

M52038ASP

PAL SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION

The M52038ASP is a single chip semiconductor integrated circuit that has color TV signal-processing functions. It processes signals of video intermediate frequency, audio intermediate frequency as well as video, color, and deflection signals. Combining it with a tuner and simple output drive circuits, based on discrete transistors, enables low-cost design of PAL color TV sets.

FEATURES

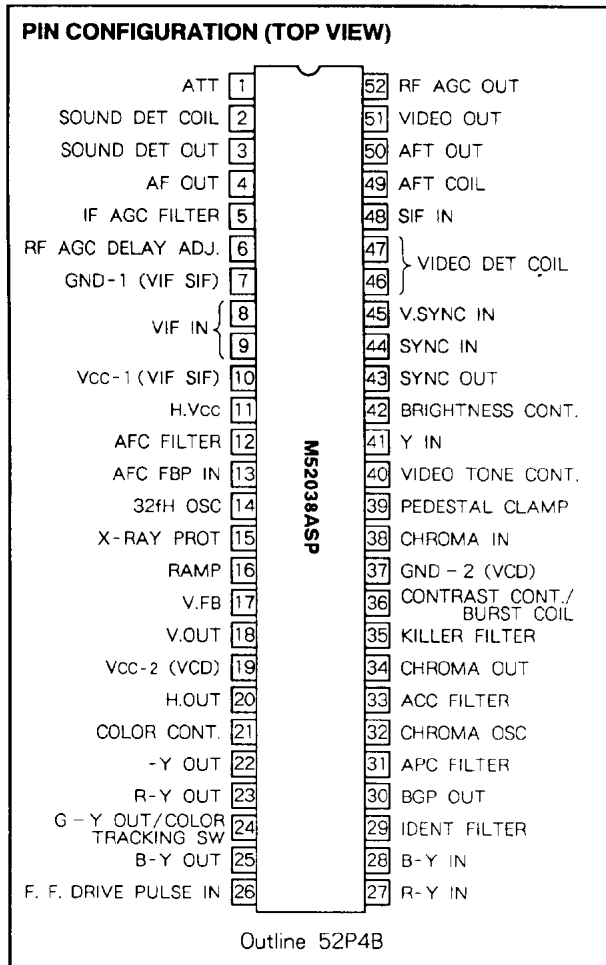
- Provided with all signal-processing functions except tuner and output drive functions. Useful in TV set cost-reduction.
- Input pins are used for differential inputs, using two input pins for each signal. They improve stability and prevent oscillations.
- For horizontal oscillation, the oscillator uses a ceramic resonator to produce reference signal of 32 times the horizontal deflection frequency. The count-down of the reference signal provides horizontal deflection signal. It is unnecessary, therefore, to adjust free-running frequency.
- For vertical oscillation, the count-down of twice the horizontal deflection signal, produced by the horizontal deflection count-down circuit, provides the vertical deflection signal. It eliminates the variable resistor for vertical synchronization. The count-down method has reduced the number of additional parts in the vertical deflection circuit.
- Capable of the AFT defeat, video muting, and audio muting functions.
- Picture quality, contrast, brightness, color saturation, and sound volume are each controlled by direct currents.
- Combining this IC with the SECAM chroma-IC enables a dual system composition.

APPLICATION

PAL color TV sets.

RECOMMENDED OPERATING CONDITION

Supply voltage range..... 8.5~9.5V(V₁₀, V₁₉)
 Rated supply voltage..... 9.0V(V₁₀, V₁₉)
 Supply current range..... 15~22mA(I₁₁)
 Rated supply current..... 18mA(I₁₁)



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ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Ratings	Unit
V _{cc}	Supply voltage	10.8	V
P _d	Power dissipation	1.4	W
T _{opr}	Operating temperature	-20~65	°C
T _{stg}	Storage temperature	-40~125	°C

ELECTRICAL CHARACTERISTICS (T_a = 25 °C, unless otherwise noted)

