

M52303ASP

NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION

The M52303ASP is a single-chip semiconductor integrated circuit that processes color NTSC system television signals. It features a variety of signal processing functions including video IF, sound IF, picture, color, and deflection signal processing. It also combines tuner and simple transistor output level to facilitate practical PAL/NTSC system color television set design.

FEATURES

- With the exception of tuner and output level, all color television signal processing functions are built-in, enhancing practicality and reliability of the television set itself while contributing to lower power consumption.
- The intermediate frequency input pins consist of two pins for actuation input and feature high-stability toward oscillation.
- Horizontal oscillation can be counted down from 32 times the horizontal frequency using a ceramic oscillator, and requires no adjustment of free run frequency.
- Vertical oscillation can be counted down from 2 times the horizontal frequency produced by horizontal count-down and requires no vertical sync volume. Because count-down is used, the number of external components required for the vertical circuit is minimized.
- Enables use of AFT defeat, picture muting, and sound muting.
- Features direct current control for picture quality, contrast, luminance, color saturation, and volume.
- Equipped with built-in on-screen character display circuit.

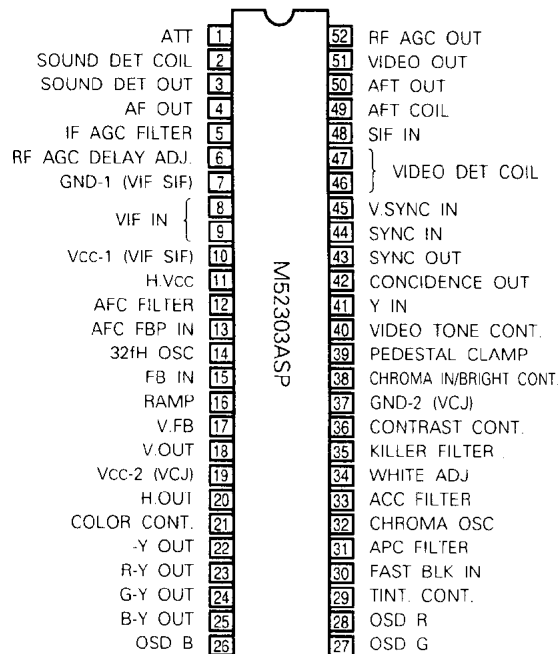
APPLICATION

NTSC CTV

RECOMMENDED OPERATING CONDITION

Supply voltage range8.5 ~ 9.5V (V10, V19)
 Rated supply voltage9.0V (V10, V19)
 Current range15 ~ 22mA (I11)
 Rated current18mA (I11)

PIN CONFIGURATION (TOP VIEW)

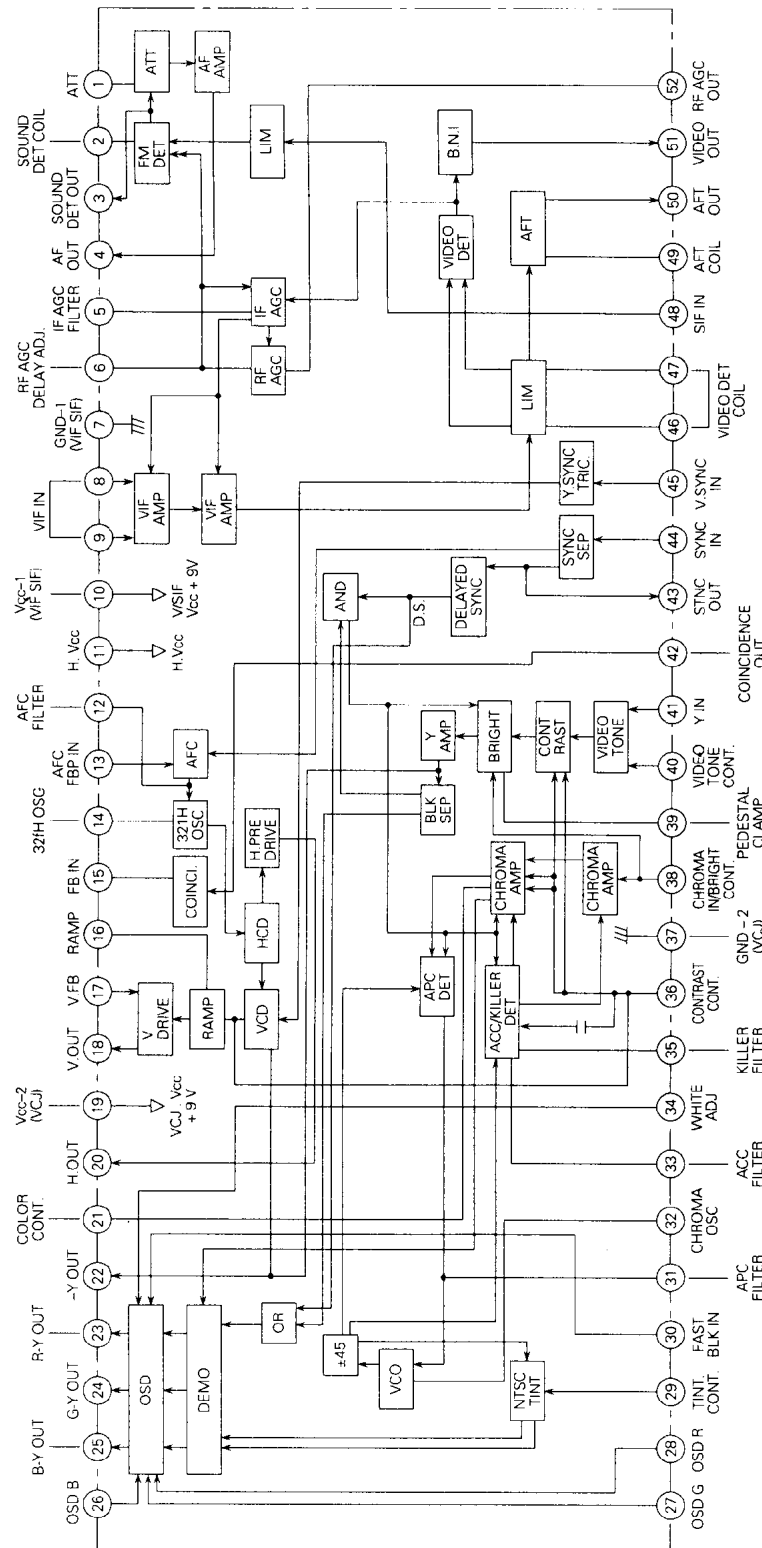


Outline 52P4B

M52303ASP

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BLOCK DIAGRAM



M52303ASP

NTSC 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)

Symbol	Parameter	Test point ()	Input ()	Test conditions ("—" in the table below denotes "OPEN".)														Limits			Unit
				1	5	6	V _{CC} 10	S	S	S	S	S	S	S	S	S	S	Min.	Typ.	Max.	
I _{CC10}	Circuit current	A10	—	—	—	—	9.0 V	—	—	—	—	—	—	—	—	—	—	27	3G	50	mA
V ₅₁	Video output DC voltage	51	—	—	—	—	9.0 V	—	—	—	—	—	—	—	—	—	—	4.55	4.0	5.35	V
V ₀₅₁	Video output signal voltage	51	A SG.1	—	—	—	9.0 V	—	—	—	—	—	—	—	—	—	—	1.7	2.0	2.3	Vp-p
V _{51L}	Sync. tp voltage	51	A SG.2	—	—	—	9.0 V	—	—	—	—	—	—	—	—	—	—	2.3	2.6	2.9	V
V _{in min.}	Input sensitivity	51A	A SG.3	—	—	—	9.0 V	—	—	—	—	—	—	—	—	—	—	37	45	51	dBμ
V _{in max.}	Maximum allowable input	51A	A SG.4	—	—	—	9.0 V	—	—	—	—	—	—	—	—	—	—	103	110	—	dBμ
V _{BTH}	Black spot noise inverter	51	A SG.2 SG.5	—	Variable	—	9.0 V	—	—	—	—	—	—	—	—	—	1.7	2.0	2.3	—	V
V _{BCL}																					
BW	Video frequency characteristics	51	A SG.8	—	Variable	—	9.0 V	—	—	—	—	—	—	—	—	—	—	5.6	8	—	MHz
IM	Intermodulation	51	A SG.9	—	—	—	9.0 V	—	—	—	—	—	—	—	—	—	—	32	45	—	dB
S/N	Video noise	51A	A SG.2	—	—	—	9.0 V	—	—	—	—	—	—	—	—	—	—	50	56	—	dB
V ₅₀	AFT output DC voltage	50	—	—	—	—	9.0 V	—	—	—	—	—	—	—	—	—	—	3.0	4.0	5.0	V
V _{50H}	AFT output Maximum voltage	50	A SG.6	—	—	—	9.0 V	—	—	—	—	—	—	—	—	—	—	8.0	8.7	—	V
V _{50L}	AFT output Minimum voltage	50	A SG.7	—	—	—	9.0 V	—	—	—	—	—	—	—	—	—	—	—	0.3	1.0	V
μAFT	AFT sensitivity	50	A SG.5	—	—	—	9.0 V	—	—	—	—	—	—	—	—	—	—	40	60	120	mV/kHz

