M52340SP

PRELIMINARY
Notice: This is not a final specification
Some parametric limits are subject to change

PAL/NTSC SYSTEM SHINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION

The M52340SP is a single-chip semiconductor integrated circuit to process signals of a color TV. Circuits to process video IF, sound IF, video, color, and deflection signals, a I²C bus control circuit, and D/A are build in this device.

This IC can be used not only for popular-type TV sets but also for middle-class TV sets. Combined with a SECAM chroma decoder, the M52325AP, this device can process signals of every type of TVs in the world by discriminating them fully automatically.

FEATURES

- A built-in I²C bus control circuit makes it possible to reduce the number of peripheral parts and rationalize production lines.
- Various filters (TRAP, BPF, Y-DL, RGB clamp) are build in this IC.
- PLL detection system is introduced to process video IF and voice IF. Furthermore, AFT coil is not necessary.
- DL aperture control
- Color signal frequency and vertical frequency of TVs of every type can be discriminated fully automatically.
- Horizontal/vertical countdown system
- V-pulse output
- RGB output

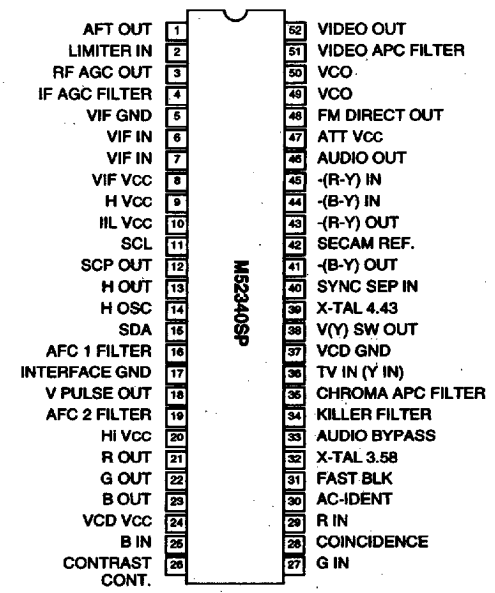
APPLICATION

PAL/NTSC system color TV

RECOMMENDED OPERATING CONDITION

Supply voltage ..... 4.75V to 5.25V (pins ⑧ and ㉔)
7.6V to 8.4V (pins ⑨, ⑳, and ㊼)
Rated supply voltage ..... 5.0V (pins ⑧ and ㉔)
8.0V (pins ⑨, ⑳, and ㊼)
Maximum output current ..... 5.0mA (pin ⑱)
5.0mA (pin ⑬)

PIN CONFIGURATION (TOP VIEW)