VIF-SIF SECTION

Symbol	Parameter	Test Point	Input ()	Test conditions*														Limits			Unit					
				1	5	6	V _{cc} 10	S 2	S 5	S 6	S 6A	S 10	S 10A	S 47	S 48	S 48A	S 49	S 51	S 52	S 52A		Min.	Typ.	Max.		
I _{cc10}	Circuit current	A10	-	-	-	9.0V	-	-	○	-	○	-	-	-	-	-	-	-	-	○	-	27	36	50	mA	
V ₅₁	Video output DC voltage	51	-	-	-	9.0V	○	○	○	-	○	-	-	-	-	-	-	-	-	○	○	-	4.55	4.9	5.35	V
V ₀₅₁	Video output signal voltage	51	A SG1	-	-	9.0V	○	-	○	-	○	-	-	-	-	-	-	-	-	○	○	-	1.7	2.0	2.3	V _{P-P}
V _{51L}	Sync. tip voltage	51	A SG2	-	-	9.0V	○	-	○	-	○	-	-	-	-	-	-	-	-	○	○	-	2.3	2.6	2.9	V
V _{in min}	Input sensitivity	51A	A SG3	-	-	9.0V	○	-	○	-	○	-	-	-	-	-	-	-	-	○	○	-	37	45	51	dBμ
V _{in max}	Maximum allowable input	51A	A SG4	-	-	9.0V	○	-	○	-	○	-	-	-	-	-	-	-	-	○	○	-	103	110		dBμ
V _{BTH}	Black spot noise inverter	51	A SG2 SG5	Variable	Variable	9.0V	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	1.7	2.0	2.3	V	
V _{BCL}																										3.3
BW	Video frequency characteristics	51	A SG8	-	Variable	9.0V	○	-	○	-	○	-	-	-	-	-	-	-	-	○	○	-	5.6	8		MHz
IM	Inter-modulation	51	A SG9	-	-	9.0V	○	-	○	-	○	-	-	-	-	-	-	-	-	○	○	-	32	45		dB
S/N	Video noise	51A	A SG2	-	-	9.0V	○	-	○	-	○	-	-	-	-	-	-	-	-	○	○	-	50	56		dB
V ₅₀	AFT output DC voltage	50	-	-	-	9.0V	○	○	○	-	○	-	-	-	-	-	-	-	-	○	-	3.0	4.0	5.0	V	
V _{50H}	AFT output maximum voltage	50	A SG6	-	-	9.0V	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	8.0	8.7		V	
V _{50L}	AFT output minimum voltage	50	A SG7	-	-	9.0V	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-		0.3	1.0	V	
μ AFT	AFT sensitivity	50	A SG5	-	-	9.0V	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	40	60	120	mV/kHz	
V _{50D}	AFT defeat voltage	50	A SG5	-	-	9.0V	○	-	○	-	○	-	-	-	-	-	-	-	-	○	-	4.35	4.5	4.65	V	
V _{52H}	RF AGC maximum voltage	52	A SG11	-	-	2.5V	9.0V	○	○	-	○	-	-	-	-	-	-	-	-	○	○	-	7.0	8.0		V
V _{52L}	RF AGC minimum voltage	52	A SG10	-	-	2.5V	9.0V	○	○	-	○	-	-	-	-	-	-	-	-	○	○	-		0.01	0.3	V
V. S. MUTE1	Sync mute starting voltage	5 6	-	9.0V	M	9.0V	-	-	-	○	-	-	-	-	○	○	-	-	-	○	-		0.7	1.2	V	
V ₃	AF direct output direct current voltage	3	-	-	-	9.0V	-	○	○	-	○	-	-	-	○	○	-	-	-	○	-	3.4	3.9	4.5	V	
V _{0AF}	AF direct output signal voltage	3	C SG12	-	-	9.0V	-	○	○	-	○	-	-	-	○	○	-	-	-	○	-	540	630	720	mVrms	

* : "-" Indicates open.

