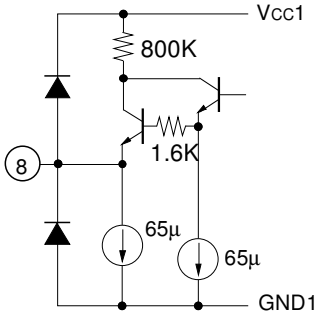
Applications

Image processing of video games and personal computers

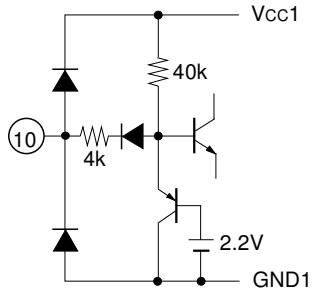
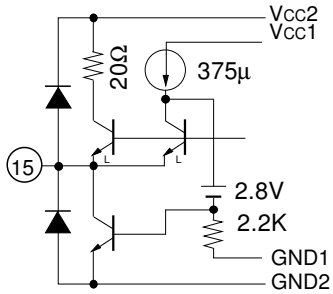
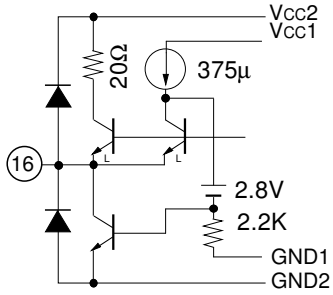
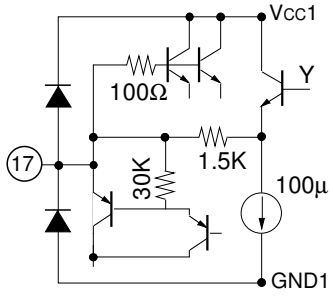
CXA2075 Block Diagram and Pin Configuration



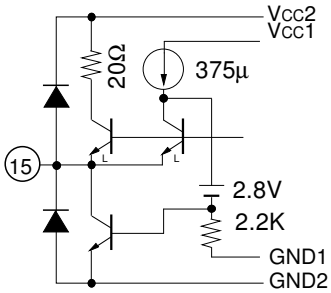
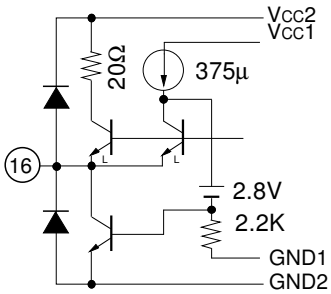
Pin Description

Pin No.	Symbol	Pin Voltage	Equivalent Circuit	Description
1	GND1	0 V *		Ground for all circuits other than RGB, composite video and Y/C output circuits. The leads to GND2 should be as short and wide as possible.
2 3 4	RIN GIN BIN	Black level when clamped 2.7 V		Analog RGB signal inputs. Input 100% = 1 Vp-p (max.). To minimize clamp error, input at as low impedance as possible. I_{CLP} turns ON only in the burst flag period.
5	NC			NO CONNECTION
6	SCIN	——		Subcarrier input. Input 0.4 to 5.0 Vp-p sine wave or pulse. Refer to Notes on Operation, Nos. 3 and 5.
7	NPIN	1.7 V		Pin for switching between NTSC and PAL modes NTSC: Vcc, PAL: GND
8	BFOUT	H 3.6 V L 3.2 V		BF pulse monitoring output. Incapable of driving a 75Ω load.

Pin Description

Pin No.	Symbol	Pin Voltage	Equivalent Circuit	Description
10	SYNC IN	2.2V		Composite sync signal input. input TTL-level voltages. L (≤ 0.8 V): SYNC period H (≥ 2.0V)
12	Vcc1	5.0 V*		Power supply for all circuits other than RGB, composite video and Y/C output circuits. Refer to Notes on Operation, Nos. 4 and 10
15	COUT	1.0V		Chroma signal output. Capable of driving a 75Ω load. Refer to notes on operation, Nos. 6 and 9.
16	YOUT	1.3 V		Y signal output. Capable of driving a 75Ω load. Refer to notes on operation, Nos. 6 and 9.
17	YTRAP	Vcc - 1.0 V		Pin for reducing cross color caused by the subcarrier frequency component of the Y signal. When the CVOUT pin is in use, EITHER conect a resistorbetween YTRAP and VCC, (3.3K for NTSC) to enable the internal trap OR connect a capacitor or a capacitor and an inductor in series between YTRAP and GND. No influence on YOUT pin. For choosing component values, see Notes on Operation, No. 8

Pin Description

Pin No.	Symbol	Pin Voltage	Equivalent Circuit	Description
19	$V_{CC}2$	5.0 V*		Power supply for RGB, composite video and Y/C output circuitsDecouple this pin with a large capacitor of 10 µF or above as a high current flows. Refer to Notes on Operation, Nos. 4 and 10
20	CVOUT	1.0V		Composite video signal output. Capable of driving a 75Ω load. Refer to notes on operation, Nos. 6 and 9.
21 22 23	BOUT GOUT ROUT	1.0 V 1.0 V 1.0 V		Analog RGB signal outputs. Capable of driving a 75Ω load. Refer to notes on operation, Nos. 6 and 9.

