

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.

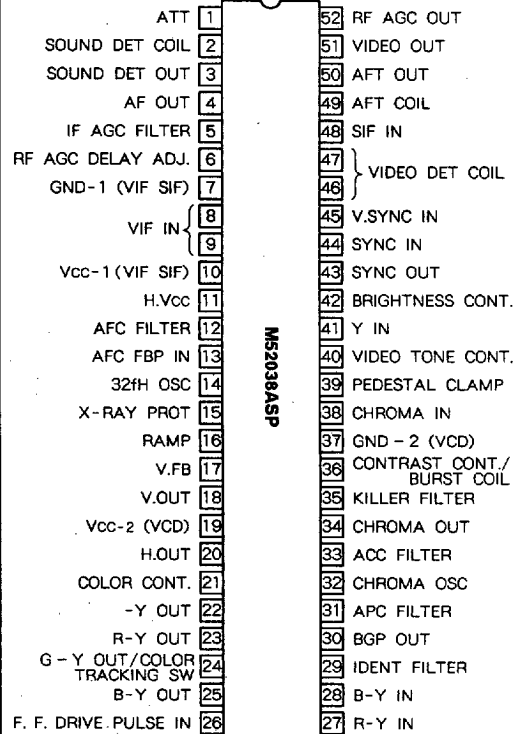
APPLICATION

PAL color TV sets.

RECOMMENDED OPERATING CONDITION

Supply voltage range	8.5~9.5V(V ₁₀ , V ₁₉)
Rated supply voltage	9.0V(V ₁₀ , V ₁₉)
Supply current range	15~22mA(I ₁₁)
Rated supply current	18mA(I ₁₁)

PIN CONFIGURATION (TOP VIEW)



Outline 52P4B

PAL SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

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.	
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 _{O51}	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	9.0V	○	○	○	○	○	○	○	○	○	○	○	○	1.7	2.0	2.3	V		
V _{BCL}																						3.3	3.8
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.

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VIF-SIF SECTION (cont.)

Symbol	Parameter	Test Point	Input ()	Test conditions*														Limits			Unit						
				1	5	6	Vcc 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.			
LIM	Limiting sensitivity	3	C SG14	-	-	-	9.0V	-	○	○	-	○	-	-	-	○	○	-	-	-	-	-	-	42	50	dBμ	
AMR	AMR	3	C SG15	-	-	-	9.0V	-	○	○	-	○	-	-	-	○	○	-	-	-	-	-	-	50	60	dB	
V _{O4}	AF driver output	4	C SG12	-	-	-	9.0V	-	○	○	-	○	-	-	-	○	○	-	-	-	-	-	-	250	460	650	mVrms
V _{O4 max}	AF driver maximum output	4	C SG12	9.0V	-	-	9.0V	-	○	○	-	○	-	-	-	○	○	-	-	-	-	-	-	700	930	1200	mVrms
ATT	Maximum attenuation	4	C SG12	9.0V	-	-	9.0V	-	○	○	-	○	-	-	-	○	○	-	-	-	-	-	-	70	80	dB	
GAF	AF driver gain																						2.1	4.3	5.2	dB	
S/N AF	Sound S/N	4	C SG16	9.0V	-	-	9.0V	-	○	○	-	○	-	-	-	○	○	-	-	-	-	-	-	55	66	dB	
S MUTE	Sound mute voltage	2	C SG12	9.0V	-	-	9.0V	○	○	○	-	○	-	-	-	○	○	-	-	-	-	-	-	0.4	1.0	mVrms	
V.S. MUTE2	Video sound muting sound output	4	C SG12	9.0V	-	Variable	9.0V	-	-	-	-	○	-	-	-	○	○	-	-	-	-	-	-	0.3	1.0	V	
THD AF	AF driver maximum output distortion	4	C SG12	9.0V	-	-	9.0V	○	○	○	-	○	-	-	-	○	○	-	-	-	-	-	-	1	5	%	
V ₁	Pin ① voltage	1	-	H	-	-	9.0V	-	○	○	-	○	-	-	-	○	○	-	-	-	-	-	-	4.8	5.3	5.8	V

*: "-" Indicates open.