PAL SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

VIDEO SECTION

Symbol	Parameter	Test Point	Input ()	Test conditions*																Limits			Unit								
				11A	16A	19A	21A	22A	29A	36A	38A	39A	40A	42A	S19A	S22A	S24A	S27A	S28A	S28A	S35A	S36A		S39A	S42A	S44A	Min.	Typ.	Max.		
Icc19	Circuit current	A19	--	--	9.0 V	--	--	4.5 V	--	2.7 V	--	--	○	○	--	--	○	--	--	--	--	--	--	30	40	50	mA				
Y _{max}	Maximum output	22	F SG21	--	9.0 V	--	--	9.0 V	--	Variable	--	--	○	○	--	--	--	--	--	--	--	--	5.0	6.2		V _{P-P}					
G _Y	Standard gain	22	F SG22	--	9.0 V	--	--	4.5 V	--	Variable	--	--	○	○	--	--	--	--	--	--	--	--	11	15	19	dB					
G _{Y min}	Contrast control characteristics	22	F SG22	--	9.0 V	--	--	2.5 V	Variable	--	--	○	○	--	--	--	--	--	--	--	--	--	--	--	--	--	--	dB			
G _{Y max}																													+2	+6	+8.5
VBRT-I -norm	Brightness control characteristics-I	22	D SG18	12 V	9.0 V	--	--	4.5 V	--	9.0 V	4.9 V	○	○	--	--	--	--	--	--	--	--	--	○	2.75	3.1	3.45	V _{O-P}				
VBRT-I-L																												2.25	2.6	2.95	
VBRT-I-H																												3.05	3.4	3.75	
VBRT-II -norm	Brightness control characteristics-II	22	D SG18	12 V	9.0 V	--	--	4.5 V	2.4 V	9.0 V	--	○	○	--	--	--	--	--	--	--	--	--	○	2.75	3.1	3.45	V _{O-P}				
VBRT-II-L																												1.65	2.0	2.35	
VBRT-II-H																												3.85	4.2	4.55	
G _P	Peaking value	22	F SG23 SG24	--	9.0 V	--	--	4.5 V	--	Variable	--	--	○	○	--	--	--	--	--	--	--	--	7.5	11	14.5	dB					
G _{T norm}	Video tone control characteristics	22	F SG24	--	9.0 V	--	--	4.5 V	Variable	4.5 V	--	○	○	--	--	--	--	--	--	--	--	--	--	--	--	--	--	dB			
G _{T min}																													-1.3	-0.5	1.2
G _{T max}																													-21	-15	-11
f _{B (Y)}	Frequency characteristics	22	F SG25	--	9.0 V	--	--	4.5 V	--	Variable	--	--	○	○	--	--	--	--	--	--	--	--	7	8		MHz					
DG _Y	Differential gain	22	F SG22	--	9.0 V	--	--	4.5 V	--	Variable	--	--	○	○	--	--	--	--	--	--	--	--	--	1	6		%				
V ₄₀	Pin 40 voltage	40	--	--	9.0 V	--	--	4.5 V	--	M	○	○	○	○	○	○	○	○	○	○	○	○	4.15	4.45	4.75	V					
V _{BLK V}	Vertical blanking voltage	22	--	12 V	9.0 V	--	--	2.5 V	--	Variable	--	--	○	○	--	--	--	--	--	--	--	--	7.3	7.7		V _{O-P}					
V _{BLK TV50}	Vertical blanking pulse width	22	--	12 V	9.0 V	--	--	2.5 V	--	Variable	--	--	○	○	--	--	--	--	--	--	--	--	1.31	1.38	1.44	ms					
V _{BLK H}	Horizontal blanking threshold voltage	22 25A	H SG28 0.5 V _{P-P}	--	9.0 V	--	Variable	2.5 V	--	Variable	--	--	○	○	○	○	○	○	○	○	○	○	6.35	6.8		V _{O-P}					
V _{DC REG}	DC regeneration control characteristics	22	F SG17	--	9.0 V	--	--	4.5 V	--	9.0 V	--	--	○	○	--	--	--	--	--	--	--	--	-1.2	-0.2	1.0	V					

* : "--" Indicates open.