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ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test point	Input ()	Test conditions ("—" in the table below denotes "OPEN".)																								Limits			Unit																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
				1	5	6	Vcc	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S		S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test point	Input ()	Test conditions ("—" in the table below denotes "OPEN")																									
																						Limits							
				11	11A	15	16A	17	19	S	S	S	S	S	S	S	S	S	S	S	S	S	Min.	Typ.	Max.	Unit			
I _{SS}	Sync. separation input sensitivity current	I _{SS} 43	I _{SS} Variable	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.05	0.1	0.2	mA				
V _{A3H}	Sync. separation output maximum voltage	43	D SG.17	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8.0	8.9	—	Vo-p				
V _{A3L}	Sync. separation output minimum voltage	43	D SG.17	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2.5	3.0	3.5	Vo-p				
I _{CC11}	H. Vcc inflow current	A11	—	—	12 V	0 V	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12.0	16.0	20.0	mA				
f _H	Horizontal free-run frequency	20	—	—	12 V	0 V	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15.20	15.625	15.95	kHz				
V _{I1 min}	Horizontal oscillation starting voltage	11 20	—	Variable	—	0 V	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4.5	5.4	V				
f _{PHL}	Horizontal pull-in range	D 20	D SG.18 f variable	9.0 V	0 V	0 V	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—500	—600	—	Hz				
f _{PHH}			9.0 V	0 V	0 V	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	+500	+600	—	Hz			
V _{20H}	Horizontal output maximum voltage	20	D SG.18	9.0 V	0 V	0 V	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3.2	3.8	—	Vo-p				
V _{20L}	Horizontal output minimum voltage	20	D SG.18	9.0 V	0 V	0 V	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	0.3	Vo-p				
T _H	Horizontal output pulse width	20	D SG.18	9.0 V	0 V	0 V	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22	24	26	μS				
V _{Z0H} (6V)	Horizontal output maximum voltage at terminal 11 - 6 V	20	—	6.0 V	0 V	0 V	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.2	1.8	2.4	Vo-p				
f _H (Vcc)	Free-run frequency increase/decrease supply voltage	20	—	—	9V 15V	0 V	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15.20	15.625	15.95	kHz				
V _{RPO}	Overvoltage detection operating voltage	15 20	—	9.0 V	—	Variable	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.63	0.73	0.83	V					

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ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test point	Input ()	Test conditions ("—" in the table below denotes "OPEN".)																								Limits			Unit
				11	11A	15	16A	17	19	36	S	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.				
				9.0 V	9.0 V	0 V	—	3.7 V	9.0 V	4.5 V	0	—	—	0	0	0	0	0	0	0	0	—	—	—	—	4.2	5	—			
V _{18H}	Vertical output maximum voltage	18	D SG.17	9.0 V	9.0 V	0 V	—	3.7 V	9.0 V	4.5 V	0	—	—	0 <td>0<td>0<td>0<td>0<td>0<td>—</td><td>—</td><td>—</td><td>—</td><td>4.2</td><td>5</td><td>—</td><td>V_{o-p}</td></td></td></td></td></td>	0 <td>0<td>0<td>0<td>0<td>—</td><td>—</td><td>—</td><td>—</td><td>4.2</td><td>5</td><td>—</td><td>V_{o-p}</td></td></td></td></td>	0 <td>0<td>0<td>0<td>—</td><td>—</td><td>—</td><td>—</td><td>4.2</td><td>5</td><td>—</td><td>V_{o-p}</td></td></td></td>	0 <td>0<td>0<td>—</td><td>—</td><td>—</td><td>—</td><td>4.2</td><td>5</td><td>—</td><td>V_{o-p}</td></td></td>	0 <td>0<td>—</td><td>—</td><td>—</td><td>—</td><td>4.2</td><td>5</td><td>—</td><td>V_{o-p}</td></td>	0 <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>4.2</td> <td>5</td> <td>—</td> <td>V_{o-p}</td>	—	—	—	—	4.2	5	—	V _{o-p}				
V _{18L}	Vertical output minimum voltage	18	D SG.17	9.0 V	9.0 V	0 V	—	3.7 V	9.0 V	4.5 V	0	—	—	0 <td>0<td>0<td>0<td>0<td>0</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>0</td><td>0.3</td><td>V_{o-p}</td></td></td></td></td>	0 <td>0<td>0<td>0<td>0</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>0</td><td>0.3</td><td>V_{o-p}</td></td></td></td>	0 <td>0<td>0<td>0</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>0</td><td>0.3</td><td>V_{o-p}</td></td></td>	0 <td>0<td>0</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>0</td><td>0.3</td><td>V_{o-p}</td></td>	0 <td>0</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>0</td> <td>0.3</td> <td>V_{o-p}</td>	0	—	—	—	—	—	0	0.3	V _{o-p}				
G _{VV}	Vertical open loop gain	17 18	E SG.19	—	—	—	4.5 V Variable	3.7 V	9.0 V	—	—	—	—	—	0 <td>0<td>0<td>0<td>—</td><td>—</td><td>—</td><td>—</td><td>16</td><td>22</td><td>28</td><td>dB</td></td></td></td>	0 <td>0<td>0<td>—</td><td>—</td><td>—</td><td>—</td><td>16</td><td>22</td><td>28</td><td>dB</td></td></td>	0 <td>0<td>—</td><td>—</td><td>—</td><td>—</td><td>16</td><td>22</td><td>28</td><td>dB</td></td>	0 <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>16</td> <td>22</td> <td>28</td> <td>dB</td>	—	—	—	—	16	22	28	dB					
V _{19 min}	Vertical oscillation starting voltage	16 19	—	9.0 V	9.0 V	0 V	0 V	—	Variable	4.5 V	0	—	—	0 <td>0<td>0<td>0<td>0<td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>5</td><td>6.5</td><td>V</td></td></td></td></td>	0 <td>0<td>0<td>0<td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>5</td><td>6.5</td><td>V</td></td></td></td>	0 <td>0<td>0<td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>5</td><td>6.5</td><td>V</td></td></td>	0 <td>0<td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>5</td><td>6.5</td><td>V</td></td>	0 <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>5</td> <td>6.5</td> <td>V</td>	—	—	—	—	—	5	6.5	V					
V _{RAMP}	Ramp peak voltage	16	D SG.17	9.0 V	9.0 V	0 V	0 V	—	9.0 V	4.5 V	0	—	—	0 <td>0<td>0<td>0<td>0</td><td>—</td><td>—</td><td>—</td><td>—</td><td>4.60</td><td>4.90</td><td>5.30</td><td>V_{o-p}</td></td></td></td>	0 <td>0<td>0<td>0</td><td>—</td><td>—</td><td>—</td><td>—</td><td>4.60</td><td>4.90</td><td>5.30</td><td>V_{o-p}</td></td></td>	0 <td>0<td>0</td><td>—</td><td>—</td><td>—</td><td>—</td><td>4.60</td><td>4.90</td><td>5.30</td><td>V_{o-p}</td></td>	0 <td>0</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>4.60</td> <td>4.90</td> <td>5.30</td> <td>V_{o-p}</td>	0	—	—	—	—	4.60	4.90	5.30	V _{o-p}					
V _{RAMP}	Ramp amplitude	16	D SG.17	9.0 V	9.0 V	0 V	—	—	9.0 V	4.5 V	0	—	—	0 <td>0<td>0<td>0<td>0</td><td>—</td><td>—</td><td>—</td><td>—</td><td>1.20</td><td>1.45</td><td>1.85</td><td>V_{p-p}</td></td></td></td>	0 <td>0<td>0<td>0</td><td>—</td><td>—</td><td>—</td><td>—</td><td>1.20</td><td>1.45</td><td>1.85</td><td>V_{p-p}</td></td></td>	0 <td>0<td>0</td><td>—</td><td>—</td><td>—</td><td>—</td><td>1.20</td><td>1.45</td><td>1.85</td><td>V_{p-p}</td></td>	0 <td>0</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>1.20</td> <td>1.45</td> <td>1.85</td> <td>V_{p-p}</td>	0	—	—	—	—	1.20	1.45	1.85	V _{p-p}					
f _{V60}	Vertical free-run frequency 60	16	D SG.18	9.0 V	9.0 V	0 V	0 V	—	9.0 V	4.5 V	0	—	—	0 <td>0<td>0<td>0<td>0<td>—</td><td>—</td><td>—</td><td>—</td><td>51.8</td><td>52.8</td><td>53.8</td><td>Hz</td></td></td></td></td>	0 <td>0<td>0<td>0<td>—</td><td>—</td><td>—</td><td>—</td><td>51.8</td><td>52.8</td><td>53.8</td><td>Hz</td></td></td></td>	0 <td>0<td>0<td>—</td><td>—</td><td>—</td><td>—</td><td>51.8</td><td>52.8</td><td>53.8</td><td>Hz</td></td></td>	0 <td>0<td>—</td><td>—</td><td>—</td><td>—</td><td>51.8</td><td>52.8</td><td>53.8</td><td>Hz</td></td>	0 <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>51.8</td> <td>52.8</td> <td>53.8</td> <td>Hz</td>	—	—	—	—	51.8	52.8	53.8	Hz					
f _{V60}	Vertical pull-in frequency 60	16	D SG.20 f variable	9.0 V	9.0 V	0 V	0 V	—	9.0 V	4.5 V	0	—	—	0 <td>0<td>0<td>0<td>0<td>—</td><td>—</td><td>—</td><td>—</td><td>65.7</td><td>66.7</td><td>67.7</td><td>Hz</td></td></td></td></td>	0 <td>0<td>0<td>0<td>—</td><td>—</td><td>—</td><td>—</td><td>65.7</td><td>66.7</td><td>67.7</td><td>Hz</td></td></td></td>	0 <td>0<td>0<td>—</td><td>—</td><td>—</td><td>—</td><td>65.7</td><td>66.7</td><td>67.7</td><td>Hz</td></td></td>	0 <td>0<td>—</td><td>—</td><td>—</td><td>—</td><td>65.7</td><td>66.7</td><td>67.7</td><td>Hz</td></td>	0 <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>65.7</td> <td>66.7</td> <td>67.7</td> <td>Hz</td>	—	—	—	—	65.7	66.7	67.7	Hz					
T _{V60}	Vertical output pulse width 60	16	D SG.17	9.0 V	9.0 V	0 V	0 V	—	9.0 V	4.5 V	0	—	—	0 <td>0<td>0<td>0<td>0</td><td>—</td><td>—</td><td>—</td><td>—</td><td>494</td><td>544</td><td>594</td><td>μS</td></td></td></td>	0 <td>0<td>0<td>0</td><td>—</td><td>—</td><td>—</td><td>—</td><td>494</td><td>544</td><td>594</td><td>μS</td></td></td>	0 <td>0<td>0</td><td>—</td><td>—</td><td>—</td><td>—</td><td>494</td><td>544</td><td>594</td><td>μS</td></td>	0 <td>0</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>494</td> <td>544</td> <td>594</td> <td>μS</td>	0	—	—	—	—	494	544	594	μS					
V _{42Hi}	Coincidence output maximum voltage	42	D SG.18	9.0 V	9.0 V	5 V	—	—	9.0 V	—	—	—	—	0 <td>0<td>0<td>0<td>0</td><td>—</td><td>—</td><td>—</td><td>—</td><td>7.0</td><td>7.4</td><td>—</td><td>V</td></td></td></td>	0 <td>0<td>0<td>0</td><td>—</td><td>—</td><td>—</td><td>—</td><td>7.0</td><td>7.4</td><td>—</td><td>V</td></td></td>	0 <td>0<td>0</td><td>—</td><td>—</td><td>—</td><td>—</td><td>7.0</td><td>7.4</td><td>—</td><td>V</td></td>	0 <td>0</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>7.0</td> <td>7.4</td> <td>—</td> <td>V</td>	0	—	—	—	—	7.0	7.4	—	V					
V _{42Lo}	Coincidence output minimum voltage	42	—	9.0 V	9.0 V	5 V	—	—	9.0 V	—	—	—	—	0 <td>0<td>0<td>0<td>0</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>0</td><td>0.5</td><td>V</td></td></td></td>	0 <td>0<td>0<td>0</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>0</td><td>0.5</td><td>V</td></td></td>	0 <td>0<td>0</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>0</td><td>0.5</td><td>V</td></td>	0 <td>0</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>0</td> <td>0.5</td> <td>V</td>	0	—	—	—	—	—	0	0.5	V					

