

SONY®

CXA1044BP

RGB Predriver for High Resolution Display

Description

The CXA1044BP is a bipolar IC designed for the RGB signal processing of high resolution displays.

Features

- Single power supply 12V
- Built-in wideband amplifier (with linear frequency response up to 40 MHz) (-2.0dB Typ.)
- External circuit can be simplified.

Applications

High resolution display RGB predriver and others

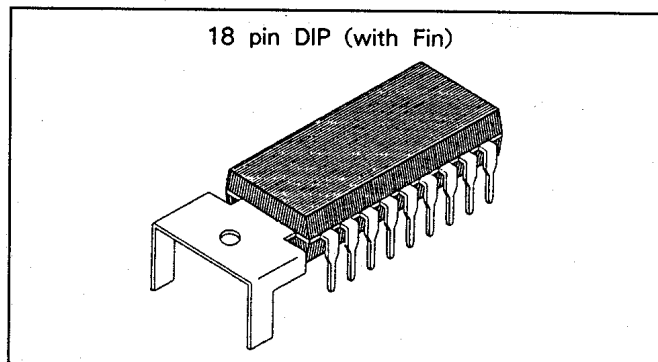
Absolute Maximum Ratings (Ta = 25°C)

- Supply voltage Vcc 15 V
- Operating temperature Topr -10 to +70 °C
- Storage temperature Tstg -65 to +150 °C
- Allowable power dissipation Pd 2.19 W
- Input voltage for each pin

Symbol	Max.	Symbol	Max.
R IN	Vcc + 0.3V	R GND	5V
G IN	Vcc + 0.3V	G GND	5V
B IN	Vcc + 0.3V	B GND	5V
CONTRAST CONT	Vcc + 0.3V		
CLAMP	Vcc + 0.3V		
BRT	Vcc + 0.3V		
ABL	Vcc + 0.3V		
BLK	Vcc + 0.3V		