PAL SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

CHROMA SECTION 2 (cont.)

Symbol	Parameter	Test Point	Input ()	Test conditions*																Limits			Unit								
				11A	16A	19	21	22A	29	36	38	39	40	42	S19	S19A	S22	S24	S27A	S28A	S28A	S35		S36	S39	S42	Min.	Typ.	Max.		
Δ DHR-Y	Difference of demodulation output on line	23A	H SG28	12V	-	9.0V	2.5V	-	2.5V	-	9.0V	-	9.0V	-	○	○	○	○	○	○	○	○	○	○	○			35	mV _{P-P}		
Δ DHG-Y		24A	0.2 V _{P-P}																												
CLB-Y	Demodulation output carrier leak	25A	-	12V	-	9.0V	2.5V	-	2.5V	-	9.0V	-	9.0V	-	○	○	○	○	○	○	○	○	○	○	○			0.2	V _{P-P}		
CLR-Y		23A																													
CLG-Y		24A																													
V ₂₁	Pin ② voltage	21	G SG26 0dB	12V	-	9.0V	M	-	4.5V	-	9.0V	-	9.0V	-	○	○	○	○	○	○	○	○	○	○	○	4.2	4.5	4.8	V		
V _{21K}		21	-																								0.1	0.35	V		
DBWR-Y	Demodulation output band width	23	-	12V	-	9.0V	-	4.5V	-	9.0V	-	9.0V	-	○	○	○	○	○	○	○	○	○	○	○	○	0.8	1		MHz		
DBG-Y		24	H SG30																												
DBW-Y		25																													
C _{in max}	Chroma input dynamic range	G 34	G SG26 Variable	12V	-	9.0V	-	4.5V	-	9.0V	-	9.0V	-	○	○	○	○	○	○	○	○	○	○	○	○	1.0	1.4		V _{P-P}		
\angle R-Y-P	Demodulation angle	23A	H SG28	12V	-	9.0V	-	4.5V	-	9.0V	-	9.0V	-	○	○	○	○	○	○	○	○	○	○	○	○		90		deg.		
\angle G-Y-P		25A	0.2 V _{P-P}																												
		25A																									240		deg.		