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NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test point	Input ()	Test conditions ("—" in the table below denotes "OPEN".)																Limits			Unit		
				11A	16A	19	21	22A	29	36	38	39	40	42	S 19	S 19A	S 22	S 44	S 35	S 36	S 39	Min.		Typ.	Max.
IC19	Circuit current	A19	—	—	—	9.0 V	—	—	—	4.5 V	—	2.7 V	—	—	—	—	—	—	—	—	36	46	56	mA	
Ymax	Maximum output	22	F SG.21	—	—	9.0 V	—	—	—	9.0 V	—	Variable	—	—	—	—	—	—	—	—	5.0	6.2	—	Vp-p	
Gy	Standard gain	22	F SG.22	—	—	9.0 V	—	—	—	4.5 V	—	Variable	—	—	—	—	—	—	—	—	11	15	19	dB	
Gy min	Contrast control characteristics	22	F SG.22	—	—	9.0 V	—	—	—	2.5 V	—	Variable	—	—	—	—	—	—	—	—	—	—45	—30	dB	
Gy max				—	—	9.0 V	—	—	—	6.5 V	—	Variable	—	—	—	—	—	—	—	—	—	2	6	8.5	dB
V _{BRT II} norm	Brightness control characteristics II	22	D SG.18	—	—	—	—	—	—	.5 V	—	—	—	—	—	—	—	—	—	—	2.95	3.3	3.65	—	
V _{BRT II} L				12 V	—	9.0 V	—	—	—	4.5 V	.4 V	—	9.0 V	—	—	—	—	—	—	—	—	2.05	2.4	2.75	V _{o-p}
V _{BRT II} H				—	—	—	—	—	—	—	.4 V	—	—	—	—	—	—	—	—	—	—	3.75	4.1	4.45	—
Gp	Peaking value	22	F SG.23 SG.24	—	—	9.0 V	—	—	—	4.5 V	—	Variable	—	—	—	—	—	—	—	—	7.5	11	14.5	dB	
GT norm	Video tone control characteristics	22	F SG.24	—	—	9.0 V	—	—	—	—	—	—	4.5 V	—	—	—	—	—	—	—	—1.3	—0.5	1.2	—	
GT min				—	—	9.0 V	—	—	—	4.5 V	—	Variable	—	—	—	—	—	—	—	—	—	—21	—15	—11	dB
GT max				—	—	9.0 V	—	—	—	—	—	—	2.5 V	—	—	—	—	—	—	—	—	3.0	6.0	10.0	—
fb Y	Frequency characteristics	22	F SG.25	—	—	9.0 V	—	—	—	4.5 V	—	Variable	—	—	—	—	—	—	—	—	7	8	—	MHz	
DG Y	Differential gain	22	F SG.22	—	—	9.0 V	—	—	—	4.5 V	—	Variable	—	—	—	—	—	—	—	—	—	1	6	X	
V40	Terminal 40 voltage	40	—	—	—	9.0 V	—	—	—	4.5 V	—	—	M	—	—	—	—	—	—	4.15	4.45	4.75	V		
V _{BLK} Y	Vertical blanking voltage	22	—	12 V	—	9.0 V	—	—	—	2.5 V	—	Variable	—	—	—	—	—	—	—	—	7.3	7.7	—	V _{o-p}	
V _{BLK} TV	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 SG.28 0.5Vp-p	—	—	9.0 V	—	Variable	—	2.5 V	—	Variable	—	—	—	—	—	—	—	—	6.35	6.8	—	V _{o-p}	
Y DC REG	DC regeneration control characteristics	22	F SG.17	—	—	9.0 V	—	—	—	4.5 V	—	—	9.0 V	—	—	—	—	—	—	—	—1.2	—0.2	1.0	V	

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NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test point	Input ()	Test conditions ("—" in the table below denotes "OPEN").																Limits			Unit			
				11A	16A	19	21	22A	29	36	38	39	40	S 19	S 19A	S 22	S 30	34	36	27	28	S 35		S 36	S 39	Min.
C _{max}	Demodulation output maximum amplitude	25A	G SG.26 0dB	12 V	—	9.0 V	6.5 V	—	—	6.5 V	—	—	9.0 V	○	—	○	—	—	—	—	—	—	3.6	5.5	—	V _{p-p}
ACC-I	ACC characteristics	25A	G SG.26 -20dB	12 V	—	9.0 V	—	—	—	4.5 V	—	—	9.0 V	○	—	○	—	—	—	—	—	—	-8	-3.8	0.5	dB
ACC-II			G SG.26 +6dB	12 V	—	9.0 V	—	—	—	—	—	—	—	9.0 V	○	—	—	—	—	—	—	—	-3.0	0	3.0	
V _k	Killer operation input level	G 21	SG.26 Input variable	12 V	—	9.0 V	—	—	—	4.5 V	—	—	9.0 V	○	—	○	—	—	—	—	—	—	-59	-52	-46	dB
V _{ok}	Killer color residual	25A	G SG.29 0dB	12 V	—	9.0 V	—	—	—	9.0 V	—	—	9.0 V	○	—	○	—	—	—	—	—	—	—	15	35	mV _{p-p}
C _{norm}	Demodulation standard output	25A	G SG.26 0dB	12 V	—	9.0 V	—	—	—	4.5 V	—	—	9.0 V	○	—	○	—	—	—	—	—	—	1.0	1.7	2.4	V _{p-p}
C _{u min}	Color control characteristics I	25A	G SG.26 0dB	12 V	—	9.0 V	2.5 V	—	—	4.5 V	—	—	9.0 V	○	—	○	—	—	—	—	—	—	-62	-52	-46	dB
C _{u max}				12 V	—	9.0 V	6.5 V	—	—	—	—	—	9.0 V	○	—	○	—	—	3.8	7.3	10.8					
C _{s min}	Color control characteristics II	25A	G SG.26 0dB	12 V	—	9.0 V	—	—	—	2.5 V	—	—	9.0 V	○	—	○	—	—	—	—	—	—	-48	-38	-30	dB
C _{s max}				12 V	—	9.0 V	—	—	6.5 V	—	—	—	9.0 V	○	—	○	—	—	1.7	5.2	8.7					
f _{pc L}	APC pull-in range	21 G	G SG.27 0dB	12 V	—	9.0 V	—	—	—	4.5 V	—	—	9.0 V	○	—	○	—	—	—	—	—	—	0.5	0.9	—	kHz
f _{pc H}				12 V	—	9.0 V	—	—	—	—	—	—	9.0 V	○	—	○	—	—	0.5	0.9	—					
f _{pc}	Total APC range			12 V	—	9.0 V	—	—	—	—	—	—	9.0 V	○	—	—	—	—	—	—	—	1.0	1.8	—	kHz	
V ₂₃	Demodulation output DC voltage	23A	—	12 V	—	9.0 V	—	—	—	4.5 V	—	—	9.0 V	○	—	○	—	—	—	—	—	—	4.6	5.0	5.4	V
V ₂₄		24A		12 V	—	9.0 V	—	—	—	—	—	—	—	9.0 V	○	—	—	—	—	—	—	—	—	—	—	V
V ₂₅		25A		12 V	—	9.0 V	—	—	—	—	—	—	—	9.0 V	○	—	—	—	—	—	—	—	—	—	—	—
V _{23,24}	Demodulation output DC offset voltage	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	V
V _{24,25}		—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
V _{25,23}		—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
CL B-Y	Demodulation output carrier leak	25A	—	12 V	—	9.0 V	2.5 V	—	—	2.5 V	—	—	9.0 V	○	—	○	—	—	—	—	—	—	—	—	—	V _{p-p}
CL R-Y		23A		12 V	—	9.0 V	—	—	—	—	—	—	—	9.0 V	○	—	—	—	—	—	—	—	—	—	—	
CL G-Y		24A		12 V	—	9.0 V	—	—	—	—	—	—	—	9.0 V	○	—	—	—	—	—	—	—	—	—	—	