Outline 52P4B

NC : NO CONNECTION

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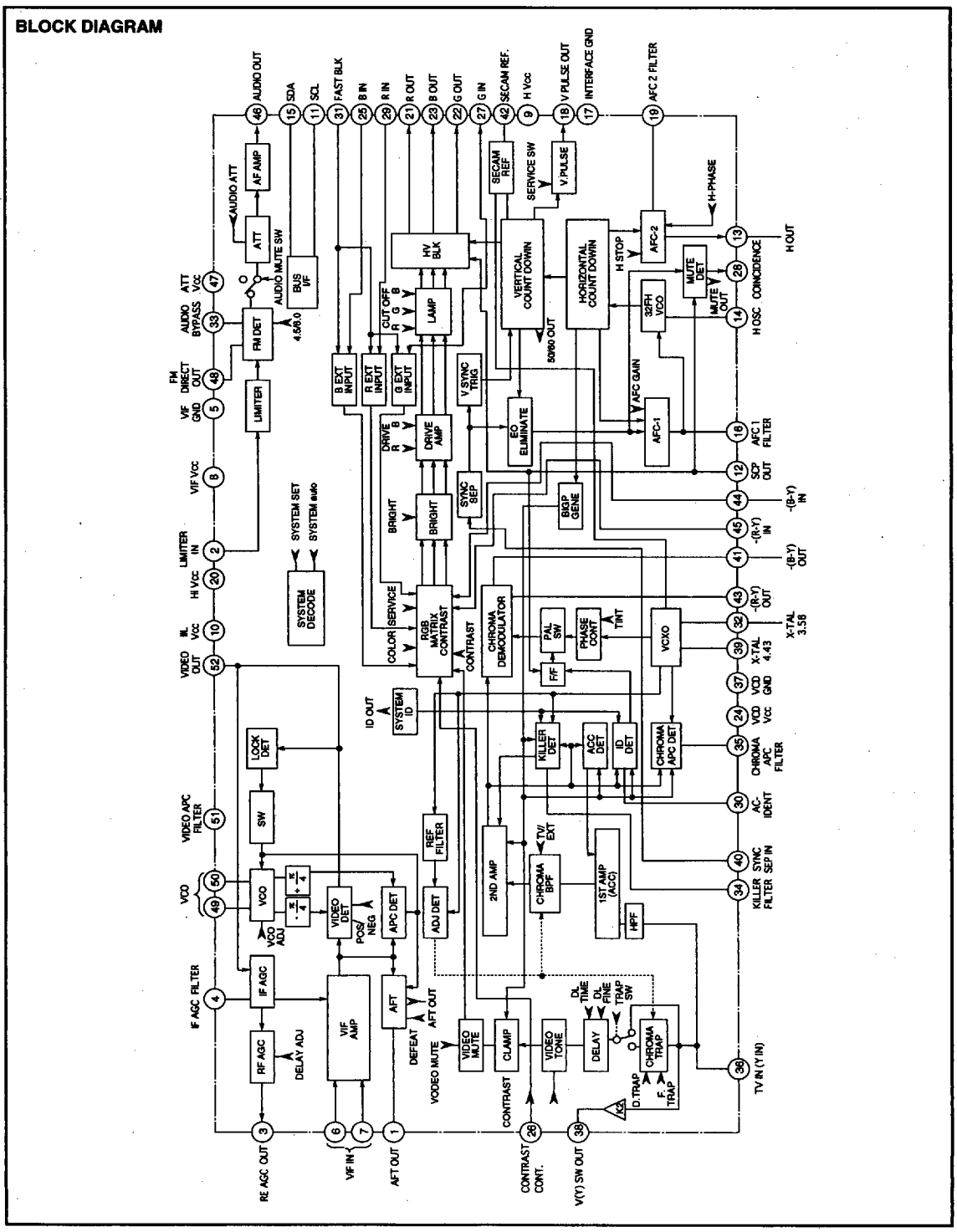
BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS (Ta=25℃, unless otherwise noted)

Symbol	Parameter	Ratings	Unit
Vcc	Supply voltage	5.0, 8.0	V
Pd	Power dissipation	1.4	W
Topr	Operating temperature	-20 to 65	℃
Tstg	Storage temperature	-40 to 150	℃
Surge	Electrostatic discharge	±200 (-150 for only minus side of pin ⑲)	V

ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Input signal		SW conditions	Test conditions																											Limits			Unit
					S 2	S 4	S 16	S 31	S 40	S 44	S 45															Vcc					Min.	Typ.	Max.	
		Input pin	SG name conditions	PIN conditions	P 1	P 3	P 4	P 12	P 13	P 16	P 18	P 21	P 22	P 23	P 26	P 36	P 38	P 40	P 41	P 43	P 46	P 48	P 52	P 8	P 9	P 20	P 24	P 47				
	Standard conditions of circuit current			SW	1	1	1	1	1	0	0																						
				PIN																				5V	8V	8V	5V	8V				
Icc8	Pin 8 current			SW																														
				PIN																				M					20.0	27.0	33.0	mA
Icc9	Pin 9 current			SW																														
				PIN																					M				12.0	18.0	24.0	mA
Icc20	Pin 20 current			SW																														
				PIN																						M			9.0	15.0	21.0	mA
Icc24	Pin 24 current			SW																														
				PIN																							M		55.0	80.0	105.0	mA
Icc47	Pin 47 current			SW																														
				PIN																								M	1.4	2.0	2.4	mA
VIF block																																		
—	Standard conditions of IF parameters	—	—	SW	1	1	1	1	1	0	0																						
				PIN																				5V	8V	8V	5V	8V	—	—	—	
Vdc NEG	Video detector output DC voltage (NEG)	—	—	SW																														
				PIN																			M						4.8	5.2	5.5	V
Vdc POS	Video detector output DC voltage (POS)	—	—	SW																														
				PIN																			M						2.1	2.3	2.5	V
Vo NEG	Video detector output (NEG)	V	SG1	SW		0																												
				PIN																			M						1.9	2.2	2.5	V
Vo POS	Video detector output (POS)	V	SG2	SW		0																												
				PIN																			M						1.9	2.2	2.5	V
P/N	Video S/N	V	SG3	SW		0																												
				PIN																			M						50	55	—	dB
Vf	Video frequency characteristics	V	SG4	SW		0																												
				PIN																			M						4.5	5.5	—	MHz
Vin min	Input sensitivity	V	SG5	SW		0																												
				PIN																			M						—	47	52	dBμ
Vin max	Maximum permissible Input	V	SG6	SW		0																												
				PIN																			M						102	107	—	dBμ
GR	AGC control range	—	—	SW																														
				PIN																									50	60	—	dBμ
V4H	Maximum IF AGC voltage	—	—	SW		0																												
				PIN			M																						4.0	4.4	4.8	V
V4T	IF AGC voltage (80dBu)	V	SG7	SW		0																												
				PIN			M																						2.6	3.0	3.4	V

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Input signal: Input pin	Input signal: SG name conditions	SW conditions: PIN conditions	Test conditions: SW 2 4	SW 16 31	SW 40 44	SW 45 18	P 21	P 22	P 23 26	P 36 38	P 40 41	P 43 46	P 48 52	P 8 9	Vcc P 20 24	P 47	Limits: Min.	Typ.	Max.	Unit
V4L	Minimum IF AGC voltage	V	SG8	SW	0														1.9	2.3	2.7	V
				PIN		M																
V1	AFT defeat voltage			SW															3.7	4.0	4.3	V
				PIN	M																	
μAFT N	AFT detector sensitivity (NEG)	V	SG9	SW	0														43	61	79	kHz/mV
				PIN	M																	
V1H N	Maximum AFT voltage (NEG)	V	SG10	SW															7.2	7.7	—	V
				PIN	M																	
V1L N	Minimum AFT voltage (NEG)	V	SG11	SW															—	0.3	0.8	V
				PIN	M																	
V3H	Maximum RF AGC voltage	V	SG3	SW															7.2	7.7	—	V
				PIN	M																	
V3L	Minimum RF AGC voltage	V	SG3	SW															—	0.3	0.8	V
				PIN	M																	
CRU	Capture range (U)	V	SG9	SW											M				0.8	1.2	—	MHz
				PIN																		
CRL	Capture range (L)	V	SG9	SW											M				2.2	2.6	—	MHz
				PIN																		
CRT	Capture range (T)	—	—	SW															3.0	3.8	—	MHz
				PIN																		
IM	Intermodulation	V	SG12	SW											M				31	36	—	dB
				PIN																		
DG	DG	V	SG13	SW											M				—	3	7	%
				PIN																		
DP	DP	V	SG13	SW											M				—	3	7	deg
				PIN																		
SPN	Sync ratio (NEG)	V	SG13	SW															25.0	28.5	32.0	%
				PIN											M							
DLPH	Maximum delay point (NEG/POS)	V	SG14	SW															90	96	—	dBμ
				PIN	M																	
DLPL	Minimum delay point (NEG/POS)	V	SG15	SW															—	70	76	dBμ
				PIN	M																	
SIF block																						
—	Standard conditions of SIF parameters	—	—	SW	0	1	1	1	1	0	0											
				PIN																		
VAF	AF output DC voltage	—	—	SW												5V	8V	5V 8V	2.4	2.8	3.2	V
				PIN											M							