SYNC. SECTION (Horizontal)

Symbol	Parameter	Test Point	Input ()	Test conditions*																	Limits			Unit						
				11	11A	15	16A	17	19	S 11	S 11A	S 11B	S 12	S 12A	S 13	S 16	S 17	S 19	S 20	S 22	S 36	S 44	S 44A		Min.	Typ.	Max.			
I _{SS}	Sync. separation input sensitivity current	I _{SS} 43	I _{SS} variable	-	-	-	-	9.0V	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	0.05	0.1	0.2	mA
V _{43H}	Sync. separation output maximum voltage	43	D SG17	-	-	-	-	9.0V	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	8.0	8.9		V _{O-P}
V _{43L}	Sync. separation output minimum voltage	43	D SG17	-	-	-	-	9.0V	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	2.5	3.0	3.5	V _{O-P}
T _{BGP-I}	B.G.P timing	D 30	D SG18	-	-	-	-	9.0V	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	0	1	2	μs
T _{BGP-II}																											2.0	3.0	4.5	μs
V _{BGP-H}	B.G.P amplitude	30	D SG18	-	-	-	-	9.0V	-	-	-	-	-	-	-	-	○	-	-	-	-	-	-	-	-	-	5.4	6.2	7.0	V _{O-P}
V _{BGP-L}																											0	0.3		V _{O-P}
I _{CC 11}	H.Vcc inflow current	A11	-	-	12V	0V	-	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-	12.0	16.0	20.0	mA	
f _H	Horizontal freerun frequency	20	-	-	12V	0V	-	-	○	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-	15.20	15.625	15.95	kHz	
V _{11 min}	Horizontal oscillation starting voltage	11 20	-	Variable	0V	-	-	○	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-		4.5	5.4	V	
f _{PHL}	Horizontal pull-in range	D20	D SG18 f variable	9.0V	9.0V	0V	-	-	9.0V	○	-	○	○	-	-	○	○	-	-	-	-	-	-	-	-	- 500	- 600		Hz	
																											+ 500	+ 600		Hz
V _{20H}	Horizontal output maximum voltage	20	D SG18	9.0V	9.0V	0V	-	-	9.0V	○	-	○	○	-	-	○	○	-	-	-	-	-	-	-	-	3.2	3.8		V _{O-P}	