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NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test point	Input ()	Test conditions ("—" in the table below denotes "OPEN".)																	Limits			Unit				
				11A	16A	19	21	22A	29	36	38	39	40	S 19	S 19A	S 22	30	34	26	27	28	S 35	S 36		S 39	Min.	Typ.	Max.
V ₂₁	Terminal 21 voltage	21	G SG.26 0dB	12 V	9.0 V	M	—	—	4.5 V	—	—	9.0 V	—	—	—	—	—	—	—	—	—	—	—	4.2	4.6	5.0	V	
V _{21k}		21	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.1	0.35		
SS Y	Service switch operation	22	F SG.22	—	—	—	—	—	—	4.5 V	—	—	9.0 V	—	—	—	—	—	—	—	—	—	—	—	10	90	mVp-p	
SS C		34	G SG.26 0dB	12 V	9.0 V	—	—	—	—	—	4.5 V	—	Variable	9.0 V	—	—	—	—	—	—	—	—	—	—	10	90	mVp-p	
SS V		16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	0.3	Vo-p	
VMS		22	F SG.17	12 V	9.0 V	—	—	—	—	4.5 V	—	—	9.0 V	—	—	—	—	—	—	—	—	—	—	5.7	6.2	6.8	Vo-p	
CMS R-Y	Video chroma mute switch operation	23A	G	12 V	9.0 V	—	—	—	—	4.5 V	—	—	9.0 V	—	—	—	—	—	—	—	—	—	—	—	10	90	mVp-p	
CMS G-Y		24A	SG.26 0dB	12 V	9.0 V	—	—	—	—	4.5 V	—	—	9.0 V	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
CMS B-Y		25A	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
R-Y-N B-Y	Demodulation ratio at NTSC action	23A	G	12 V	9.0 V	—	—	—	2 V	4.5 V	—	—	—	—	—	—	—	—	—	—	—	—	—	0.6	0.9	1.2	—	
C-Y B-Y		25A	SG.31 0dB	12 V	9.0 V	—	—	—	—	—	4.5 V	—	—	—	—	—	—	—	—	—	—	—	—	0.1	0.3	0.5		
CR-Y-N		Demodulation angle at NTSC action	23A	G	12 V	9.0 V	—	—	—	2 V	4.5 V	—	—	—	—	—	—	—	—	—	—	—	—	—	—	104	—	deg
CB-Y-N			25A	SG.31 0dB	12 V	9.0 V	—	—	—	—	—	4.5 V	—	—	—	—	—	—	—	—	—	—	—	—	—	241	—	deg
T _{min}	NTSC TINT control characteristics	23A	G	12 V	9.0 V	—	—	—	3.0 V	4.5 V	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	—	deg	
T _{max}		25A	SG.32 0dB	12 V	9.0 V	—	—	—	5.5 V	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—80	—	deg
OS _R	On screen threshold voltage	23A	—	12 V	9.0 V	—	—	—	—	4.5 V	—	—	—	—	—	—	—	3.0 V	7.5 V	—	—	—	—	7.0	7.5	—	V	
OS _G		24A	—	12 V	9.0 V	—	—	—	—	—	—	—	—	—	—	—	—	—	3.0 V	—	—	—	—	—	—	—	—	
OS _B		25A	—	12 V	9.0 V	—	—	—	—	—	—	—	—	—	—	—	—	—	3.0 V	—	—	—	—	—	—	—	—	

M52303ASP

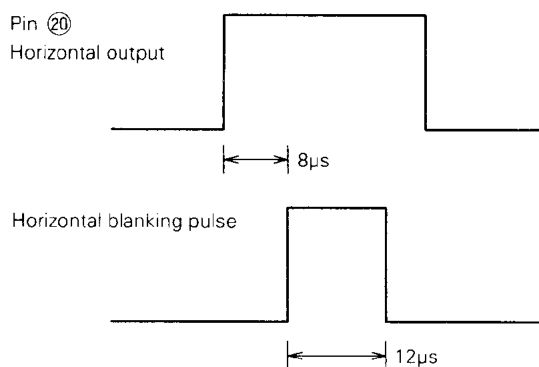
NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

ELECTRICAL CHARACTERISTICS TEST METHOD

- Note 1. Set SG to $f_0 = 45.75\text{MHz}$, 25m Vrms , CW.
Adjust the voltage of pin ⑤ so that the voltage of pin ⑤① is 1 (V) lower than in item "V51I."
Set SG to $f_0 = 45.75\text{MHz}$, 12.5m Vrms , CW.
Test the voltage of pin ⑤① and make it V51a.

$$\text{LIN} = \frac{\text{V51I} - \text{V51a}}{1(\text{V})} \times 100(\%)$$

- Note 2. Adjust the one-shot multivibrator's potentiometer so that the timing of the horizontal blanking pulse and pulse amplitude are as shown in the figure below.



Set to $8\mu\text{s}$ with the TTL IC M74LS221P's pin ①⑤ potentiometer. Also set to $12\mu\text{s}$ with the pin ⑦ potentiometer.

Precautions When Testing Items Related to Chroma

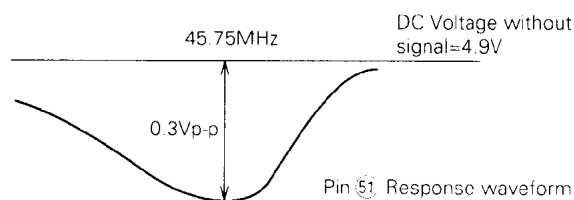
The conditions listed below are usually set when testing items related to chroma (Items C1 ~ C54).

- 1) Input signal SG.A into D input.
- 2) Turn switches S5, S11A, S12, S12A, S13, S20, and S44 on.

Coil and Potentiometer Adjustment

VIF/SIF Type Coil Adjustment

1. Set V_{BTH} test conditions described in item "V10."
2. Detune AFT coil.
3. Then adjust the applied voltage of pin ⑤ so that the tank response of pin ⑤① is $0.3\text{V}_{\text{P-P}}$.
4. Adjust the DET coil so that the peak is 45.75MHz .
 - 1) DC Voltage without Signal = 4.9V
 - 2) Pin ⑤① Response Waveform



5. Set μAFT test conditions of item "V22" and adjust the AFT coil so that the electric potential is 4.5V at 45.75MHz as shown on the next page.

V8 Input Sensitivity "Vin min"

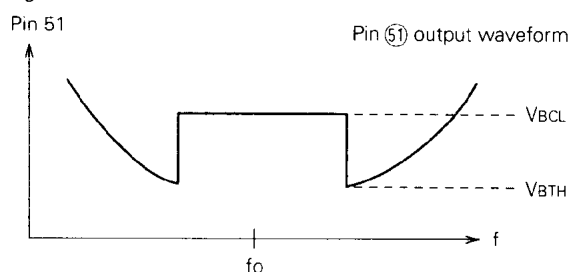
Expressed as input level 3 dB down from the test value of "video output signal voltage" as the level of SG.3 is decreased.

V9 Maximum Allowable Input "Vin max"

1. SG.4 is input as $90\text{ dB}\mu$.
2. Make V_A the output level of pin ⑤① at this time.
3. Expressed as input level 3 dB down from output level of pin ⑤① being V_A as the level of SG.4 is increased.

V10 Black Spot Noise Inverter " V_{BTH} , V_{BCL} "

1. Input SG.2 and adjust the applied voltage of pin 5 so that the voltage of pin ⑤① is 2.5V .
2. Input SG.5 and test V_{BTH} and V_{BCL} as shown in the figure below.

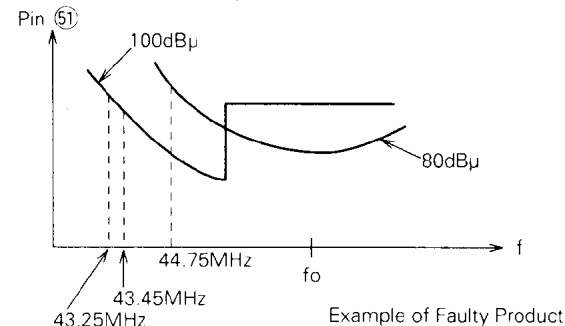


V11 Tank Response at Time of Large Input "TRA"

1. Input SG.2 and adjust the applied voltage of pin ⑤ so that the voltage of pin ⑤① is 2.5V .
(Apply the applied voltage of pin ⑤ when item V10 "Black Spot Inverter" was tested.)
2. Input SG.6, test the output voltage of pin ⑤① and make it V_A .
3. Input SG.8, test the output voltage of pin ⑤① and make it V_B .
4. Input SG.9, test the output voltage of pin ⑤① and make it V_C .

Standard: The following is considered to be a faulty product. The tank response of a faulty product is given in the figure below.

1) Example of Faulty Product



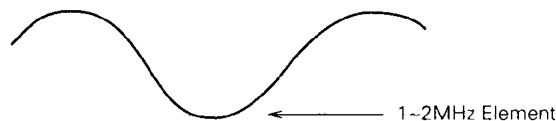
NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

V12Tank Response "TR"

1. Input SG.2 and adjust the applied voltage of pin ⑤ so that the voltage of pin ⑤ is 2.5V.
(Apply the applied voltage of pin ⑤ when item V10 "Black Spot Inverter" was tested.)
2. Input SG.6, test the output voltage of pin ⑤ and make it V_A .
(Same V_A as tested in item V11 "Tank Response at Time of Large Input.")
3. Input SG.7, test the output voltage of pin ⑤ and make it V_B .
4. Standard value is expressed as $TR = V_A - V_B$.

