



# BIPOLAR ANALOG INTEGRATED CIRCUIT

## $\mu$ PC1397C

### ANALOG INTERFACE CIRCUIT FOR TELETEXT SYSTEM

#### DESCRIPTION

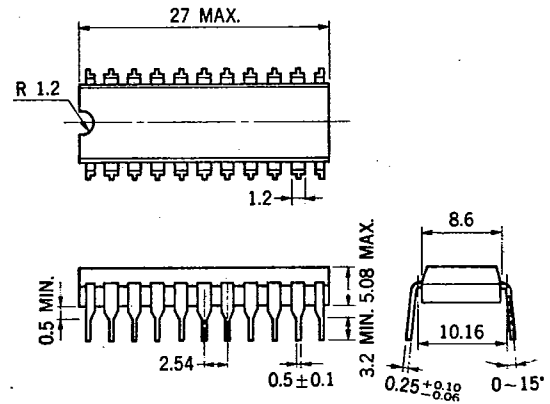
The  $\mu$ PC1397C is a monolithic integrated circuit for the interface stage between the external analog signals and chroma stage. This IC is packaged in 22 pins dual in package. This is most suitable interface IC for view data and CRT display application because of clamping circuit built in R, G and B circuit separately and excellent switching characteristics of video/data switch-circuit. Contrast function can control both of video signal and data signal, and brightness function also can do it. White peak level can set by external voltage applied to pin 15.

#### FEATURES

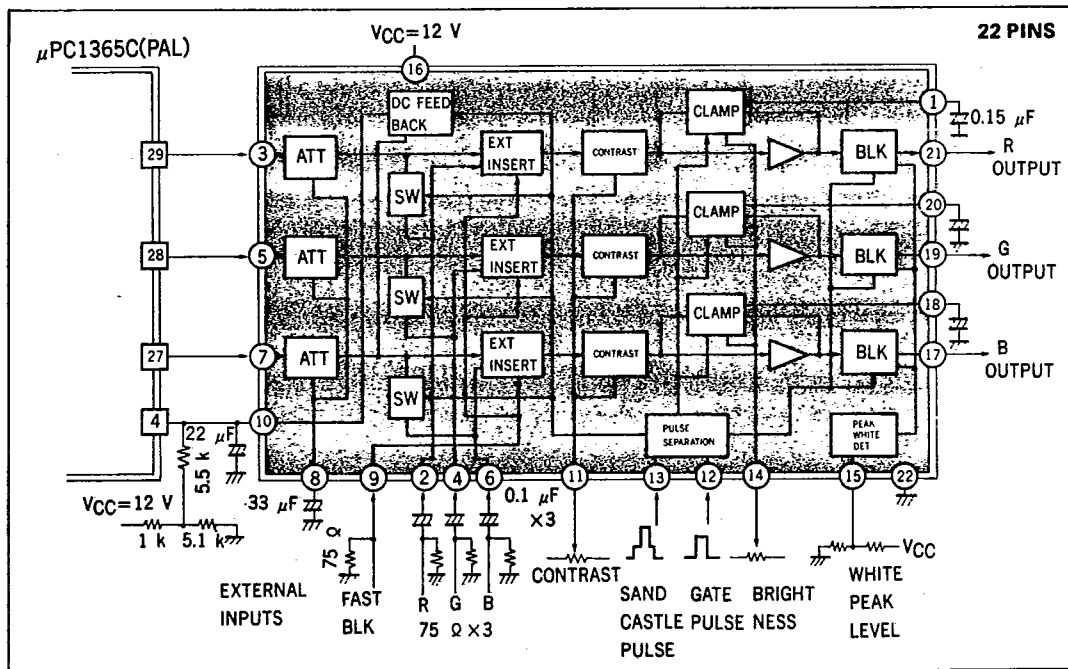
- External analog inputs are acceptable as well as digital.
- High data switching speed. R,G,B Blanking
 

The rise time	35	35	ns
The fall time	35	35	ns
The delay time	20	20	ns
- Contrast and Brightness can be controlled commonly on TV and external signals.
- Can be connected directly to R,G,B, output TV-signals of any IC's.