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ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Input signal		SW conditions	Test conditions																												Limits			Unit
					S 2	S 4	S 16	S 31	S 40	S 44	S 45														Vcc								Min.	Typ.	Max.	
		Input pin	SG name conditions	PIN conditions	P 1	P 3	P 4	P 12	P 13	P 16	P 18	P 21	P 22	P 23	P 26	P 36	P 38	P 40	P 41	P 43	P 46	P 48	P 52	P 8	P 9	P 20	P 24	P 47						
VoAF N	AF direct output (4.5MHz)			SW																													200	270	340	mVrms
				PIN																		M														
VoAF P	AF direct output (5.5MHz)	S	SG17	SW																													300	410	520	mVrms
				PIN																		M														
VoAF S	AF direct output (6.0MHz)	S	SG18	SW																													320	430	540	mVrms
				PIN																		M														
VoAF M	AF direct output (6.5MHz)	S	SG19	SW																													330	440	550	mVrms
				PIN																		M														
VoAF max	Maximum AF output (6.0MHz)	S	SG18	SW																													610	810	1010	mVrms
				PIN																	M														
ATT	Maximum attenuation (6.0MHz)	S	SG18	SW																													59	68	—	dB
				PIN																	M														
THD AF	AF output distortion (6.0MHz)	S	SG18	SW																													—	1	3	%
				PIN																	M														
LIM	Input limiting sensitivity	S	SG18	SW																													—	40	46	dB
				PIN																	M														
AMR	AMR	S	SG20	SW																													49	50	—	dB
				PIN																	M														
AFSN	AF S/N	S	SG21	SW																													53	63	—	dB
				PIN																	M														
Chroma block (PAL) SG50 and SG60 should be input to SY IN for C0 to C21 and C13 to C21 respectively.																																				
—	Standard conditions of chroma parameters		—	SW	1	1	1	1	1	0	0														5V	8V	8V	8V	5V	8V					
				PIN																																
Cn1	Chroma standard output 1	VI	SS4P	SW																													500	700	900	mV_{P-P}
				PIN															M																
Cn2	Chroma standard output 2	VI	SS4P	SW																													450	600	750	mV_{P-P}
				PIN																M															
ACC1	ACC characteristics 1	VI V=+6dB	VS4P	SW																													-3	0	3	dB
				PIN															M																
ACC2	ACC characteristics 2	VI V=-20dB	VS4P	SW																													-3	-1.5	1	dB
				PIN															M																
OV	Overload characteristics	VI eb=800mV	VS4P	SW																													-2	0	4	dB
				PIN															M																
VikP	Killer operating input level	VI V=Variable	VS4P	SW																													—	-40	-33	dB
				PIN															M																
killP	Killer color residual (PAL)	VI V=-40dB	VS4P	SW																													0	30	60	mV_{P-P}
				PIN															M																

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Input signal		SW conditions	Test conditions																												Limits			Unit
		Input pin	SG name conditions	PIN conditions	S 2 P 1	S 4 P 3	S 16 P 4	S 31 P 12	S 40 P 13	S 44 P 16	S 45 P 18	P 21	P 22	P 23	P 26	P 36	P 38	P 40	P 41	P 43	P 46	P 48	P 52	P 8	P 9	Vcc P 20	P 24	P 47	Min.	Typ.	Max.	
APC1	APC pull-in range 1	VI	VS4P	SW															M										±400	±700	—	Hz
		f=Variable		PIN																															
R/BP	Demodulated output ratio (R-Y / B-Y)	VI	VS4P	SW															M	M									0.45	0.6	0.75	ratio
		eb= Single chroma		PIN																															
θ R-Y P	Demodulated phase angle θ R-Y	VI	VS4P	SW																M	M								80	90	100	deg
		eb= Single chroma		PIN																															
CC	Carrier leak at demodulated output	VI	VS4P	SW															M										0	50	100	mVP-P
				PIN																															
DDH	Difference of demodulated output on the	VI	4.2M	SW															M										—	—	100	mV
			SIN ware	PIN																															
Cn3	Standard chroma output 3	VI	SS3N	SW															M										500	700	900	mVP-P
				PIN																															
Cn4	Standard chroma output 4	VI	SS3N	SW																M									490	600	750	mVP-P
				PIN																															

Chroma block (NTSC)