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VIDEO SECTION

Symbol	Parameter	Test Point	Input ()	Test conditions*																Limits			Unit								
				11 A	16 A	19 V	21	22 A	29	36	38	39	40	42	S19 A	S19 A	S22 A	S24 A	S27 A	S28 A	S28 A	S35 A		S36 A	S39 A	S42 A	S44 A	Min.	Typ.	Max.	
Icc19	Circuit current	A19	-	-	-	9.0 V	-	-	4.5 V	-	2.7 V	-	-	○	○	-	-	-	○	-	-	-	-	-	-	30	40	50	mA		
Ymax	Maximum output	22	F SG21	-	-	9.0 V	-	-	9.0 V	-	Variable	-	-	○	○	-	-	-	-	-	-	-	-	-	-	5.0	6.2		Vp-P		
GY	Standard gain	22	F SG22	-	-	9.0 V	-	-	4.5 V	-	Variable	-	-	○	○	-	-	-	-	-	-	-	-	-	-	11	15	19	dB		
GY min	Contrast control characteristics	22	F SG22	-	-	9.0 V	-	-	2.5 V	-	Variable	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-	-45	-30		dB	
GY max				-	-	9.0 V	-	-	6.9 V	-	Variable	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	+2	+6	+8.5	dB
VBRT-I-norm	Brightness control characteristics-I	22	D SG18	12 V	-	9.0 V	-	-	4.5 V	-	Variable	4.9 V	-	-	○	○	-	-	-	-	-	-	-	-	-	2.75	3.1	3.45	Vo-P		
VBRT-I-L				-	-	9.0 V	-	-	4.5 V	-	Variable	8.0 V	7.4 V	-	-	○	○	-	-	-	-	-	-	-	-	-	2.25	2.6	2.95	Vo-P	
VBRT-I-H				-	-	9.0 V	-	-	4.5 V	-	Variable	2.4 V	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	3.05	3.4	3.75	Vo-P
VBRT-II-norm	Brightness control characteristics-II	22	D SG18	12 V	-	9.0 V	-	-	4.5 V	-	Variable	4.5 V	-	-	○	○	-	-	-	-	-	-	-	-	-	-	2.75	3.1	3.45	Vo-P	
VBRT-II-L				-	-	9.0 V	-	-	4.5 V	2.4 V	-	Variable	9.0 V	-	-	○	○	-	-	-	-	-	-	-	-	-	-	1.65	2.0	2.35	Vo-P
VBRT-III-H				-	-	9.0 V	-	-	4.5 V	7.4 V	-	Variable	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	3.85	4.2	4.55
GP	Peaking value	22	F SG23 SG24	-	-	9.0 V	-	-	4.5 V	-	Variable	-	-	○	○	-	-	-	-	-	-	-	-	-	-	7.5	11	14.5	dB		
GT norm	Video tone control characteristics	22	F SG24	-	-	9.0 V	-	-	4.5 V	-	Variable	4.5 V	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-1.3	-0.5	1.2	dB	
GT min				-	-	9.0 V	-	-	4.5 V	-	Variable	8.9 V	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	-21	-15	-11	dB
GT max				-	-	9.0 V	-	-	4.5 V	-	Variable	2.5 V	-	-	-	-	○	○	-	-	-	-	-	-	-	-	-	-	3.0	6.0	10.0
fb (γ)	Frequency characteristics	22	F SG25	-	-	9.0 V	-	-	4.5 V	-	Variable	-	-	○	○	-	-	-	-	-	-	-	-	-	-	7	8		MHz		
DGY	Differential gain	22	F SG22	-	-	9.0 V	-	-	4.5 V	-	Variable	-	-	○	○	-	-	-	-	-	-	-	-	-	-		1	6	%		
V40	Pin 40 voltage	40	-	-	-	9.0 V	-	-	4.5 V	-	M	-	-	○	○	-	-	-	-	-	-	-	-	-	-	4.15	4.45	4.75	V		
VBLK V	Vertical blanking voltage	22	-	12 V	-	9.0 V	-	-	2.5 V	-	Variable	-	-	○	○	-	-	-	-	-	-	-	-	-	-	7.3	7.7		Vo-P		
VBLK TV50	Vertical blanking pulse width	22	-	12 V	-	9.0 V	-	-	2.5 V	-	Variable	-	-	○	○	-	-	-	-	-	-	-	-	-	-	1.31	1.38	1.44	ms		
VBLK H	Horizontal blanking threshold voltage	22	H SG28	25A	-	9.0 V	-	Variable	2.5 V	-	Variable	-	-	○	○	○	○	-	-	-	-	-	-	-	-	6.35	6.8		Vo-P		
VDC REG	DC regeneration control characteristics	22	F SG17	-	-	9.0 V	-	-	4.5 V	-	Variable	9.0 V	-	○	○	-	-	-	-	-	-	-	-	-	-	-1.2	-0.2	1.0	V		