#### PACKAGE DIMENSIONS (Unit : mm)



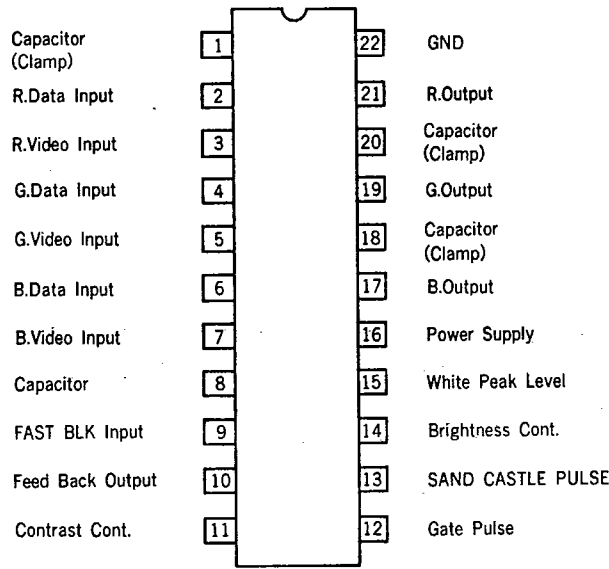
#### BLOCK DIAGRAM



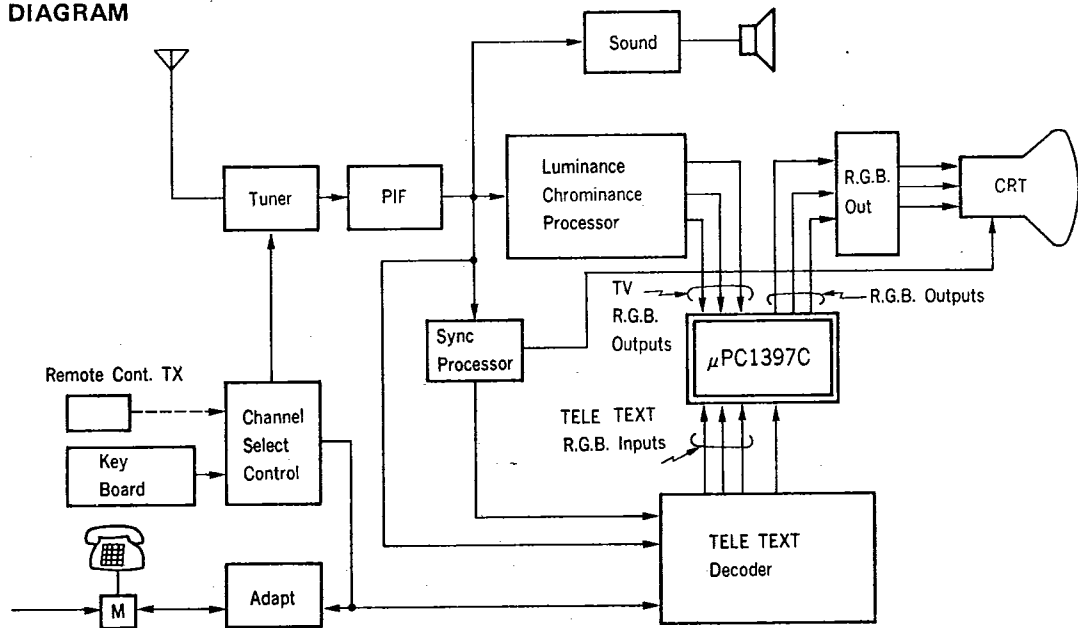
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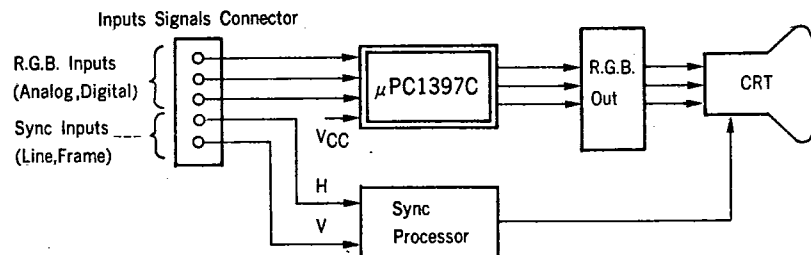
**CONNECTION DIAGRAM (Top View)**