Recommended Operating Condition

Supply voltage Vcc 11 to 13 V



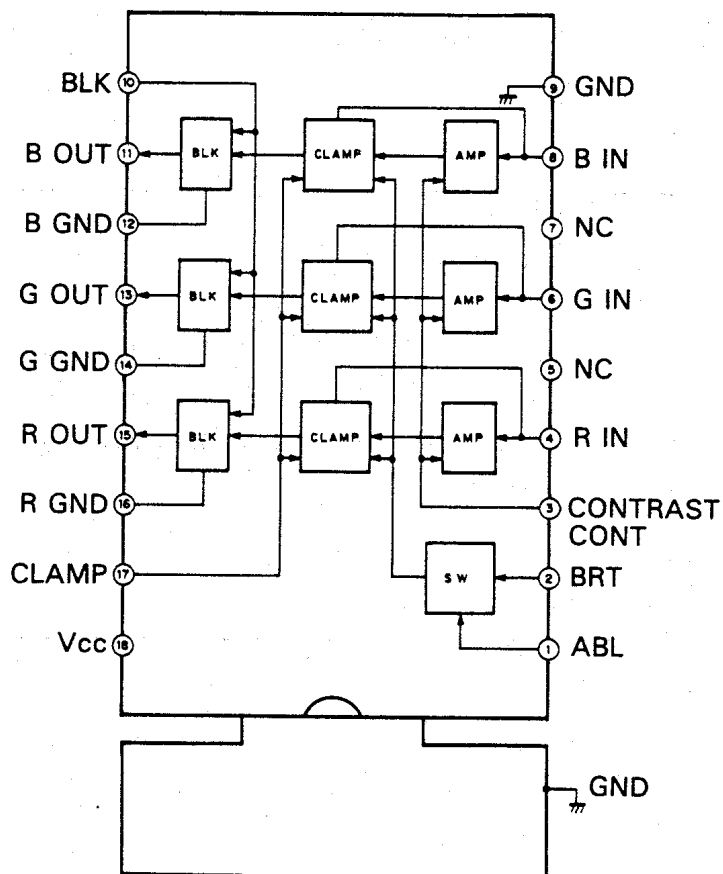
Functions

- Brightness control and contrast control
- ABL, BLK and pedestal clamp

Structure

Bipolar silicon monolithic IC

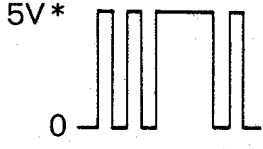
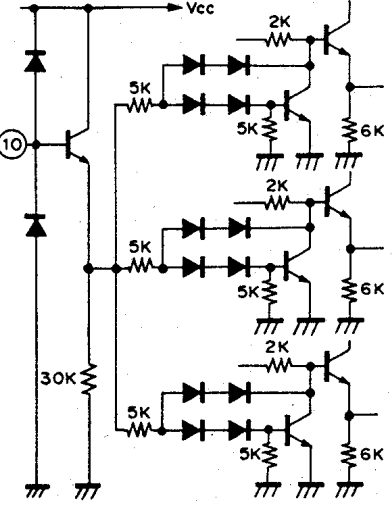
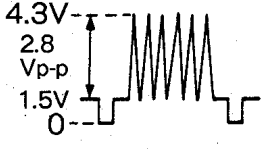
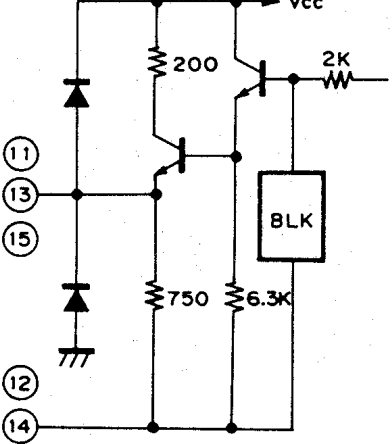
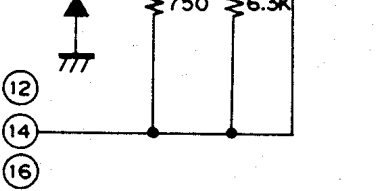
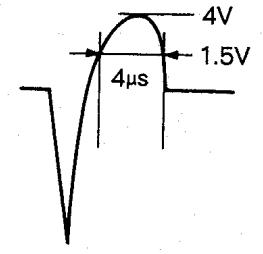
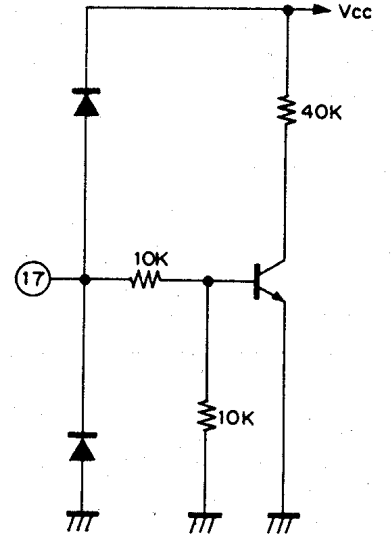
Block Diagram and Pin Configuration (Top View)



Pin Description and Equivalent Circuit


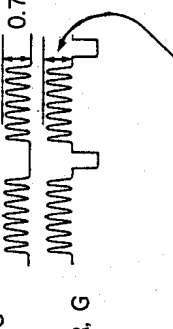
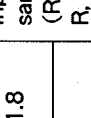
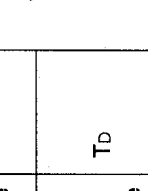
* External input voltage (DC voltage unless otherwise specified)

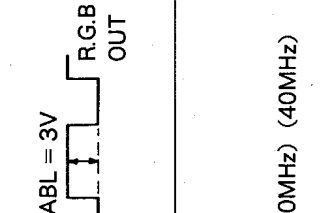
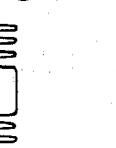
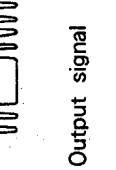
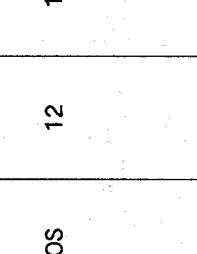
No.	Symbol	Voltage	Equivalent circuit	Description
1	ABL	+ 12V*		Pin for X-ray protection. At below threshold voltage this pin disables BRT CTL and sets BRT level to the minimum. Usually, at +12V. ABL stands for Automatic Beam Limit.
2	BRT	+ 4.5V*		DC control pin for RGB primary color pedestal level.
3	CONTRAST CONT.	+ 8.1V*		DC control pin for RGB primary color AC gain.
4 6 8	R IN G IN B IN	* 0.7V 		Signal input pins. Used for clamp operations.

