

**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

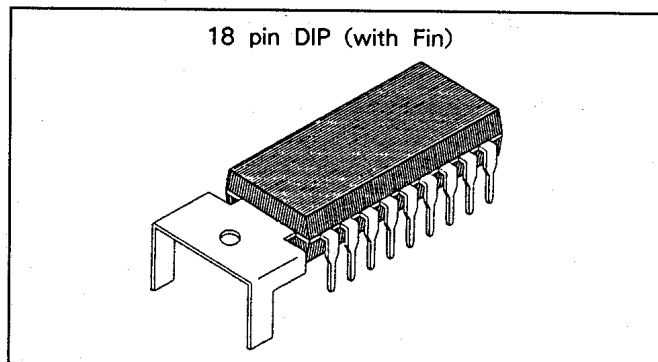
**Absolute Maximum Ratings (Ta = 25°C)**

- Supply voltage  $V_{cc}$  15 V
- Operating temperature  $T_{opr}$  -10 to +70 °C
- Storage temperature  $T_{stg}$  -65 to +150 °C
- Allowable power dissipation  $P_d$  2.19 W
- Input voltage for each pin

Symbol	Max.	Symbol	Max.
R IN	$V_{cc} + 0.3V$	R GND	5V
G IN	$V_{cc} + 0.3V$	G GND	5V
B IN	$V_{cc} + 0.3V$	B GND	5V
CONTRAST CONT	$V_{cc} + 0.3V$		
CLAMP	$V_{cc} + 0.3V$		
BRT	$V_{cc} + 0.3V$		
ABL	$V_{cc} + 0.3V$		
BLK	$V_{cc} + 0.3V$		