Symbol	Parameter	Input signal		SW conditions	Test conditions																												Limits			Unit
		Input pin	SG name conditions	PIN conditions	S 2 P 1	S 4 P 3	S 16 P 4	S 31 P 12	S 40 P 13	S 44 P 16	S 45 P 18	P 21	P 22	P 23	P 26	P 36	P 38	P 40	P 41	P 42	P 43	P 46	P 48	P 52	P 8	P 9	P 20	P 24	P 47	Min.	Typ.	Max.	
VikN	Killer operating input level (NTSC)	VI	VS3N	SW															M											±400	±600	—	Hz
		v=Variable		PIN																	M															
killN	Killer color residual (NTSC)	VI	VS3N	SW															M											0.4	0.6	0.8	ratio
		eb=0mV		PIN																	M															
APC2	APC pull-in range 2	VI	VS3N	SW															M											80	95	110	deg
		f=Variable		PIN																	M															
R/BN	Demodulated output ratio R-Y/ B-Y	VI	VS3N	SW															M											25	45	60	deg
		eb= Single chroma		PIN																															
θ R-Y N	Demodulated phase angle θ R-Y	VI	VS3N	SW															M											25	45	60	deg
		eb= Single chroma		PIN																															
TC1	TINT control characteristic 1	VI	VS3N	SW																M										180	300	420	mVP-P
		eb= Single chroma		PIN																															
TC2	TINT control characteristic 2	VI	VS3N	SW																M										4.0	4.5	5.0	V
		eb= Single chroma		PIN																															
SRA	SECAM REF output AC voltage	—	—	SW																	M															
				PIN																															
SRD	SECAM REF output DC voltage	—	—	SW																	M															
				PIN																															

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ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Input signal		SW conditions	Test conditions																										Limits			Unit
		Input pin	SG name conditions	PIN conditions	S2	S4	S16	S31	S40	S44	S45																				Min.	Typ.	Max.	
					P1	P3	P4	P12	P13	P16	P18	P21	P22	P23	P26	P36	P38	P40	P41	P42	P43	P46	P48	P52									
AUTO 1	System discrimination 1 4.43PAL	VI	SS4P	SW					0																						—	0001	—	—
				PIN										M																				
AUTO 2	System discrimination 2 4.43NTSC	VI	SS4N	SW					0																						—	0101	—	—
				PIN										M																				
AUTO 3	System discrimination 3 3.58PAL	VI	SS3P	SW					0																						—	1001	—	—
				PIN										M																				
AUTO 4	System discrimination 4 3.58NTSC	VI	SS3N	SW					0																						—	1101	—	—
				PIN										M																				
AUTO 5	System discrimination 5 SECAM	—	—	SW																											—	0011	—	—
				PIN										M						150 μA													
AUTO 6	System discrimination 6 Black and white	—	—	SW																											—	00	—	—
				PIN										M																				

Video and interface block SG50 should be input to SY IN. (SG60 is input for Y5 to Y7 and Y36 to Y46.)

Symbol	Parameter	Input signal		SW conditions	Test conditions																												Limits			Unit
					S2	S4	S16	S31	S40	S44	S45																					Min.	Typ.	Max.	
		Input pin	SG name conditions	PIN conditions	P1	P3	P4	P12	P13	P16	P18	P21	P22	P23	P26	P36	P38	P40	P41	P43	P46	P48	P52	Vcc P8	P9	P20	P24	P47				
—	Standard conditions of video and interface parameters	—	—	SW	1	1	1	1	1	0	0																							
				PIN																				5V	8V	8V	5V	8V				
Ymax	Maximum video output	VI	SGA	SW																											3.2	3.8	4.2	V
				PIN								M	M	M																				
GY	Standard video gain	VI	SGA	SW																											2.1	2.5	3.2	V
				PIN								M	M	M																				
FBY	Video frequency characteristic	VI	SGB	SW																											-4	-2	—	dB
				PIN									M																					
2AGY	Standard double-width amplifier output	VI	SGA	SW																											1.5	2.1	2.7	VP-P
				PIN													M																	
CTR1	Chroma trap attenuation 1	VI	SS3N	SW																											—	—	-18	dB
				PIN								M	M	M																				
TRF1	Trap fine adj attenuation 1	VI	SS3N	SW																														
				PIN								M	M	M																				
DTR1	D. trap attenuation 1	VI	SS3N	SW																											—	—	-24	dB
				PIN								M	M	M																				
CTR2	Chroma trap attenuation 2	VI	SS4P	SW																											—	—	-18	dB
				PIN								M	M	M																				
TRF2	Trap fine adj attenuation 2	VI	SS4P	SW																														
				PIN								M	M	M																				