Electrical Characteristics

Item	Symbol	S1	S2	S3	S4	S5	Measurement point	Measurement Conditions	Min.	Typ.	Max.	Unit.
		RIN GIN BIN	SCIN	NPIN	SYNC IN	FO						
Current Consumption 1	I_{CC1}	2 V	SG4	5 V	SG5	20K	I_{CC1}	No input signal, SG5: CSYNC TTL level, SG4: SIN wave 3.58 MHz 0.5 Vpp Figure 1		50		mA
Current Consumption2	I_{CC2}						I_{CC2}			30		
[R. G. B OUT]												
RGB output voltage	Vo(R)	SG1			2V		D	SG1 to SG3: DC direct coupling $2.5V_{DC}$, 1.0Vp-p f=200kHz Pin 9 = clamp voltage Figure 2	0.64	0.71	0.78	Vp-p
	Vo(G)	SG2					E					
	Vo(B)	SG3					F					
RGB output frequency characteristic	Vo(R)	SG1			2V		D	SG1 to SG3: DC direct coupling $2.5V_{DC}$, 1.0Vp-p f=200kHz/27MHz Pin 9 = clamp voltage Figure 2		-0.6		dB
	Vo(G)	SG2					E					
	Vo(B)	SG3					F					
[YOUT & CVOUT]												
Output sync level	Vo(YS1/2)	SG1 to SG3	0V	5V	SG5	20k	B/C	SG1 to SG3: 100% color bar input, 1.0 Vp-p (Max.) SG5: CSYNC TTL level Figure 4	0.26	0.29	0.33	Vp-p
R100%: Y level	Vo(YR1/2)								0.17	0.21	0.26	V
G100%: Y level	Vo(YG1/2)								0.35	0.42	0.49	V
B100%: Y level	Vo(YB1/2)								0.065	0.08	0.095	V
White100%: Y level	Vo(YW1/2)								0.6	0.71	0.82	V
Output frequency characteristic	f_C (Y1/2)	SG1 to SG3	0V	5V	2V	20k		SG1 to SG3: DC direct coupling $2.5V_{DC}$, 1.0Vp-p f=200kHz/5MHz Pin 9 clamp voltage.Figure 3		-0.5		dB
[COUT & CVOUT]												
Burst levell	Vo(BN1/2)	SG1 to SG3	SG4	5V	SG5	20k	A/C	SG1 to SG3: 100% color bar input, 1.0 Vp-p (Max.) SG4: SIN wave, 3.58MHz 0.5Vp-p SG5: CSYNC TTL level. Figure5	0.22	0.28	0.33	Vp-p
R chroma ratio	R/BN1/2								2.84	3.16	3.48	
R phase	$\theta_{R1/2}$								94	104	114	deg
G chroma ratio	G/BN1/2								2.65	2.95	3.25	
G phase	$\theta_{G1/2}$								231	241	251	deg
B chroma ratio	B/BN1/2								2.01	2.24	2.47	
B phase	$\theta_{B1/2}$								337	347	357	deg
Burst width	tw (B) 1/2								2.5	2.75	3.2	µS
Burst position	tD (B) 1/2								0.4	0.6	0.75	µS
Output frequency characteristic	f_C (Y1/2)	SG1 to SG3	SG4	5V	SG5	20k		SG1 to SG3: No signal SG4:SIN wave, 3.58MHz 0.5Vp-p SG5: CSYNC TTL level, 3.58 MHz component measured. Figure 6			20	mV p-p
PAL burst level ratio	K (BP1/2)	SG1 to SG3	SG4	5V	SG5	16k		SG1 to SG3: No signal SG4:SIN wave, 4.43MHz 0.5Vp-p SG5: CSYNC TTL level Figure 6	0.9	1.0	1.1	
PAL burst phase	$\theta_{PAL1/2}$								125	135	145	deg
	$\overline{\theta_{PAL1/2}}$								215	225	235	

* Clamp voltage: voltage appearing at Pin 9 when CSYNC is input.