**Recommended Operating Condition**

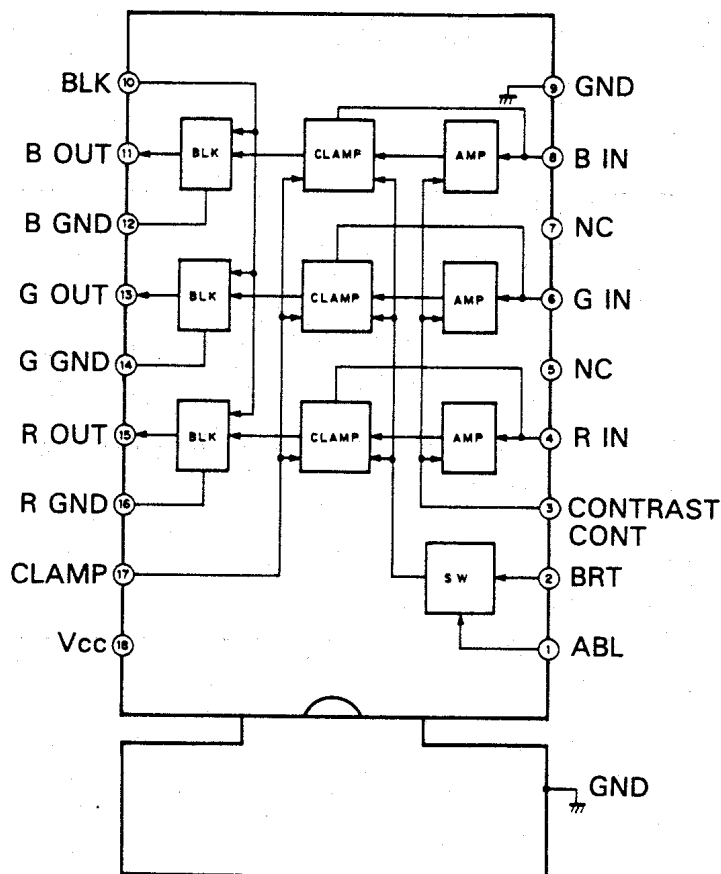
Supply voltage  $V_{cc}$  11 to 13 V

**Functions**

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

**Structure**

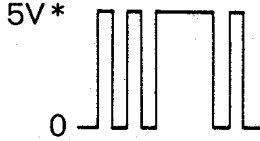
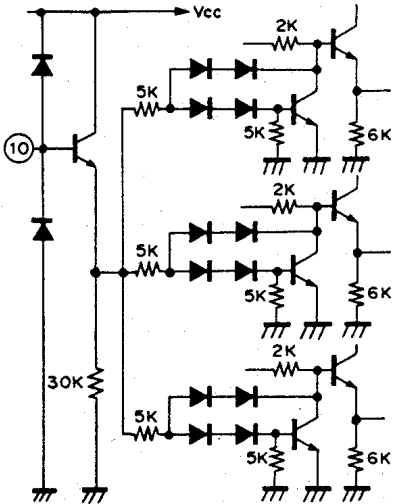
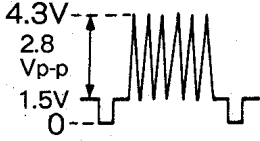
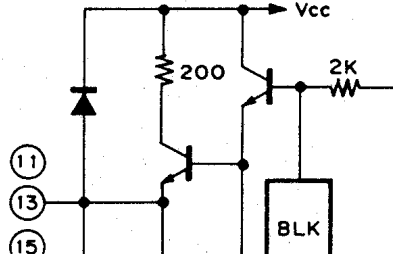
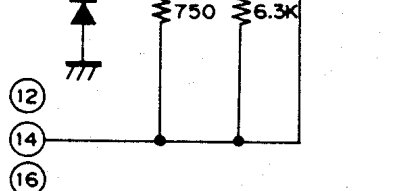
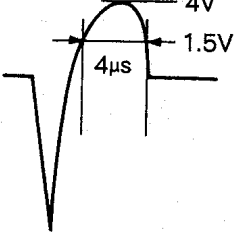
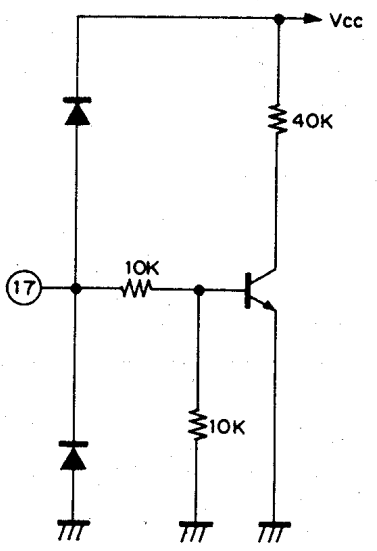
Bipolar silicon monolithic IC

**Block Diagram and Pin Configuration (Top View)**

Pin Description and Equivalent Circuit

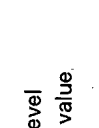
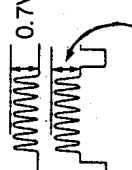
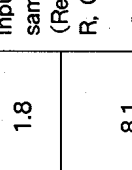
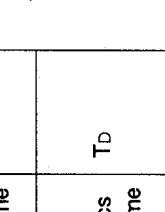
\* External input voltage (DC voltage unless otherwise specified)

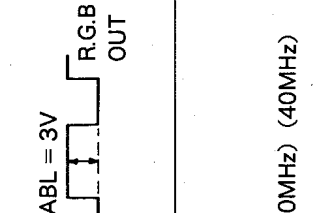


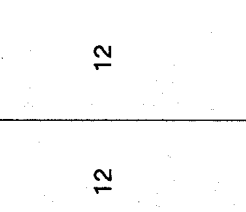
No.	Symbol	Voltage	Equivalent circuit	Description
1	ABL	+ 12V*		<p>Pin for X-ray protection. At below threshold voltage this pin disables BRT CTL and sets BRT level to the minimum. Usually, at + 12V. ABL stands for Automatic Beam Limit.</p>
2	BRT	+ 4.5V*		<p>DC control pin for RGB primary color pedestal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

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<sub>p-p</sub> 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>