No.	Symbol	Voltage	Equivalent circuit	Description
10	BLK	 <p>5V* 0</p>		<p>Input pin for composite BLK input. Reduce to ground voltage when blanking RGB primary colors.</p>
11 13 15	B OUT G OUT R OUT	 <p>4.3V 2.8V_{p-p} 1.5V 0</p>		<p>Output pins for each of RGB primary colors.</p>
12 14 16	B GND G GND R GND	0V*		<p>GND pins for each of the RGB outputs.</p>
17	CLAMP	<p>*</p>  <p>4V 1.5V 4μs</p>		<p>Clamp input pin at high, clamp operations are performed. Threshold is at 1.5V approx. When more than 4 μs pass at above threshold voltage, clamp is applied.</p>

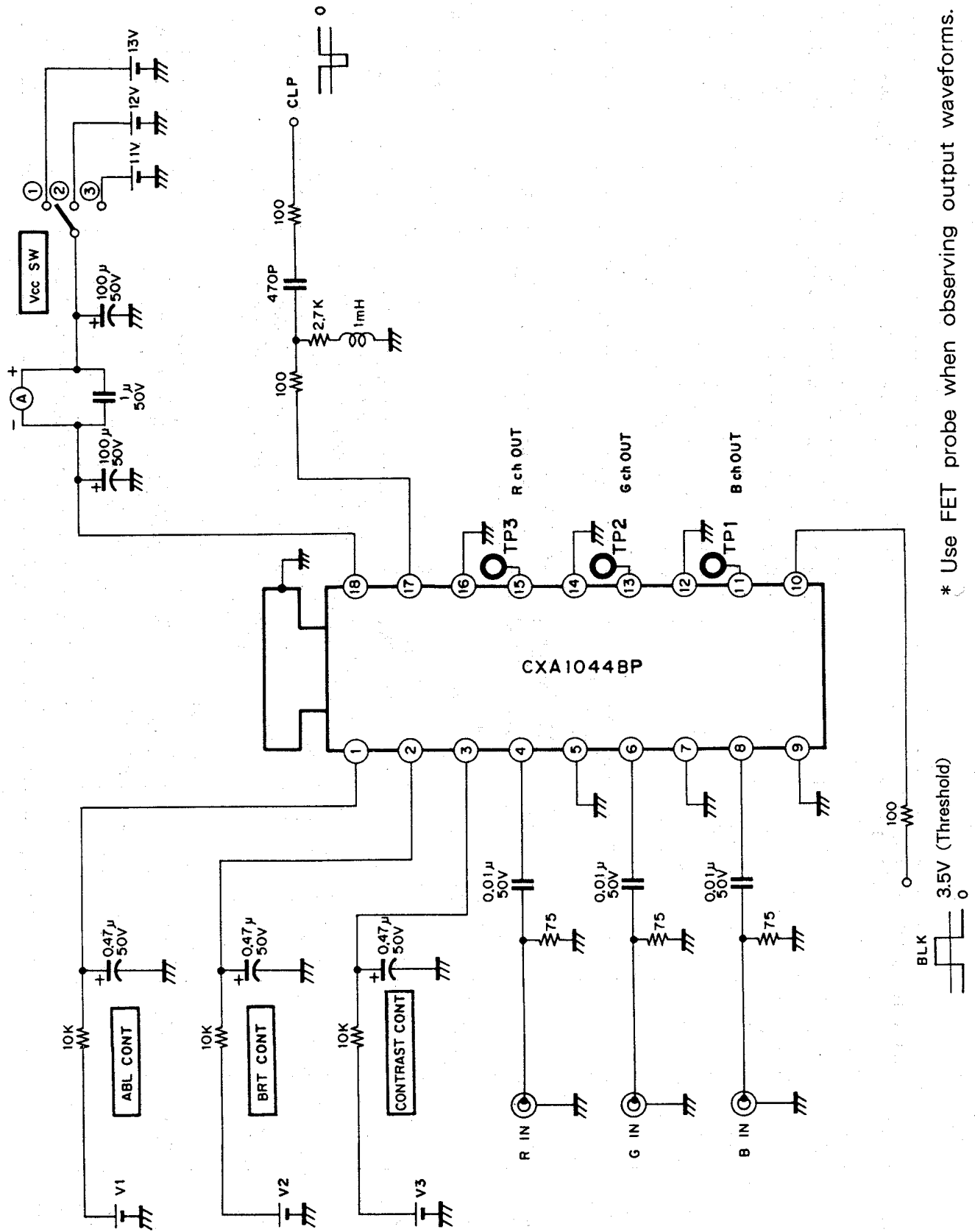
(See the Electrical Characteristics Test Circuit. Ta = 25°C Vcc = 12V)