**1 TV SET BLOCK DIAGRAM**



**2 CRT DISPLAY SET BLOCK DIAGRAM**



T-77-07-11

**ABSOLUTE MAXIMUM RATINGS (T<sub>a</sub> = +25 °C unless otherwise)**

Supply Voltage	V <sub>CC</sub>		15	V
Power Dissipation	P <sub>D</sub>	T <sub>a</sub> = +70 °C	850	mW
RGB (VIDEO) Input	E <sub>RGB</sub>		0 to V <sub>CC</sub>	V <sub>dc</sub>
RGB (DATA) Input	E <sub>DATA</sub>		0 to V <sub>CC</sub>	V <sub>dc</sub>
SAND CASTLE Pulse	E <sub>SCP</sub>		-6 to V <sub>CC</sub>	V <sub>dc</sub>
Gate Pulse	E <sub>GP</sub>		-6 to V <sub>CC</sub>	V <sub>dc</sub>
Fast BLK Pulse	E <sub>F.BLK</sub>		0 to V <sub>CC</sub>	V <sub>dc</sub>
Control Voltage	E <sub>cont</sub>		0 to V <sub>CC</sub>	V <sub>dc</sub>
Operating Temperature	T <sub>opt</sub>		-20 to +70	°C
Storage Temperature	T <sub>stg</sub>		-40 to +125	°C

**RECOMMENDED OPERATING CONDITIONS**

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V <sub>CC</sub>	10.8	12.0	13.2	V
RGB (VIDEO) Input Voltage	e <sub>in B ~ W</sub>		3		V <sub>p-p</sub>
Black level of RGB (VIDEO) Input Voltage	E <sub>in BK</sub>		2.7		V <sub>dc</sub>
RGB (DATA) Input Voltage	e <sub>in RGB</sub>	0.7	1.0 (75 Ω)	1.4	V <sub>p-p</sub>
Black level of RGB (DATA) Input Voltage	E <sub>in BK</sub>	0		2	V <sub>dc</sub>
Return level of RGB (DATA) (Line, Frame)	E <sub>in BK (R)</sub>			e <sub>in RGB</sub> × 1 %	V <sub>dc</sub>
Fast BLK Input, H. Level	V <sub>F.BLK (H)</sub>	1		3	V <sub>dc</sub>
L. Level	V <sub>F.BLK (L)</sub>	0		0.4	V <sub>dc</sub>
Gate Input Pulse Voltage	V <sub>G</sub>		3		V <sub>p</sub>
SAND CASTLE Pulse	V <sub>SCP</sub>			6	V <sub>dc</sub>
BLK Level		2			V <sub>dc</sub>
Gate Level		8			V <sub>dc</sub>
Brightness Control Voltage	V <sub>C BR</sub>	1	2	4	V <sub>dc</sub>
White Peak Suppression Setting Voltage	V <sub>WPS</sub>	4		9	V <sub>dc</sub>

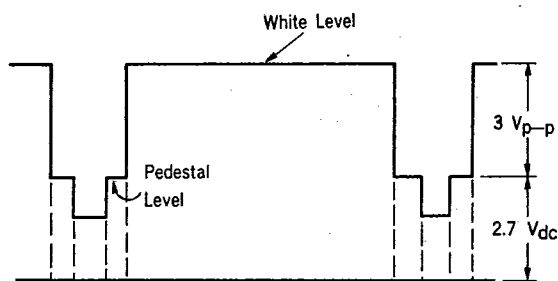
**ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$  unless otherwise noted,  $V_{CC} = 12\text{ V}$ )**