V15Ringing "RG"

Test the p-p value via HPF of the 1~2MHz in the 16kHz low part of the pin ⑤ output signal as shown in the figure below.



V16Noise Canceller Level "V_{NC}"

Standard is expressed as $V_{NC} = V_{51L}$ (sync signal tip voltage) - V_{BTH} (black spot noise inverter threshold voltage).

V17Sync Ratio "S/P"

1. Input SG1, test p-p value of the pin ⑤ output signal and make it V_A .
2. Input SG15, test p-p value of the pin ⑤ output signal and make it V_B .
3. Standard is expressed as $S/P = \frac{V_B}{V_A} \times 100$ [%]

V18Video Noise "S/N"

1. Input SG2 and test rms value of the ⑤ A output signal.
2. Standard is expressed as

$$S/N = 20 \log \frac{V_{051} \text{ Test Value } (V_{p-p}) \times 10^3}{\text{Test Value (mVrms)}} \text{ [dB]}$$

S3 Limiting Sensitivity "LIM"

Decreasing the level of SG19, test the input level at test point 3 when the 400Hz element is 3 dB down from AF output "AF direct output signal voltage" V_{OAF} .

S4 AMR "AMR"

Test the 400Hz element at test point 3 and make it V_{am} . Standard is expressed as

$$AMR = 20 \log \frac{V_{OAF} \text{ (mVrms)}}{V_{am} \text{ (mVrms)}} \text{ [dB]}$$

S7 Maximum Attenuation "ATT"

1. Test 400Hz element at pin ④ output.
2. Standard Value $ATT = \frac{V_{04max}}{\text{Test Value}} \text{ [dB]}$

S8 AF Driver Gain "G_{AF}"

Expressed as $G_{AF} = 20 \log \frac{V_{04max}}{V_{OAF}} \text{ [dB]}$

S9 Sound S/N "S/N AF"

1. Test 20Hz~100kHz noise at pin ④ output.
2. Expressed as $S/N \text{ AF} = 20 \log \frac{V_{04max}}{\text{Test Value}} \text{ [dB]}$

S10AF Driver Pop Noise "N_{AFP}"

Test 20 times at 5ms amplitude.

DS1 Sync Separation Input Sensitivity Current "I_{ss}"

The current value is expressed as the value of constant current source ISS where low electric potential (approx. 3V) can be obtained for pin ④ output as current of constant current source ISS is gradually increased.

DS2 Minimum Horizontal Sync Separation Input Voltage "H.SYNC min"

DS3 Minimum Vertical Sync Separation Input Voltage "V.SYNC min"

Expressed as input level where a high electrical potential can be obtained for pin ④ output as input level of SG.B or SG.E is gradually decreased. The reference level (0 dB) is 1Vp-p for both SG.B and SG.E.

DH3 Horizontal Oscillator Starting Voltage "V₁₁ min"

Expressed as applied voltage of pin ① where pin output waveform can be generated as the applied voltage of pin ① is gradually increased from low voltage (approx. 3V).

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DH4 Horizontal Pull-In Range "f_{PHL} f_{PHH}"

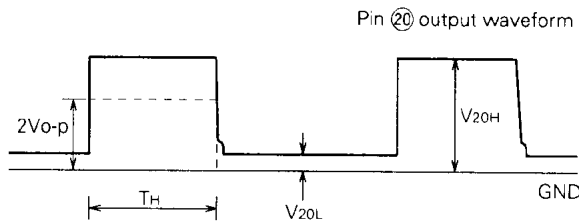
1. Decrease the frequency of input signal SG.B the proper amount and set while the input signal and output waveform of pin ⑳ are not in sync.
2. Next, gradually increase the input frequency and test the input signal frequency exactly when the input signal and output waveform of pin ⑳ become synchronized.
3. Perform in the same manner for pull-in range for upper side.
4. Expressed as difference from reference value of 15625 Hz.

DH5 Horizontal Output Maximum Voltage "V_{20H}"

DH6 Horizontal Output Minimum Voltage "V_{20L}"

DH7 Horizontal Output Pulse Amplitude "T_H"

V_{20H}, V_{20L}, and T_H are shown in the figure below.



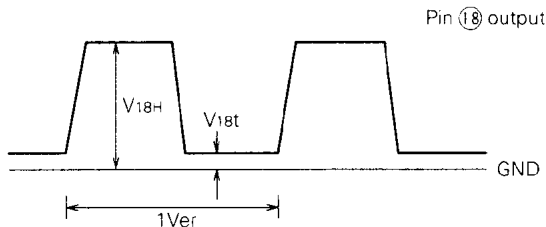
DH8 AFC Output Voltage "V_{AFC}"

Test p-p value of the pin ⑫ output waveform.

DV4 Vertical Output Maximum Voltage "V_{18H}"

DV5 Vertical Output Minimum Voltage "V_{18L}"

V_{18H} and V_{18L} are shown in the figure below.



DV6 Vertical Open Loop Gain "G_v"

1. Input SG.C (2 kHz, 100m VP-P, CW) into pin ⑰ and test the output amplitude of pin ⑱.

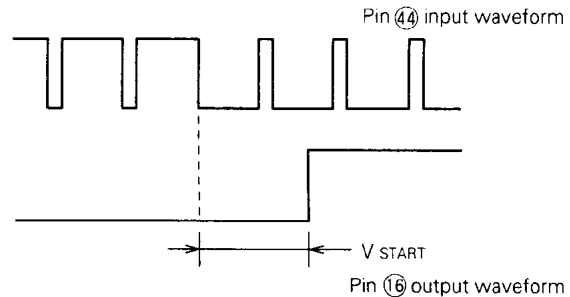
$$2. \text{Standard Value} = 20 \log \frac{\text{Pin 18 Output Amplitude(mV}_{p-p})}{100\text{mV}_{p-p}} \text{ [dB]}$$

DV7 Vertical Oscillator Starting Voltage "V_{19min}"

Expressed as applied voltage of pin ⑲ where pin output waveform can be generated as the applied voltage of pin ⑲ is gradually increased from low voltage (approx. 3V).

DV8 Vertical Output Pulse Start Position "V_{START}"

"V_{START}" is shown in the figure below.



DV9 Minimum Vertical Sync Detection Amplitude "TV min"

Expressed as vertical sync signal amplitude of input signal where pin ⑱ output waveform can be generated as the vertical sync signal amplitude of SG.D is changed.

Y2 Maximum Output "Y_{max}"

Adjust applied voltage of pin ⑳ so that the DC potential of pin ㉒ is 4.5V.

Y3 Standard Gain "G_Y"

1. Adjust applied voltage of pin ⑳ so that the DC potential of pin ㉒ is 3.0V.
2. $G_Y = 20 \log \frac{\text{Test Value mV}_{p-p}}{200\text{mV}_{p-p}} \text{ [dB]}$

Y4 Contrast Control Characteristics "GYmin GYmax"

1. Adjust applied voltage of pin ⑳ so that the DC potential of pin ㉒ is 3.0V.
(Apply voltage of pin ⑳ described in item Y3.)
2. Change 36 applied voltage to 2.5V, 6.5V and make V_A and V_B the test values of pin ㉒ output signal.

$$3. G_{Ymin} = 20 \log \frac{V_A \text{ (mV}_{p-p})}{G_Y \text{ Test Value(mV}_{p-p})} \text{ [dB]}$$

$$G_{Ymax} = 20 \log \frac{V_B \text{ (mV}_{p-p})}{G_Y \text{ Test Value(mV}_{p-p})} \text{ [dB]}$$

Y7 Peaking Value "G_p"

1. Adjust applied voltage of pin ⑳ so that the DC potential of pin ㉒ is 3.0V.
(Apply voltage of pin ⑳ described in item Y3.)
2. Make V_A the output signal voltage of pin ㉒ at time of SG.H input, and make V_B the output signal voltage of pin ㉒ at time of SG.J input.

$$3. G_p = 20 \log \frac{V_B}{V_A} \text{ [dB]}$$

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Y8 Video Tone Control Characteristics "GT norm, GT min, GT max"

1. Adjust applied voltage of pin ③⑨ so that the DC potential of pin ②② is 3.0V.
(Apply voltage of pin ③⑨ described in item Y3.)
2. Change(40) applied voltage to 4.5V, 6.5V, 2.5V and make V_A , V_B , and V_C the output signal voltages of pin ②②.
3. $G_{T \min} = 20 \log \frac{V_B}{V_A}$ [dB], $G_{T \max} = 20 \log \frac{V_C}{V_A}$ [dB],

$G_{T \text{norm}}$ (dB) is the amount of change with V_B when G_P was tested in item Y7.

Y9 Frequency Characteristics "fs(y)"

1. Adjust applied voltage of pin ③⑨ so that the DC potential of pin ②② is 3.0V.
(Apply voltage of pin ③⑨ described in item Y3.)
2. Test the frequency of SG.K 3 dB down from the V_A value when G_P was tested in item Y3.

Y10 Differential Gain "DGY"

1. Adjust applied voltage of pin ③⑨, change DC potential of pin ②② to 4.0V and 2.0V, and make V_A and V_B the output signal voltages of pin ②②.

$$2. DGY = \frac{|V_A - V_B|}{V_B} \times 100\%$$

Y12 Vertical Blanking Voltage "VBLK V"

Y15 DC Playback Ratio Adjustability Characteristic "VDC REG"

1. Make V_A the output pedestal electrical potential of pin ②② when S42 is off, and make V_B the output pedestal electrical potential of pin ②② when S42 is on.
2. $YDC \text{ REG} = V_A - V_B$ [V]

Y14 Horizontal Blanking Threshold Voltage "VBLK H"

1. In order to facilitate testing, apply 3.0V of applied voltage to pin ③⑨ so that scanning period potential of pin ②② decreases.
2. Expressed as electric potential of pin ②② where no 25A output signal is obtained while gradually increasing the 22A applied voltage.