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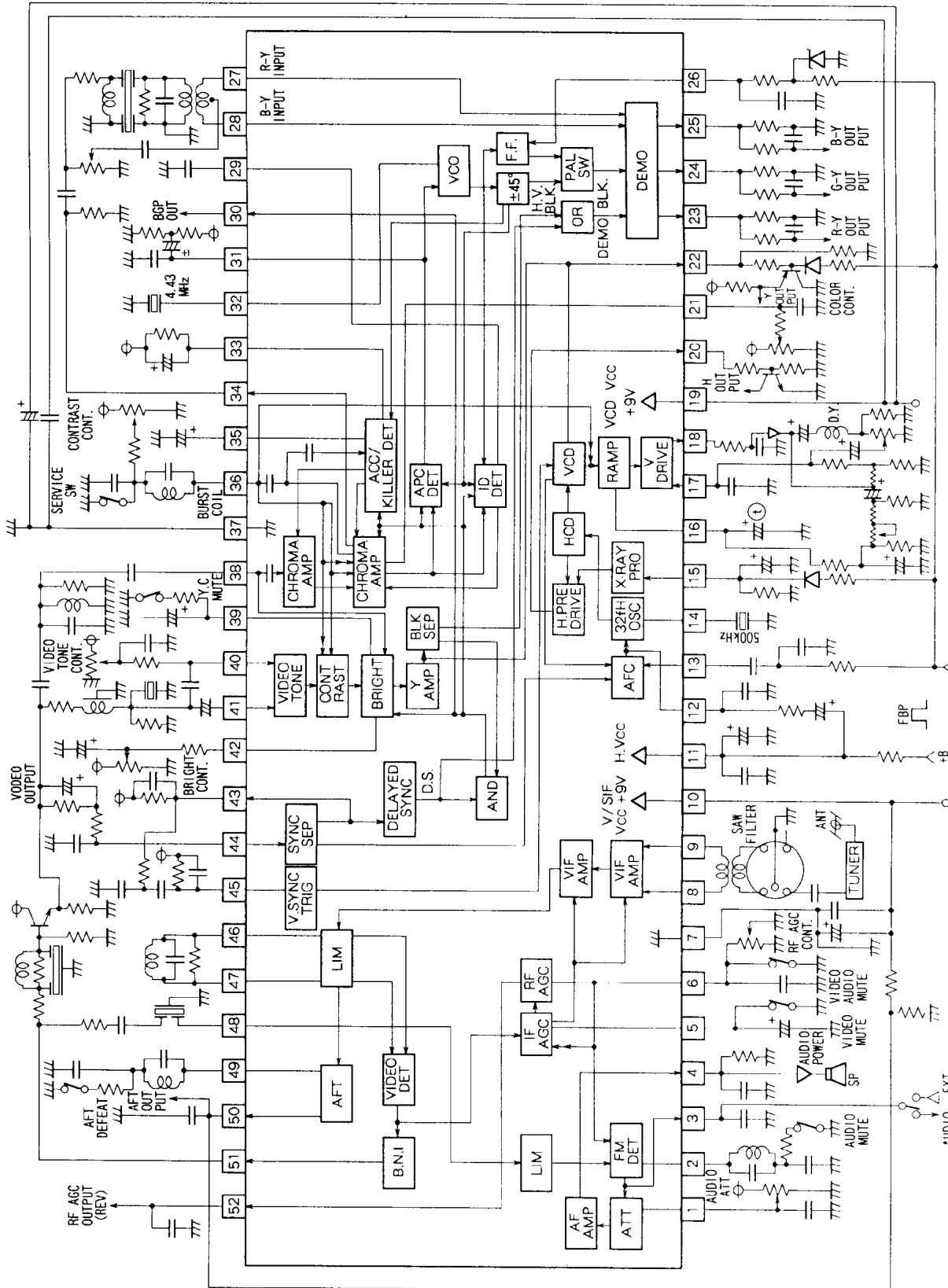
CHROMA SECTION 3

Symbol	Parameter	Test Point	Input ()	Test conditions*																Limits			Unit							
				11A	16A	19	21	22A	29	36	38	39	40	42	S19	S19A	S22	S24	S27A	S28A	S28A	S35		S36	S39	S42	Min.	Typ.	Max.	
Δ V _{P-C}	Color tracking characteristics	22	F SG22	12V	-	9.0V	-	4.0V	4.5V	Variable	9.0V	-	9.0V	-	○	○	○	○	○	○	○	○	○	○	○	-6	-2	+2	dB	
		25A	G SG26 0dB	12V	-	9.0V	-	4.0V	4.5V	Variable	9.0V	-	9.0V	-	○	○	○	○	○	○	○	○	○	○	○	○				
SS _Y	Service switch operation color tracking	22	F SG22						Variable																			100	mV _{P-P}	
SS _C		34	G SG26 0dB	12V	0V	9.0V	-	4.5V	-	9.0V	-	9.0V	-	○	○	○	○	○	○	○	○	○	○	○	○			100	mV _{P-P}	
SS _V		16	-																									0.3	V _{O-P}	
CTS	Color tracking switch operation	G 34	G SG26 0dB	12V	-	9.0V	-	4.5V	-	9.0V	-	9.0V	-	○	○	○	○	○	○	○	○	○	○	○	○	3	6	9	dB	
VMS	Video, chroma mute switch operation	22	F SG17	12V	-	9.0V	-	4.5V	-	9.0V	-	9.0V	-	○	○	○	○	○	○	○	○	○	○	○	○	5.6	6.2	6.8	V _{O-P}	
CMS _{R-Y}		23A	-																											mV _{P-P}
CMS _{G-Y}		24A	G SG26 0dB	12V	-	9.0V	-	4.5V	-	9.0V	-	9.0V	-	○	○	○	○	○	○	○	○	○	○	○	○			100	mV _{P-P}	
CMS _{B-Y}	25A																												mV _{P-P}	

* : "-" Indicates open.