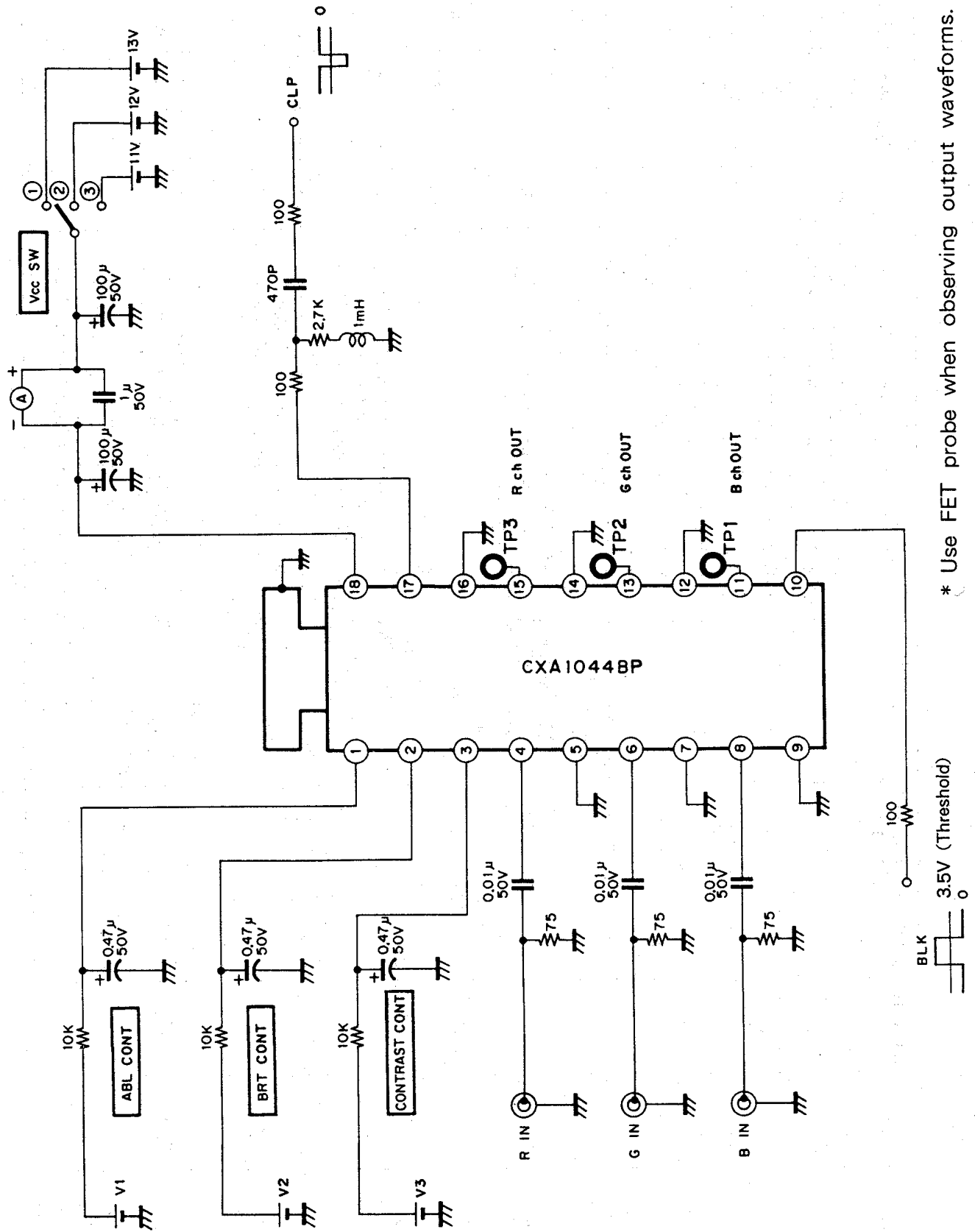
(See the Electrical Characteristics Test Circuit. Ta = 25°C Vcc = 12V)

**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 <sub>CC</sub>	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 <sub>MIN</sub>	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 <sub>MAX</sub>		12		2.7	3.1		3.55		
3	CONTRAST characteristics MIN	CONT <sub>MIN</sub>	12	1.8 to 12 Option	1.8	Input (Each of R, G and B inputs) Output (Each of R, G and B outputs)	 0.7Vp-p, 3.58MHz Vp-p here is tested and the value taken as V <sub>x</sub> . 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 <sub>MAX</sub>	8.1	11.8	
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 <sub>L</sub>	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 <sub>D</sub>								20	
7	V <sub>CC</sub> characteristics	Δ V <sub>CC</sub>	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 <sub>CC</sub> is switched from 13V to 11V. 11V is taken as reference.	0	130	220	mV