C2 Chroma Maximum Gain "Gc"

1. Set SG.L to -26dB (Burst: 2.5mV_{p-p}, Chroma: 5.0mV_{p-p}) and test the output signal voltage of pin ③④.

$$2. G_C = 20 \log \frac{\text{Test Value (mV}_{p-p})}{5\text{mV}_{p-p}} \text{ [dB]}$$

C3 ACC Characteristics "ACC-I, ACC-II"

1. Change the SG.L input level to 0, -20, +6dB and make pin 25A output signal voltages V_A , V_B , and V_C respectively.
2. $ACC-I = 20 \log \frac{V_B}{V_A}$ [dB], $ACC-II = 20 \log \frac{V_C}{V_A}$ [dB]

C4 Killer Operation Input Level "Vik"

Expressed as the input level where direct current voltage of pin ②① becomes low when SG.L input level is decreased.

C5 Killer Color Residual "Vok"

Input SG.Q and test output signal voltage of pin ②⑤A.

C6 Chroma Normal Output "Cnorm"

Input SG.L and test the output signal voltage of pin 25A when pin ③⑥ applied voltage is 4.5V.

C7 Color Control Characteristics I "Cs min Cs max"

1. Change applied voltage of pin ②① to 2.5V, 6.5V and make V_A and V_B the output signal voltages of pin 25A.

$$2. C_{s \min} = 20 \log \frac{V_A}{C_{\text{norm}} \text{ Test Value}} \text{ [dB]},$$

$$C_{s \max} = 20 \log \frac{V_B}{C_{\text{norm}} \text{ Test Value}} \text{ [dB]}$$

C8 Color Control Characteristics II "Cu min, Cu max"

1. Change pin ③⑥ applied voltage to 2.5V, 6.5V and make V_A and V_B the output signal voltages of pin ②⑤A.

$$2. C_{u \min} = 20 \log \frac{V_A}{C_{\text{norm}} \text{ Test Value}} \text{ [dB]},$$

$$C_{u \max} = 20 \log \frac{V_B}{C_{\text{norm}} \text{ Test Value}} \text{ [dB]}$$

C9 APC Pull-In Range "fpc L, fpc H"

1. Input SG.M, increase burst and chroma frequency ($f_{sb} = f_{sc}$) the proper amount and set so that the DC voltage of pin ②① is low.
2. Test the input frequency where the DC voltage of pin ②① changes from low to high (≈ 4.5) while gradually increasing the frequency.
3. Test upper side pull-in frequency in the same manner.
4. Standard value is expressed as difference from reference value 3.579545MHz.

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C10Total APC Range " f_{pc} "

$f_{pc} = f_{pcli} + f_{pch}$ [kHz]

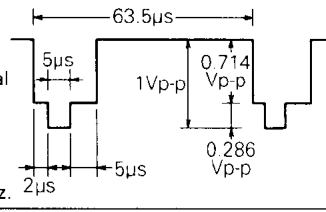
C23Chroma CW Phase Difference " θ_{cw} "

1. Carry out item 1 of item C22 "Phase Alteration by Color Control."
2. Apply input signal the contains 90° phase in relation to burst and make the deviation from reference phase the standard value of θ_{cw} .

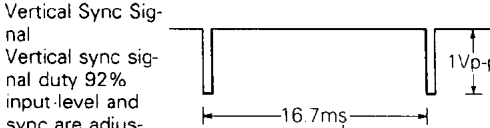
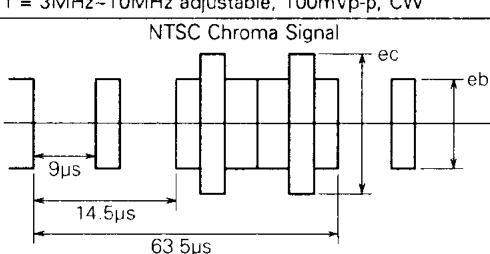
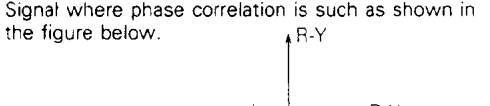
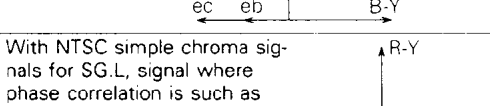
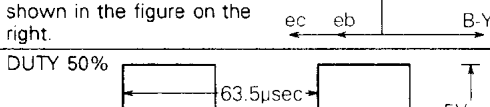
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NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

INPUT SIGNAL

SG. No.	Signals (50Ω termination)
SG. 1	$f_o = 45.75\text{MHz}$, 90dBμ, $f_m = 16\text{kHz}$, AM77.8%
SG. 2	$f_o = 45.75\text{MHz}$, 80dBμ, CW
SG. 3	$f_o = 45.75\text{MHz}$, CW, Adjustable Level
SG. 4	$f_o = 45.75\text{MHz}$, $f_m = 16\text{kHz}$, AM16.0%, Adjustable Level
SG. 5	$f_o = 45.75\text{MHz} \pm 5\text{MHz}$, 80dBμ, Sweep signal
SG. 6	$f_o = 44.75\text{MHz}$, 80dBμ, CW
SG. 7	$f_o = 46.75\text{MHz}$, 80dBμ, CW
SG. 8	$f_o = 43.25\text{MHz}$, 100dBμ, CW
SG. 9	$f_o = 43.45\text{MHz}$, 100dBμ, CW
SG. 10	$f_1 = 45.75\text{MHz}$, 90dBμ, CW $f_2 = 40 \pm 5\text{MHz}$, 70dBμ, CW } mixed signal
SG. 11	$f_1 = 45.75\text{MHz}$, 90dBμ, CW $f_2 = 42.17\text{MHz}$, 70dBμ, CW $f_3 = 41.25\text{MHz}$, 70dBμ, CW } mixed signal
SG. 12	$f_o = 45.75\text{MHz}$, 110dBμ, CW
SG. 13	$f_o = 45.75\text{MHz}$, 60dBμ, CW
SG. 14	$f_o = 45.75\text{MHz}$, 89dBμ
SG. 15	$f_o = 45.75\text{MHz}$, 92dBμ, $f_m = 16\text{kHz}$, AM16.0%
SG. 16	$f_1 = 45.75\text{MHz}$, 90dBμ, CW $f_2 = 41.25\text{MHz}$, 70dBμ, CW } mixed signal
SG. 17	$f_o = 4.5\text{MHz}$, 90dBμ, $f_m = 400\text{Hz}$, FM $\pm 25\text{kHz}$ dev.
SG. 18	$f_o = 45.75\text{MHz}$, 90dBμ, 10-Stage Wave, 87.5% TV Modulation ($f_{sc} = 4.43\text{MHz}$)
SG. 19	$f_o = 4.5\text{MHz}$, $f_m = 400\text{Hz}$, FM $\pm 25\text{kHz}$ dev. Adjustable Level
SG. 20	$f_o = 4.5\text{MHz}$, 90dBμ, $f_m = 400\text{Hz}$, AM30%
SG. 21	$f_o = 4.5\text{MHz}$, 90dBμ, CW
SG. 22	$f_1 = 45.75\text{MHz}$, 90dBμ, $f_m = 16\text{kHz}$, AM77.8% $f_2 = 41.25\text{MHz}$, 70dBμ, CW } mixed signal
SG. 23	$f_1 = 45.75\text{MHz}$, 90dBμ, $f_m = 16\text{kHz}$, AM77.8% $f_2 = 41.25\text{MHz}$, 50dBμ, CW } mixed signal
SG. 24	$f_o = 45.75\text{MHz}$, 90dBμ, CW
SG. 25	$f_o = 45.75\text{MHz}$, 84dBμ, CW
SG. 26	$f_o = 400\text{Hz}$, 20mVp-p, CW
SG. 27	$f_o = 40.75\text{MHz}$ 80dBμ, CW
SG. 28	$f_o = 40.75\text{MHz}$ 45dBμ, CW
SG. A	Make input for sync separation NTSC system APL 100% normal video signal shown in the figure on the right. Vertical must be interlaced at 50Hz. 
SG. B	Horizontal sync signal duty 92% input level and sync are adjustable. 
SG. C	$f = 2\text{kHz}$, 100mVp-p, CW