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Input signal		SW conditions	Test conditions																												Limits			Unit
					S2	S4	S16	S31	S40	S44	S45															Vcc								Min.	Typ.	Max.	
		Input pin	SG name conditions	PIN conditions	P1	P3	P4	P12	P13	P16	P18	P21	P22	P23	P26	P36	P38	P40	P41	P43	P46	P48	P52	P8	P9	P20	P24	P47								
DTR2	D. trap attenuation 2	VI	SS4P	SW																													—	—	-24	dB
				PIN								M	M	M																						
YDL1	YDL value 1	VI	SGA	SW																													270	350	430	nsec
				PIN								M	M	M																						
YDL2	YDL value 2	VI	SGA	SW																													80	150	220	nsec
				PIN								M	M	M																						
YDL3	YDL value 3	VI	SGA	SW																													190	300	410	nsec
				PIN								M	M	M																						
YDL4	YDL value 4	VI	SGA	SW																													380	500	620	nsec
				PIN								M	M	M																						
GTnor	Video tone control characteristic 1	VI	SGB	SW																													1.0	1.4	1.8	VP-P
				PIN								M	M	M																						
GTmax	Video tone control characteristic 2	VI	SGB	SW																													0	3.6	6.7	dB
				PIN								M	M	M																						
GTmin	Video tone control characteristic 3	VI	SGB	SW																													-12.0	-9.3	-5	dB
				PIN								M	M	M																						
GT2M	Video tone control characteristic 4	VI	SGB	SW																													-5.6	-2.8	-0.2	dB
				PIN								M	M	M																						
GT5M	Video tone control characteristic 5	VI	SGB	SW																													-4	-1.4	1.2	dB
				PIN								M	M	M																						
GYnor	Contrast control characteristic 1	VI f=100kHz	SGB	SW																													2.1	2.5	2.9	VP-P
				PIN								M	M	M																						
GYmin	Contrast control characteristic 2	f=100kHz	SGB	SW																													—	—	50	mV
				PIN								M	M	M																						
Lum nor	Brightness control characteristic 1	—	—	SW																													1.8	2.2	2.6	V
				PIN								M	M	M																						
Lum max	Brightness control characteristic 2	—	—	SW																													0.55	0.8	1.05	V
				PIN								M	M	M																						
Lum min	Brightness control characteristic 3	—	—	SW																													-1.3	-1	-0.7	V
				PIN								M	M	M																						
D(R)	Drive control characteristic R	VI	SGA	SW																													3.9	4.8	6.4	dB
				PIN								M																								
D(B)	Drive control characteristic B	VI	SGA	SW																													3.9	4.8	6.4	dB
				PIN										M																						
EX(R)	EXT (R) I/O characteristic	FB ER	SGD	SW				0																									5.3	5.7	6.5	VP-P
				PIN								M																								
EX(G)	EXT (G) I/O characteristic	FB EG	SGD	SW				0																									5.3	5.7	6.5	VP-P
				PIN									M																								