Electrical characteristics

No.	Item	Symbol	ABL CONT (V)	BRT CONT (V)	CONTRAST CONT (V)	Input condition	Test contents and conditions	Min.	Typ.	Max.	Unit
1	Supply current	I _{CC}	12	12	8.1	Input is grounded for all 3 channels	Test consumption current when BRT and contrast control are set to MAX. 	40	53	66	mA
2	BRT characteristics MIN	BRT _{MIN}	3	1.8	4.5			Test pedestal level of R, G and B outputs when BRT control voltage is set to 1.8V and 12V.	0.7	1.0	1.3
	BRT characteristics MAX	BRT _{MAX}		12		2.7	3.1		3.55		
3	CONTRAST characteristics MIN	CONT _{MIN}	12	1.8 to 12 Option	1.8	Input (Each of R, G and B inputs) Output (Each of R, G and B outputs) V _{pp} here is tested and the value taken as V _x . Then specifications can be obtained through the following formula, $G_{CONT} = 20 \log \left(\frac{V_x}{0.7} \right) \text{ (dB)}$ 	-3.0	-1.3	0	dB	
		CONTRAST characteristics MAX			CONT _{MAX}		8.1	11.8	13.2		14.0
4	R.G.B. gain deviation	Δ CONT					Calculate the gain difference between R, G and B in 3. (Absolute value)	0	0	0.5	dB
5	Pedestal stability	Δ PED	12	4.5	1.8	Input conditions are the same outputs as in 3. (Respective outputs of R, G and B) Test this pedestal voltage fluctuations when contrast control voltage is varied from 1.8V to 8.1V. 	-50	0	50	mV	
					8.1						
6	BLK characteristics fall delay time	T _L	12	12	8.1	Ground respective of R, G and B inputs. Test the BLK pulse response of R, G and B outputs waveforms for the BLK input pulse at IC pins 11, 13 and 15. 			60	ns	
	BLK characteristics rise delay time	T _D							20		
7	V _{CC} characteristics	Δ V _{CC}	12	4.5	4.5	Ground respective inputs of R, G and B. Test the difference in pedestal level voltage between R, G and B outputs when V _{CC} is switched from 13V to 11V. 11V is taken as reference.	0	130	220	mV	