NO.	CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
1	Supply Current	$I_{CC}$		43		mA	$V_{CC} = 12\text{ V}$ No Input; RGB (VIDEO), RGB (DATA) Clamp Gate Pulse
2	RGB (VIDEO) Gain	$G_V \begin{pmatrix} R \\ G \\ B \end{pmatrix}$	0.9	1.17	1.5	times	RGB (VIDEO) Input; $B \sim W = 3\text{ V}_{p-p}$ Bk. Level = $2\text{ V}_{dc}$ Set; Bk. Out level = $2\text{ V}_{dc}$ Contrast = MAX, WPS Level = $V_{CC}$
3	Relative Ratio $G_v \begin{pmatrix} R \\ G \\ B \end{pmatrix}$	$\Delta G_{v-x-y}$	0.85	1.0	1.15	times	Same as No. 2
4	RGB (DATA) Gain	$G_e \begin{pmatrix} R \\ G \\ B \end{pmatrix}$	2.9 1.3	3.5 1.5	4.1 1.7	times times	RGB (DATA) Input; Contrast = MAX. $B \sim W = 1\text{ V}_{p-p}$ Set; Bk. Out Level = Contrast = TYP. $2\text{ V}_{dc}$
5	Relative Ratio $G_e \begin{pmatrix} R \\ G \\ B \end{pmatrix}$	$\Delta G_{e-x-y}$	0.85	1.0	1.15	times	Same as No. 4
6	Relative Ratio $G_e/G_v$	$G_e/G_v$	2.7	3.0	3.3	times	Same as No. 2, 4
7	RGB (VIDEO), RGB (DATA) Frequency Characteristic	$f_{e-v} \begin{pmatrix} R \\ G \\ B \end{pmatrix}$	6.0	-	-	MHz	RGB (VIDEO), RGB (DATA) Input; $0.5\text{ V}_{p-p}$ , 0 dB, $f = 100\text{ kHz}$ -3 dB, Contrast = MAX.
8	RGB Quiescent Output Voltage	$E_o \begin{pmatrix} R \\ G \\ B \end{pmatrix}$	3.2	3.5	3.8	$V_{dc}$	RGB (VIDEO) Input; $B \sim W = 0\text{ V}_{p-p}$ Bk. Level = $2.7\text{ V}_{dc}$ BRT Cont = $3.5\text{ V}_{dc}$
9	$E_o \begin{pmatrix} R \\ G \\ B \end{pmatrix}$ Supply Voltage Coefficient	$\Delta E_{o-v} \begin{pmatrix} R \\ G \\ B \end{pmatrix}$	-	0.3	-	V/V	$V_{CC} = 12\text{ V} \pm 20\%$ $E_{oB} = 3.5\text{ V}_{dc}$ (at $V_{CC} = 12\text{ V}$ )
10	$E_o \begin{pmatrix} R \\ G \\ B \end{pmatrix}$ Temperature Coefficient	$\Delta E_{o-T} \begin{pmatrix} R \\ G \\ B \end{pmatrix}$	-2	0	+2	$\text{mV}/^\circ\text{C}$	$T_a = -20$ to $+70^\circ\text{C}$ $E_{oB} = 3.5\text{ V}_{dc}$ (at $T_a = +25^\circ\text{C}$ )
11	Difference Output Voltage	$\Delta E_{o-x-y}$	-100	0	100	$\text{mV}_{dc}$	RGB (VIDEO) Input; $B \sim W = 0\text{ V}_{p-p}$ Bk. Level = $2.7\text{ V}_{dc}$ BRT Cont = $3.5\text{ V}_{dc}$
12	$E_{o-x-y}$ Temperature Coefficient	$E_{o-x-y} (T)$	-	0	60	$\text{mV}_{dc}$	$T_a = -20$ to $+70^\circ\text{C}$ Maximum Changing Level
13	Maximum Output Voltage	$E_{oM}$	8.5	-	-	V	RGB (VIDEO) Input; $B \sim W = 3\text{ V}_{p-p}$ Bk. Level = $2.7\text{ V}_{dc}$ White Clip Level, Cont. = MAX. BRT = 2 to $6\text{ V}_{dc}$ , WPS Level = $V_{CC}$
14	Changing Bk. Level RGB (VIDEO)/RGB (DATA)	$V_{BK}$	-	-	60	$\text{mV}_{dc}$	RGB (VIDEO) Input; $B \sim W = 3\text{ V}_{p-p}$ Bk. Level = $2.7\text{ V}_{dc}$ , RGB (DATA) Input; $B \sim W = 1\text{ V}_{p-p}$ , Set; Bk. Out Level = $2\text{ V}_{dc}$
15	DC Restored (VIDEO), (DATA)	$T_{DC} \begin{pmatrix} V \\ D \end{pmatrix}$	90	95	100	%	RGB (VIDEO) Input; $B \sim W = 3\text{ V}_{p-p}$ Bk. Level = $2.7\text{ V}_{dc}$ , APL = 10 to 90 % No Blanking, Set; Bk. Out Level = $2\text{ V}_{dc}$
16	Brightness Control Sensitivity	BR	0.9	1.0	1.1	V/V	BRT Cont. Voltage = 1.5 to $2.5\text{ V}_{dc}$ Changing Bk. Level
17	Contrast Cont. Range	Rcont.	15	17	19	dB	RGB (VIDEO) Input; $B \sim W = 3\text{ V}_{p-p}$ Bk. Level = $2.7\text{ V}_{dc}$ , RGB (DATA): $B \sim W = 1\text{ V}_{p-p}$ , Cont. = MAX./MIN. Set; Bk. Out Level = $2\text{ V}_{dc}$