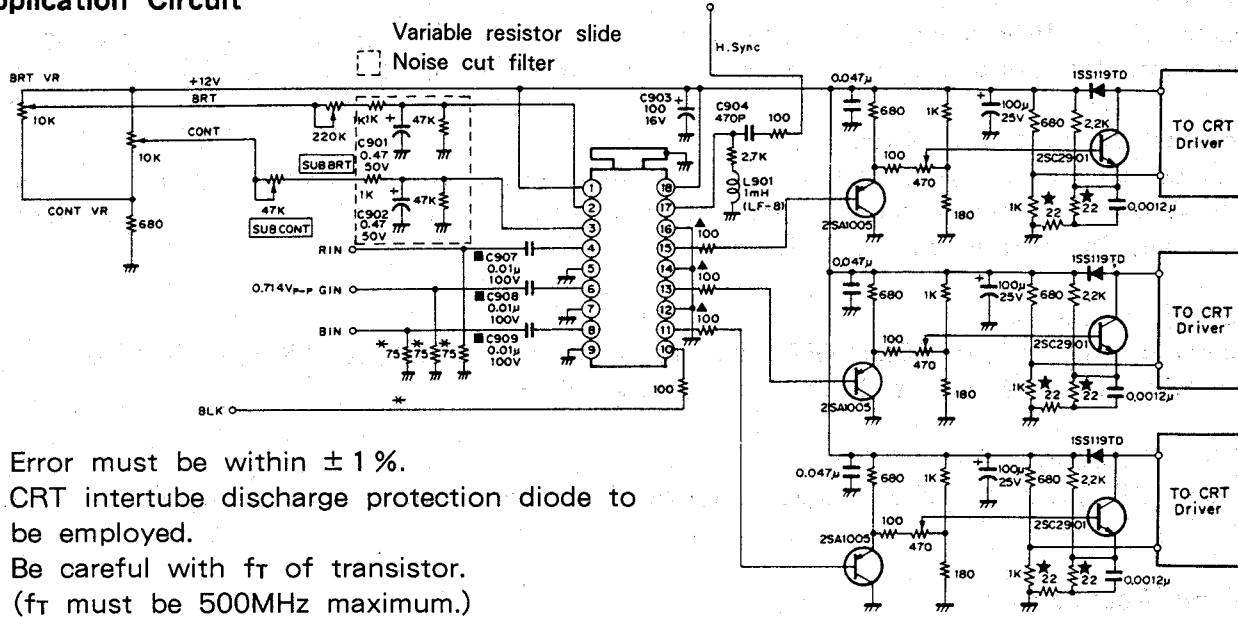
No.	Item	Symbol	ABL CONT (V)	BRT CONT (V)	CONTRAST CONT (V)	Input condition	Test contents and conditions	Min.	Typ.	Max.	Unit
8	ABL check	ABL	12 ↓ 3	12	8.1		<p>Test the difference in pedestal voltage between R, G and B outputs when ABL voltage is switched between 12V and 3V. BRT, CONTRAST control set 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 <sub>CONT</sub> (30)				Input signal	 <p>R.G.B IN f = 3.58MHz (30MHz) (40MHz) 0.7Vp-p</p>	-1.9	-0.8	0.3	dB
	Frequency characteristics ② (40MHz)	f <sub>CONT</sub> (40)	12	1.8 to 12	1.8 to 8.1	Output signal	 <p>Take amplitude ratio of R, G, and B outputs at 3.58MHz and 30MHz (40MHz). Test this voltage</p>	-4.0	1.1	1.8	
11	Crosstalk	CROS	12	12	8.1	Input Gch only. Ground R and Bch.	<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>		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  $75\Omega$ .
- ★ 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  $220\Omega$ ). (The more the resistance increases, the more the oscillation occurrence decreases, though the frequency characteristics deteriorates.)

Description of Operation