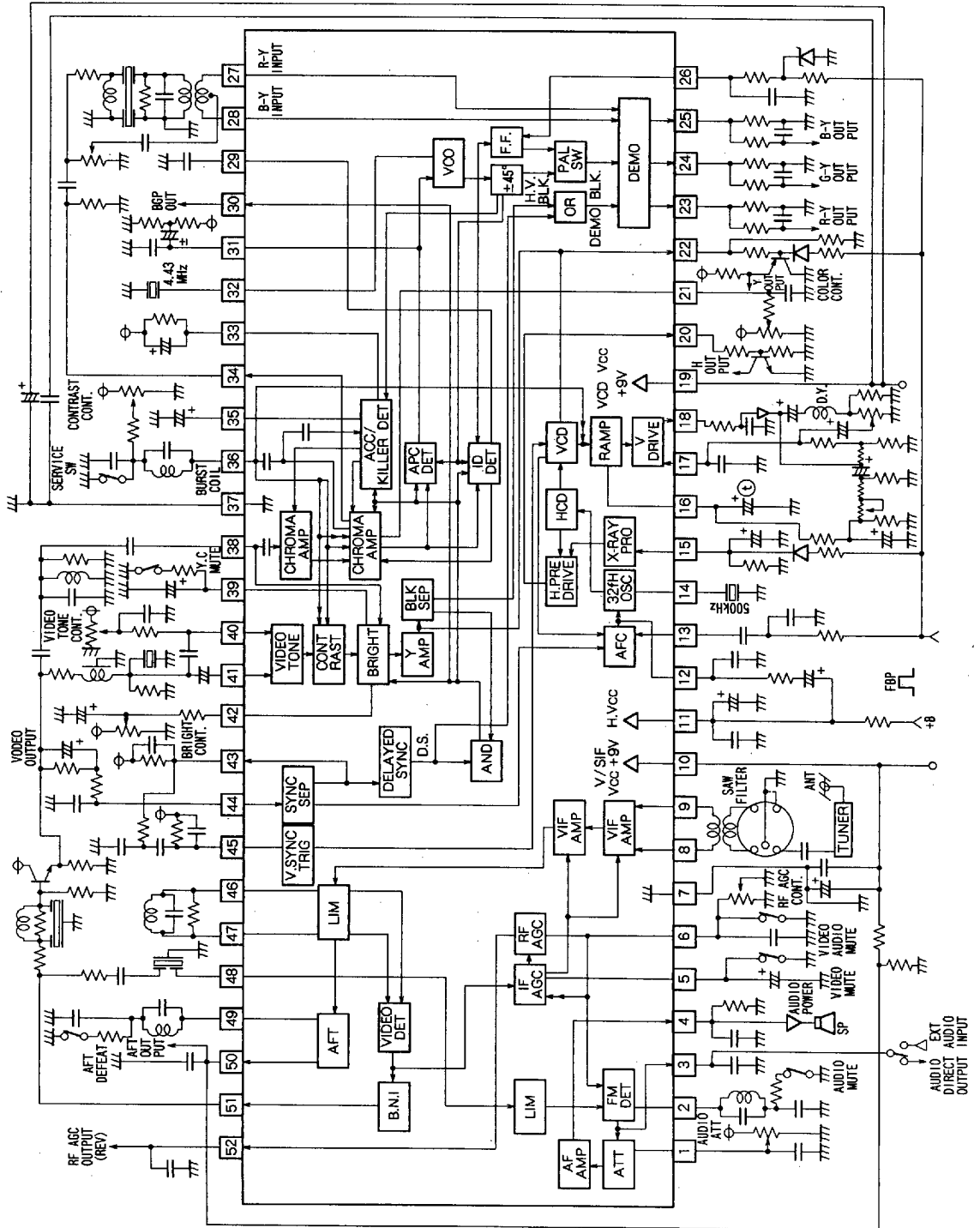
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PAL SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