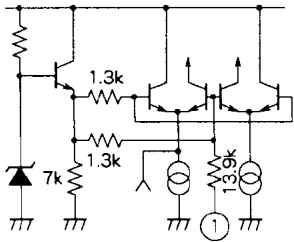
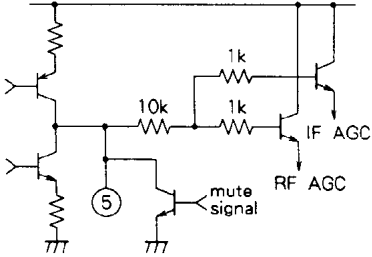
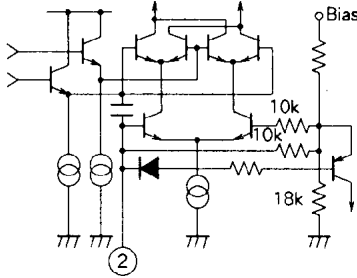
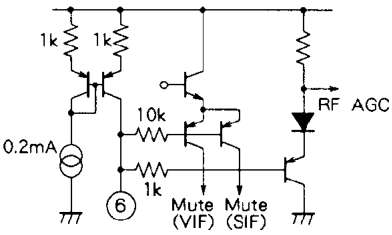
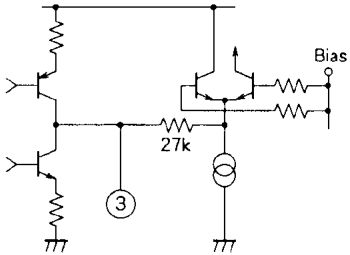
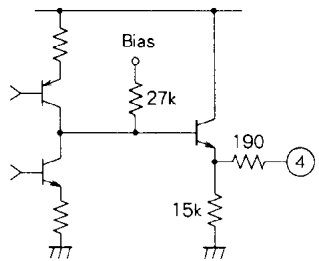
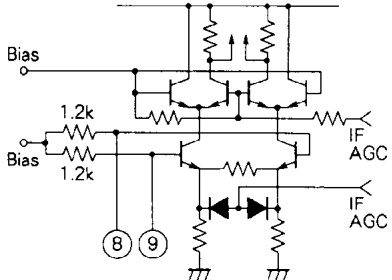
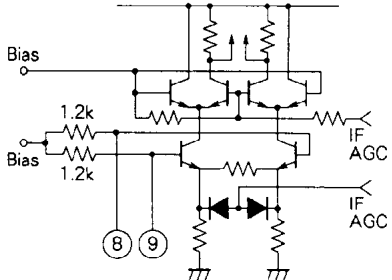
PAL SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