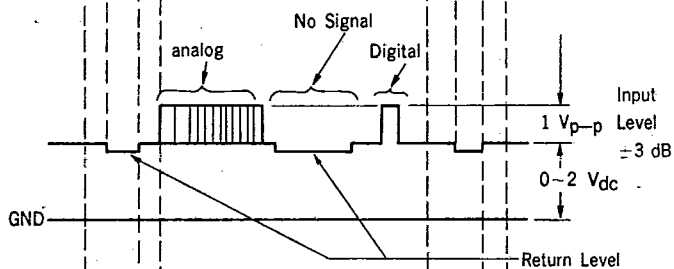
NO.	CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
18	Maximum Changing Black Level by Contrast	$E_{oc}$	-50	0	+50	mV <sub>dc</sub>	RGB (VIDEO) Input; B ~ W = 0 V <sub>p-p</sub> Bk. Level = 2.7 V <sub>dc</sub> , Set; Bk. Level = 2 V <sub>dc</sub> Contrast = MAX. ~ MIN.
19	White Suppression Output Voltage	$WS \begin{pmatrix} R \\ G \\ B \end{pmatrix}$	6.5	7.0	7.5	V <sub>dc</sub>	RGB (VIDEO) Input; B ~ W = 3 V <sub>p-p</sub> Bk. Level = 2.7 V <sub>dc</sub> , Set; WS Level = 7 V <sub>dc</sub> BRT Cont. = 2 to 6 V <sub>dc</sub>
20	Gate Pulse Minimum Input Voltage	V <sub>GPM</sub>	-	-	1	V <sub>p</sub>	
21	SAND CASTLE Pulse Input BLK	V <sub>sc th</sub> (BLK)	1.0	1.5	2.0	V	
	Threshold Level GATE	V <sub>sc th</sub> (GATE)	6.5	7.0	7.5	V	
22	Fast BLK Pulse Input Threshold Level	V <sub>th</sub> (F.BLK)	0.5	0.7	0.9	V	Input Level RGB Output Less than V <sub>th</sub> (F.BLK) RGB (VIDEO) More than V <sub>th</sub> (F.BLK) RGB (DATA)
23	Fast BLK SW Time Rise, Fall	t <sub>r sw</sub> , t <sub>f sw</sub>	-	35	60	ns	RGB (VIDEO) Input; W = 3 V <sub>p-p</sub> , Bk. Level = 2.7 V <sub>dc</sub> , RGB (DATA) = No Input, Cont. = MAX. Set Bk. Out Level = 2 V <sub>dc</sub>
	Relative Rise, Fall Time	Δt <sub>r sw</sub> , Δt <sub>f sw</sub>	-	0	20	ns	
24	Fast BLK SW Time Delay	t <sub>d sw</sub>	-	20	-	ns	Same as No. 23 Load Condition; 3.3 kΩ/10 pF at Fall Time Only
	Relative Delay Time	Δt <sub>d sw</sub>	-	-	20	ns	
25	RGB (DATA) SW Time Rise, Fall	t <sub>r</sub> , t <sub>f</sub> $\begin{pmatrix} R \\ G \\ B \end{pmatrix}$	-	35	60	ns	RGB (VIDEO) Input; B ~ W = 0 V <sub>p-p</sub> Bk. Level = 2.7 V <sub>dc</sub> , RGB (DATA) Input; B ~ W = 1 V <sub>p-p</sub> , Cont. = MAX. Set Bk. Out Level = 2 V <sub>dc</sub>
	Relative Rise, Fall Time	Δt <sub>r</sub> , Δt <sub>f</sub> $\begin{pmatrix} R \\ G \\ B \end{pmatrix}$	-	-	20	ns	
26	RGB (DATA) SW Time Delay	t <sub>d</sub> $\begin{pmatrix} R \\ G \\ B \end{pmatrix}$	-	20	-	ns	Same as No. 25 Load Condition; 3.3 kΩ/10 pF at Fall Time only
	Relative Delay Time	Δt <sub>d</sub> $\begin{pmatrix} R \\ G \\ B \end{pmatrix}$	-	-	20	ns	