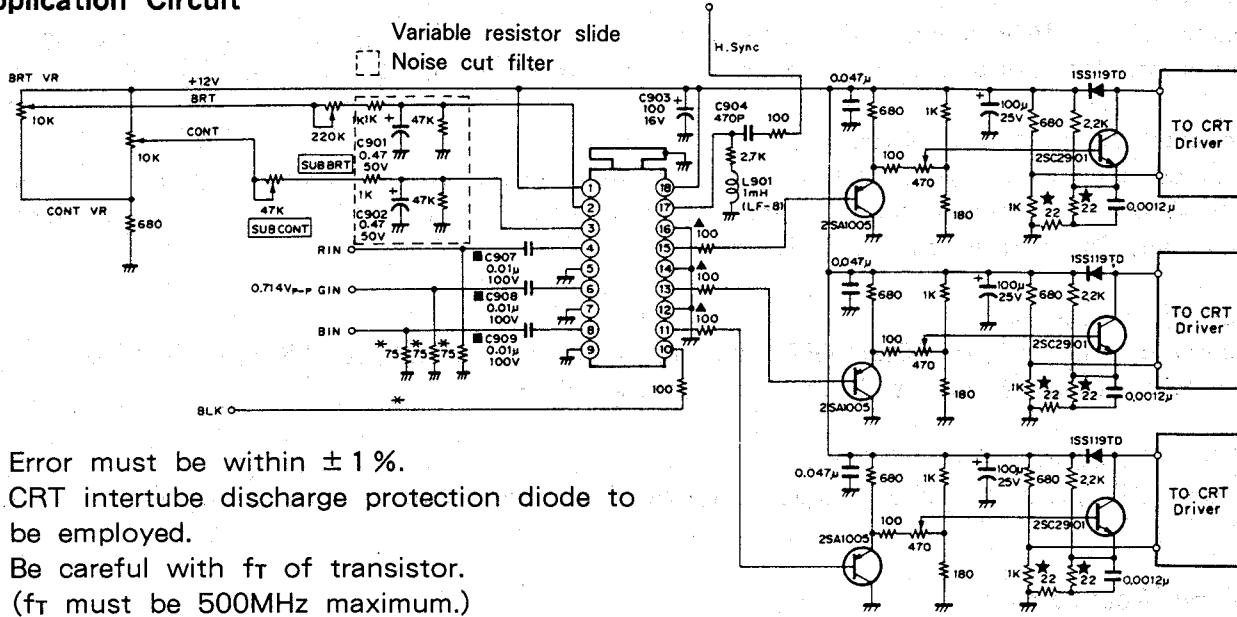
No.	Item	Symbol	ABL CONT (V)	BRT CONT (V)	CONTRAST CONT (V)	Input condition	Test contents and conditions	Min.	Typ.	Max.	Unit
8	ABL check	ABL	12 ↓ 3	12	8.1		<p>Test the difference in pedestal voltage between R, G and B outputs when ABL voltage is switched between 12V and 3V. BRT, CONTRAST control set to MAX.</p>  <p>ABL = 12V ABL = 3V R.G.B OUT</p>	1.85	2.1	2.3	Vp-p
9	Frequency characteristics ① (30MHz)	f _{CONT} (30)	12	1.8 to 12	1.8 to 8.1	Input signal	 <p>R.G.B IN f = 3.58MHz (30MHz) (40MHz) 0.7Vp-p</p>	-1.9	-0.8	0.3	dB
						Output signal	 <p>Take amplitude ratio of R, G, and B outputs at 3.58MHz and 30MHz (40MHz). Test this voltage</p>				
10	Frequency characteristics ② (40MHz)	f _{CONT} (40)					<p>Apply single only on G IN with BRT, Contrast control at MAX and test crosstalk AV voltage at B.R OUT.</p>  <p>G IN f = 30MHz 0.7Vp-p B.R OUT Test crosstalk AC component (Not terminated)</p>	-4.0	1.1	1.8	
11	Crosstalk	CROS	12	12	8.1	Input Gch only. Ground R and Bch.			110	150	mVp-p

Electrical Characteristics Test Circuit



* Use FET probe when observing output waveforms.

Application Circuit



- ★ Error must be within $\pm 1\%$.
CRT intertube discharge protection diode to be employed.
- Be careful with f_T of transistor.
(f_T must be 500MHz maximum.)
- * For impedance matching, R.G.B. input signal pin impedance must be 75Ω .
- ★ Normal R.G.B. input coupling capacitor capacity is at $0.01\mu F$.
For actual use, select the capacitors in cut-and-try method. (Too large capacity value causes frequency characteristics deterioration.)
- ▲ For oscillation prevention, introduce R.G.B. output signal to emitter-follower via damping resistance (approximately 22 to 220Ω). (The more the resistance increases, the more the oscillation occurrence decreases, though the frequency characteristics deteriorates.)

Description of Operation