TEST CIRCUIT



6249826 0019260 082



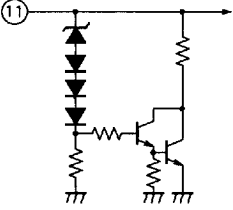
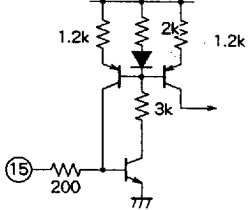
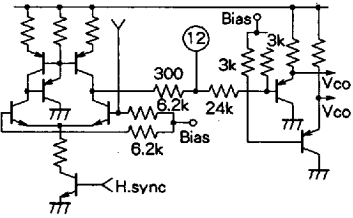
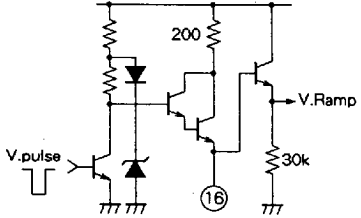
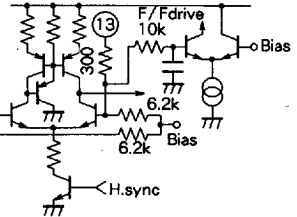
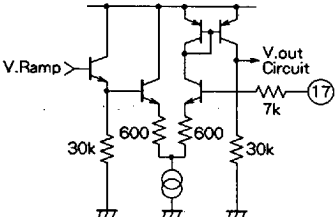
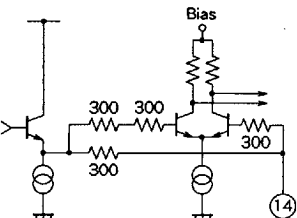
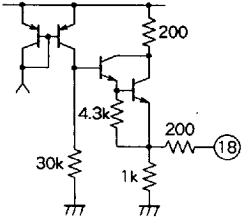
PAL SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

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)	-			

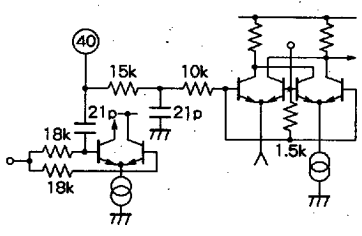
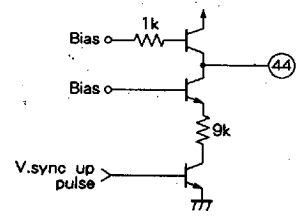
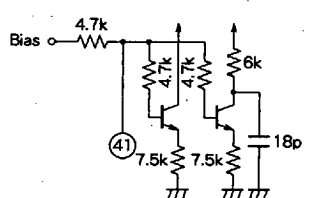
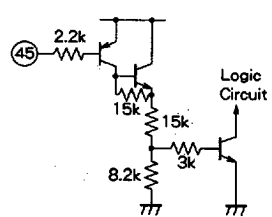
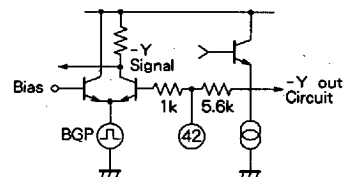
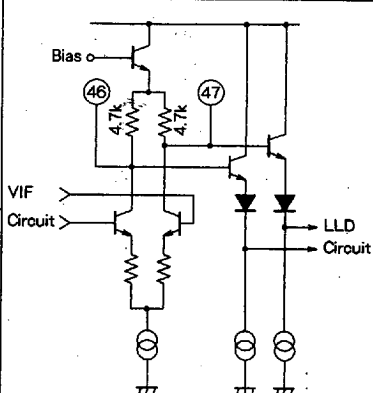
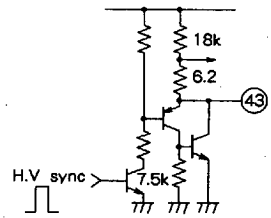
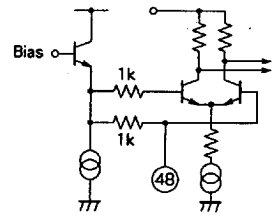
PAL SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

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	

PAL SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

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	

PAL SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION OF PIN (cont.)

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