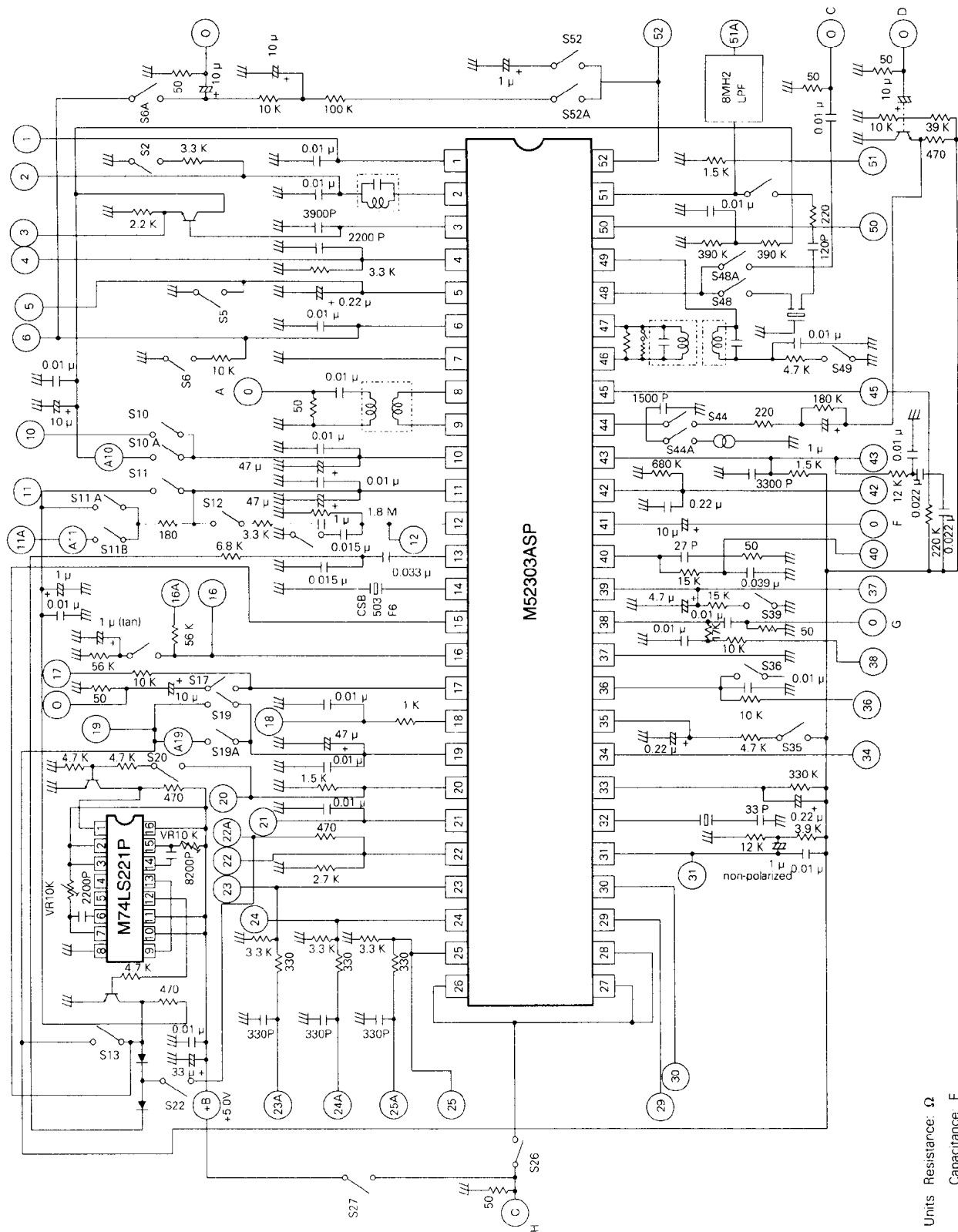
INPUT SIGNAL

SG. No.	Signals (50Ω termination)
SG. D	Change SGA vertical sync signal amplitude. Start position does not change. 
SG. E	Vertical Sync Signal Vertical sync signal duty 92% input level and sync are adjustable. 
SG. F	$f = 200\text{kHz}$, 2Vp-p, CW
SG. G	$f = 200\text{kHz}$, 200mVp-p, CW
SG. H	$f = 200\text{kHz}$, 100mVp-p, CW
SG. J	$f = 3\text{MHz}$, 100mVp-p, CW
SG. K	$f = 3\text{MHz} \sim 10\text{MHz}$ adjustable, 100mVp-p, CW
SG. L	NTSC Chroma Signal  f_{sb} : Frequency of Burst Signal f_{sc} : Frequency of Chroma Signal $f_{sb} = f_{sc} = 3.579545\text{MHz}$ 0dB: $e_b = 50\text{mVp-p}$ $e_c = 100\text{mVp-p}$
SG. M	With NTSC simple chroma signals for SG.L, the phase of burst and chroma signals should be the same and the frequency should be adjustable.
SG. P	$f = 3.68\text{MHz}$, CW, Adjustable Level
SG. Q	With NTSC simple chroma signals for SG.L, signal where: burst signal $I_b = 0\text{mVp-p}$, chroma signal amplitude $I_c = 100\text{mVp-p}$.
SG. R	$f = 3 \sim 5\text{MHz}$, CW, 0.3Vp-p
SG. S	With NTSC simple chroma signals for SG.L, f_{sb} (Burst) = 3.579545MHz f_{sc} (Chroma) = 3.68MHz Signal where phase correlation is such as shown in the figure below. 
SG. T	With NTSC simple chroma signals for SG.L, signal where phase correlation is such as shown in the figure on the right. 
SG. U	DUTY 50% 

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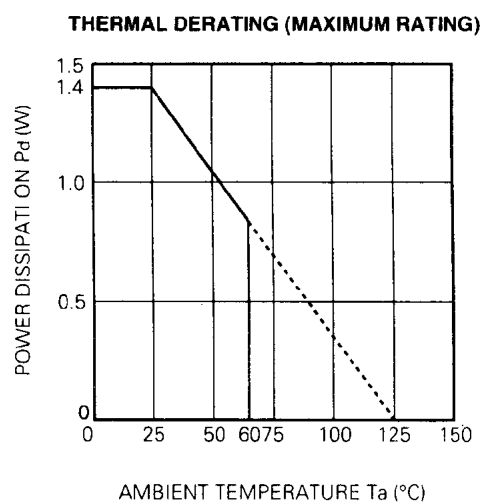
TEST CIRCUIT



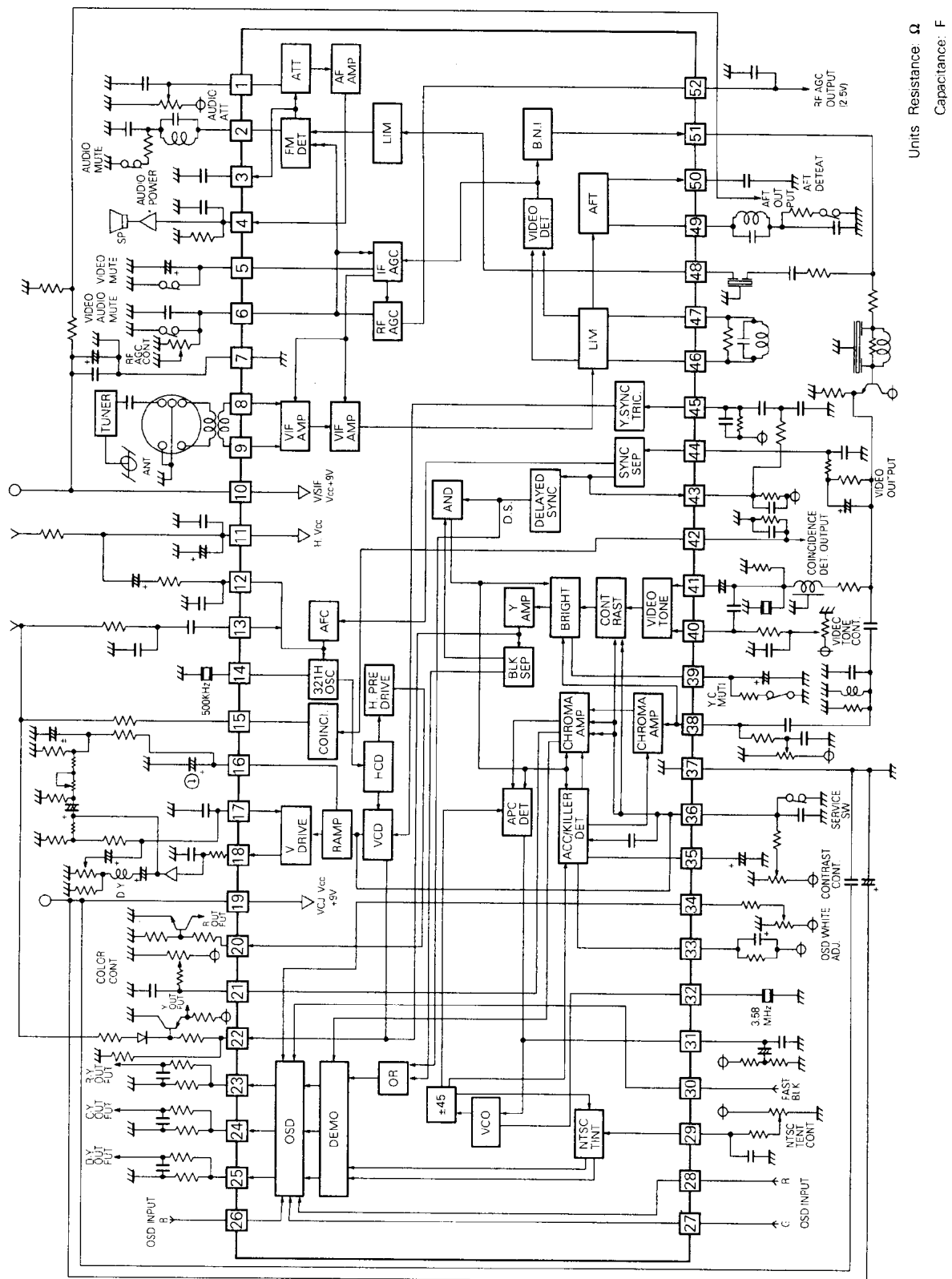
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NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

TYPICAL CHARACTERISTICS



APPLICATION EXAMPLE



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NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION OF PIN

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
①	ATT	DC 5.3	
②	SOUND DET COIL	DC 3.5 AC 250 	
③	SOUND DET OUT	DC 4.6 AC 2100 	
④	AF OUT	DC 3.9 AC 1600 	

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DESCRIPTION OF PIN (cont.)