TEST CIRCUIT



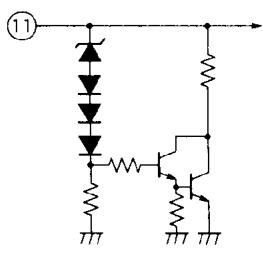
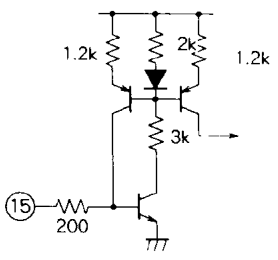
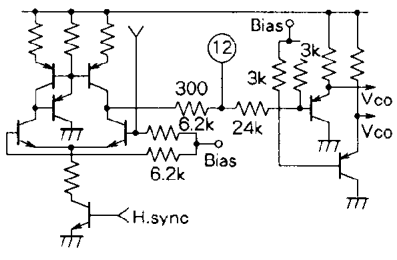
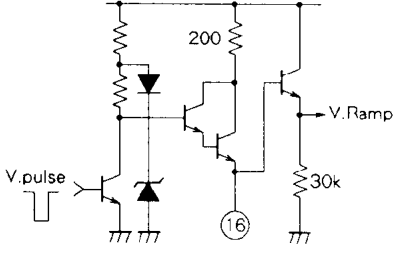
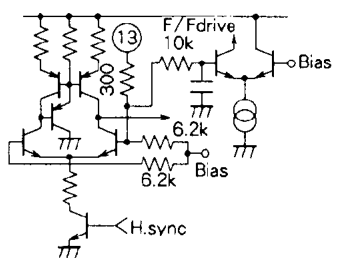
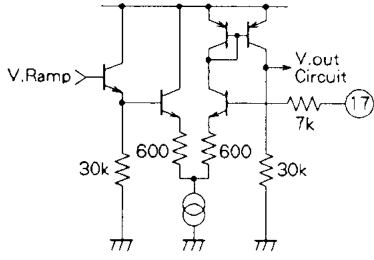
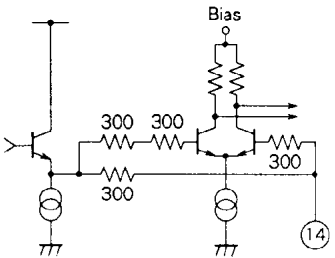
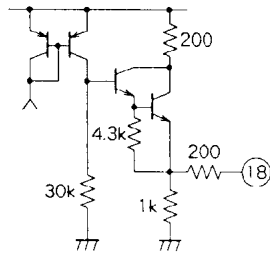
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DESCRIPTION OF PIN

Pin No.	Name	Peripheral circuit of pins	Pin No.	Name	Peripheral circuit of pins
①	ATT		⑤	IF AGC FILTER	
②	SOUND DET COIL		⑥	RF AGC DELAY ADJ.	
③	SOUND DET OUT		⑦	GND-1 (VIF SIF)	-
④	AF OUT		⑧	VIF IN	
			⑨	VIF IN	
			⑩	Vcc-1 (VIF SIF)	-

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DESCRIPTION OF PIN (cont.)

Pin No.	Name	Peripheral circuit of pins	Pin No.	Name	Peripheral circuit of pins
⑪	H.Vcc		⑮	X-RAY PROT	
⑫	AFC FILTER		⑯	RAMP	
⑬	AFC FBP IN		⑰	V.FB	
⑭	32fH OSC		⑱	V.OUT	
⑲	Vcc-2 (VCD)				

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DESCRIPTION OF PIN (cont.)

Pin No.	Name	Peripheral circuit of pins	Pin No.	Name	Peripheral circuit of pins
20	H.OUT		25	B-Y OUT	
21	COLOR CONT.		26	F. F. DRIVE PULSE IN	
22	-Y OUT		27	R-Y IN	
23	R-Y OUT		28	B-Y IN	
24	G-Y OUT/ COLOR TRACKING SW		29	IDENT FILTER	

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DESCRIPTION OF PIN (cont.)

Pin No.	Name	Peripheral circuit of pins	Pin No.	Name	Peripheral circuit of pins
30	BGP OUT		34	CHROMA OUT	
31	APC FILTER		35	KILLER FILTER	
32	CHROMA OSC		36	CONTRAST CONT. / BURST COIL	
33	ACC FILTER		37	GND-2 (VCD)	-
			38	CHROMA IN	
			39	PEDESTAL CLAMP	

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DESCRIPTION OF PIN (cont.)

Pin No.	Name	Peripheral circuit of pins	Pin No.	Name	Peripheral circuit of pins
40	VIDEO TONE CONT.		44	SYNC IN	
41	Y IN		45	V.SYNC IN	
42	BRIGHTNESS CONT.		46	VIDEO DET COIL	
43	SYNC OUT		47	VIDEO DET COIL	
			48	SIF IN	

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DESCRIPTION OF PIN (cont.)

Pin No.	Name	Peripheral circuit of pins
④⑨	AFT COIL	
⑤①	AFT OUT	
⑤②	VIDEO OUT	
⑤③	RF AGC OUT	

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Datasheets for electronics components.