μPC1397C INPUT SIGNAL LEVEL

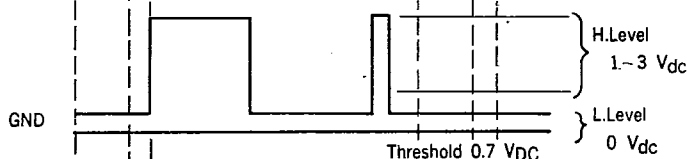
• R, G, B VIDEO Input Voltage



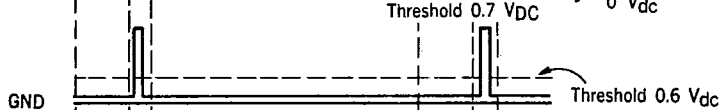
• R, G, B DATA Input Voltage  
75 ohm terminated



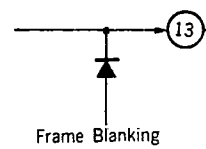
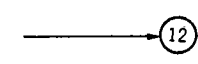
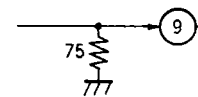
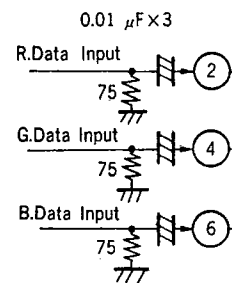
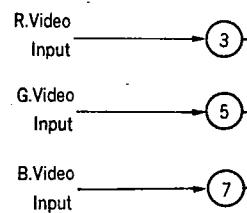
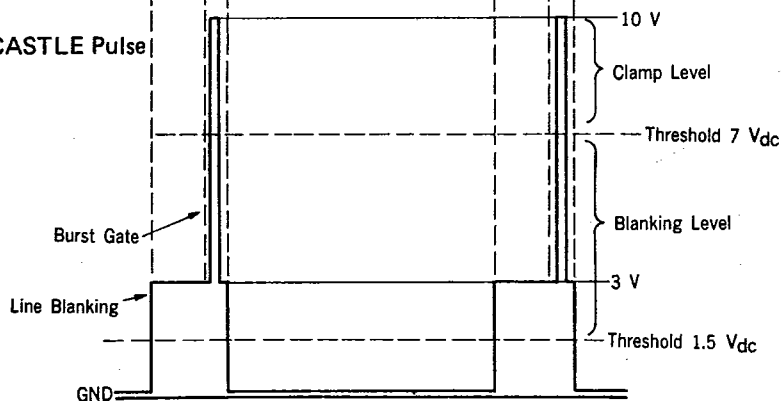
• FAST BLK Input  
75 ohm terminated