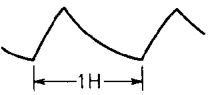
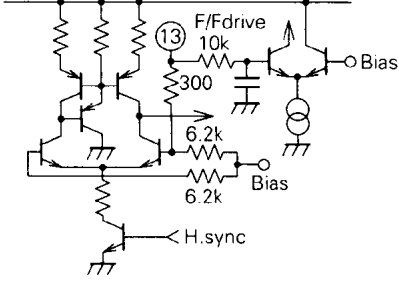
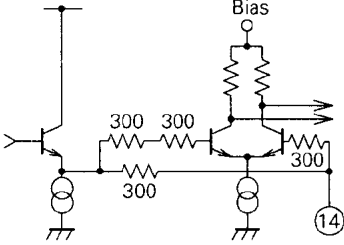
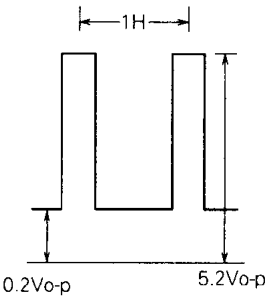
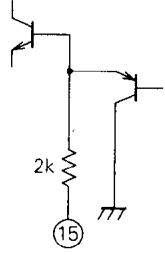
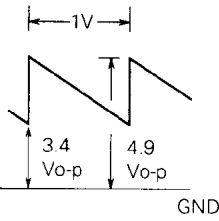
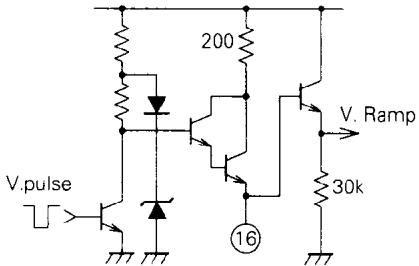
Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
⑤	IF AGC FILTER	DC 4.1	
⑥	RF AGC DELAY ADJ.	DC 2.0	
⑦	GND - 1 (VIF SIF)		
⑧	VIF IN	DC 2.35 AC 89 	

DESCRIPTION OF PIN (cont.)

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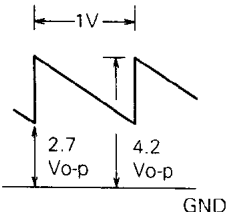
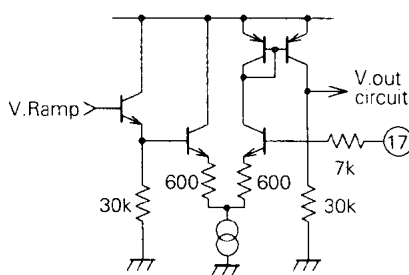
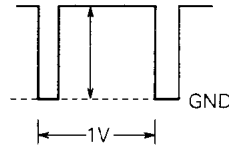
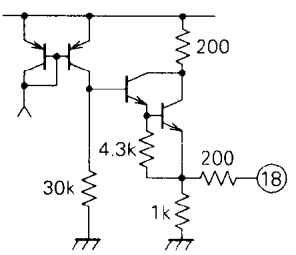
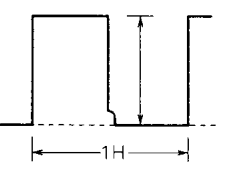
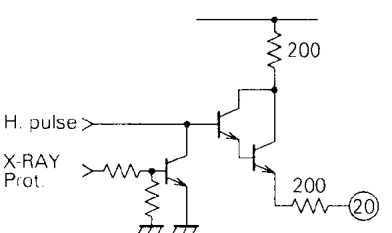
NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
⑬	AFC FBP IN	DC 3.0 AC 1100 	
⑭	32th OSC	DC 3.7 AC 310 	
⑮	FBP IN		
⑯	RAMP	AC 1500 	

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DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
⑰	V. FB	AC 1500 	
⑱	V. OUT	AC 750V _{o-p} 	
⑲	V _{cc} - 2 (V _{CJ})	V _{cc} 9.0	
⑳	H. OUT	AC 3400mV _{o-p} 	

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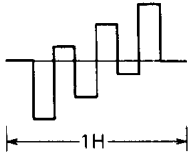
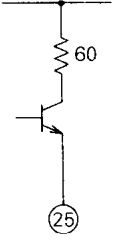
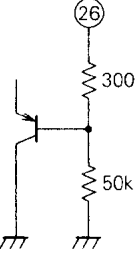
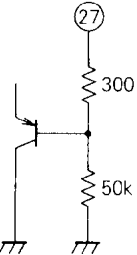
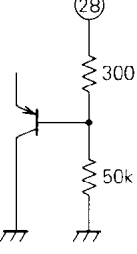
DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
②①	COLOR CONT.	DC 4.5	
②②	-Y OUT		
②③	R - Y OUT	DC 5.25 AC 1300 	
②④	G - Y OUT	DC 5.25 AC 750 	

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DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
②⑤	B - Y OUT	DC 5.25 AC 1600 	
②⑥	OSD B		
②⑦	OSD G		
②⑧	OSD R		

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Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
②⑨	TINT. CONT.	DC 4.5V	
③①	FAST BLK IN		
③①	APC FILTER	DC 6.8 AC 60 	
③②	CHROMA OSC		

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NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

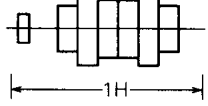
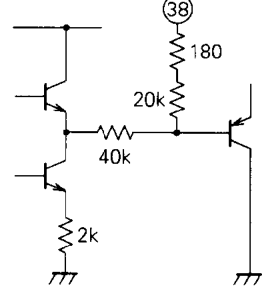
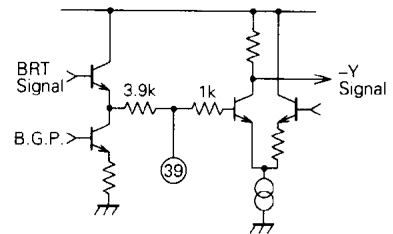
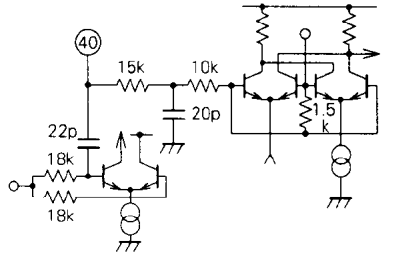
DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
③③	ACC FILTER	DC 8.0	
③④	WHITE ADJ.	DC 8.0V	
③⑤	KILLER FILTER	DC 6.9	
③⑥	CONTRAST CONT.	DC 4.5V	

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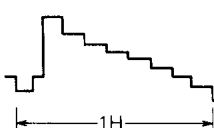
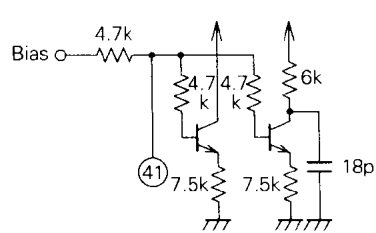
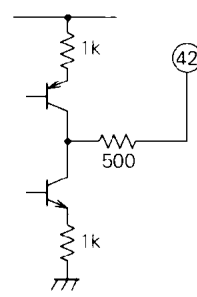
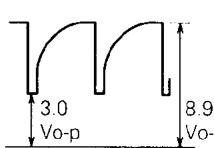
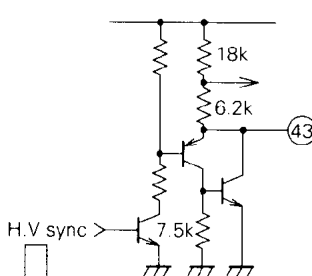
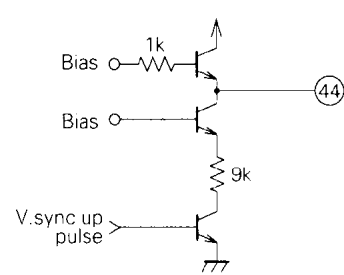
DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
37	GND - 2 (VCJ)		
38	CHROMA IN/BRIGHT	DC 4.5V DC 4.5V AC Burst 50 AC Chroma 100 	
39	PEDESTAL CLAMP		
40	VIDEO TONE CONT.	DC 4.5	

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NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

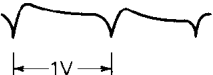
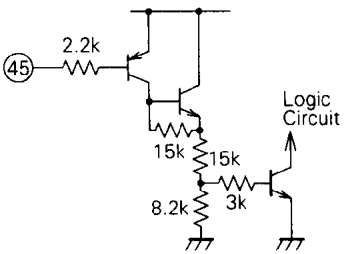
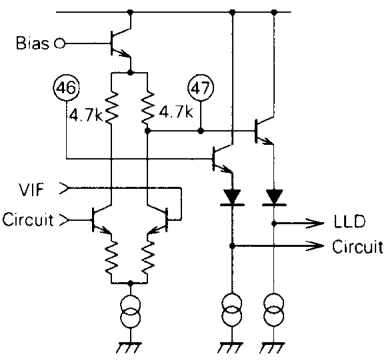
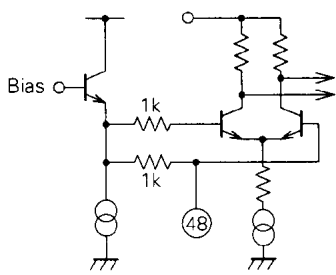
DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
④①	Y IN	DC 1.5 AC 500 	
④②	COINCIDE - - NCE OUT		
④③	SYNC OUT		
④④	SYNC IN	DC 6.7 AC 700 	

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DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
④⑤	V. SYNC IN	DC 9.0 AC 1600 	
④⑥	VIDEO DET COIL	DC 4.8	
④⑦	VIDEO DET COIL		
④⑧	SIF IN	DC 2.7 AC 89 $f_0 = 5.5\text{MHz}$	

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NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
④9	AFT COIL	DC 5.3	
⑤0	AFT OUT	DC 3.3	
⑤1	VIDEO OUT	AC 2000 	
⑤2	RF AGC OUT	DC 0	