• Gate Pulse



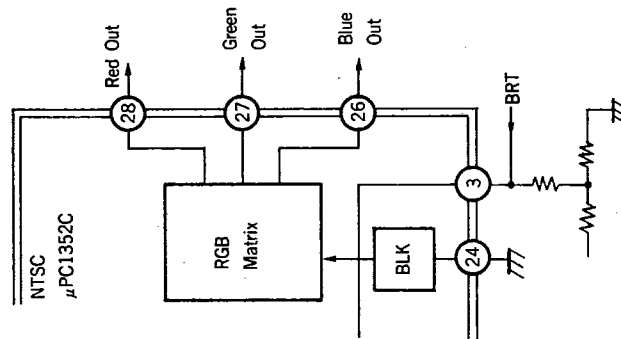
• SAND CASTLE Pulse



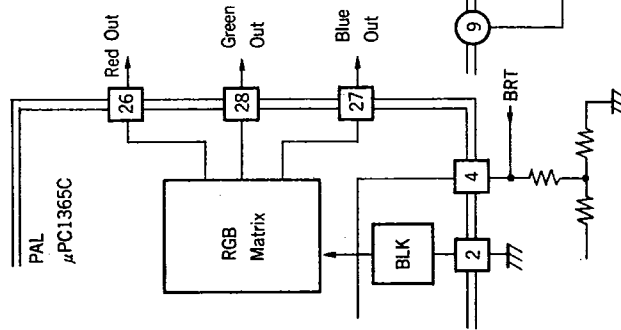
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APPLICATION

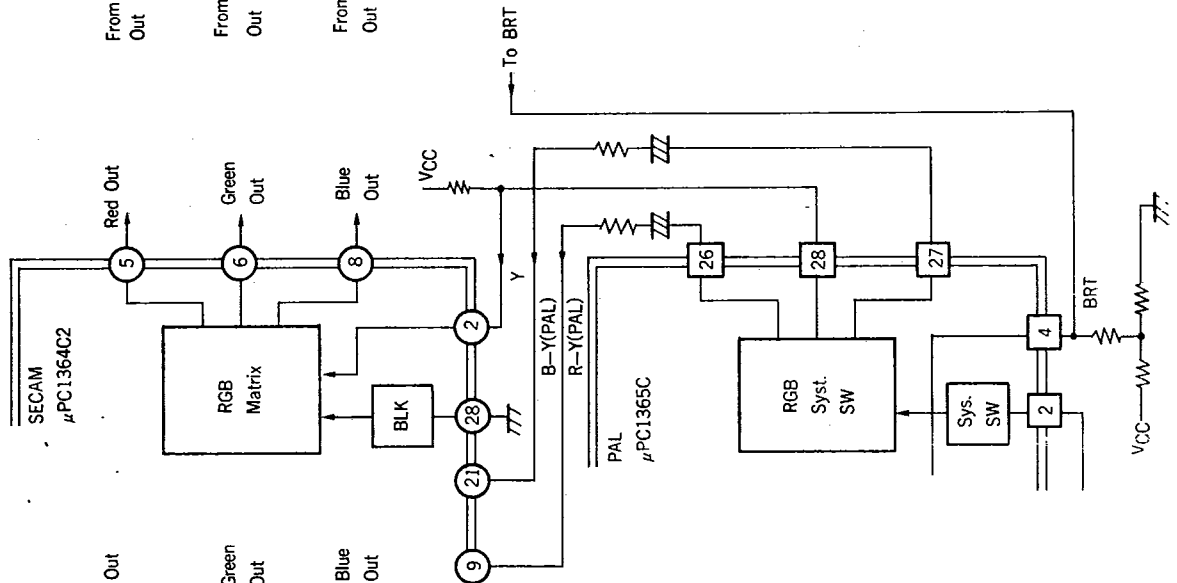
NTSC System  
Japan. CAPTAIN.  
USA TELETEXT



PAL System  
U.K. TELETEXT, Prestel



PAL - SECAM System  
W.G. Video Text, Bildschirmzeitung  
FRANCE, Antiope



Interface IC  
μPC1397C