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PAL/NTSC SYSTEM SHINGLE-CHIP COLOR TV SIGNAL PROCESSOR

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Input signal: Input pin	Input signal: SG name conditions	SW conditions	PIN conditions	Test conditions: S/P 2	S/P 4	S/P 3	S/P 16	S/P 31	S/P 12	S/P 40	S/P 13	S/P 44	S/P 16	S/P 45	S/P 18	S/P 21	S/P 22	S/P 23	S/P 26	S/P 36	S/P 38	S/P 40	S/P 41	S/P 43	S/P 46	S/P 48	S/P 52	Vcc: P 8	P 9	P 20	P 24	P 47	Limits: Min.	Typ.	Max.	Unit
EX(B)	EXT (B) I/O characteristic	FB EB	SGD	SW						0								M		M															5.3	5.7	6.5	Vp-p
				PIN																																		
OFRG	Offset voltage between R and G	—	—	SW															M																-160	-20	160	mV
				PIN																																		
OFBG	Offset voltage between B and G	—	—	SW															M	M															-160	40	160	mV
				PIN																																		
C(R)	R cutoff characteristic	—	—	SW														M																	1.8	2.1	2.4	V
				PIN																																		
C(G)	G cutoff characteristic	—	—	SW															M																1.8	2.1	2.4	V
				PIN																																		
C(B)	B cutoff characteristic	—	—	SW																M															1.8	2.1	2.4	V
				PIN																																		
DLF	DL fine delay	VI	SGA	SW														M	M	M															20	45	70	nsec
				PIN																																		
Coon 1	Color control characteristic 1	— R	SGA	SW												1			M	M	M														610	730	870	mVp-p
				PIN																																		
Coon 2	Color control characteristic 2	— R	SGA	SW													1		M	M	M														—	10	150	mVp-p
				PIN																																		
VMF	Video mute function	VI	SGA	SW															M	M	M														—	-50	-40	dB
				PIN																																		
MTXB	Matrix characteristic 1	— B	SGE	SW										1	1					M															1.1	1.7	1.9	Vp-p
				PIN																																		
MTXG	Matrix characteristic 2	— B	SGE	SW										1	1																				180	330	430	mVp-p
				PIN															M																				
MTXR	Matrix characteristic 3	— R	SGE	SW										1	1																				1.1	1.7	1.9	Vp-p
				PIN																M																		
MTXG1	Matrix characteristic 4	— R	SGE	SW										1	1																				300	500	600	mVp-p
				PIN															M																				
OSD1	OSD speed characteristic 1	ER.EG EB.FB	SGD	SW																															—	20	90	nsec
				PIN														M	M	M																		
OSD2	OSD speed characteristic 2	ER.EG EB.FB	SGD	SW																															—	50	160	nsec
				PIN														M	M	M																		
GYnor	Contrast control characteristic 3	VI	SGA	SW																	2.5V														1.7	2.7	3.5	Vp-p
				PIN														M	M	M																		
GYmin	Contrast control characteristic 4	VI	SGA	SW																	0V														—	0	50	mVp-p
				PIN														M	M	M																		
ABR	Additonal brightness voltage	—	—	SW																													8.5V		2.0	—	—	V
				PIN														M																				

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ELECTRICAL CHARACTERISTICS (cont.) DEF block

Symbol	Parameter	Input signal: Input pin	Input signal: SG name conditions	Input signal: PIN conditions	Input signal: SW conditions	Test conditions: S/P 2	S/P 4	S/P 16	S/P 31	S/P 40	S/P 44	S/P 45	S/P 18	S/P 21	S/P 22	S/P 23	S/P 26	S/P 28	S/P 36	S/P 38	S/P 40	S/P 41	S/P 43	S/P 46	S/P 48	Vcc: P 8	P 9	P 20	P 24	P 47	Limits: Min.	Typ.	Max.	Unit
—	Standard conditions of sync deflection parameters	—	—	SW	SW	1	1	1	0	0	0	0																						
				PIN																						5V	8V	8V	5V	8V				
ISS	Sync separation input sensitivity current	—	—	SW	SW																										—	0.1	0.2	mA
				PIN					M																									
BGP1	BGP timing 1	SY	SGa	SW	SW																										1.2	2.0	2.8	μsec
				PIN					M												M												
BGP2	BGP timing 2	SY	SGb	SW	SW																										1.4	2.2	3.0	μsec
				PIN					M												M												
BGPW	BGP pulse width	SY	SGa	SW	SW																										4.8	6	7.2	μsec
				PIN					M																								
fH	Horizontal free running frequency	—	—	SW	SW																										15.3	15.7	16.1	kHz
				PIN						M																							
FPH1	Horizontal pull-in range 1	SY	SGc f Variable	SW	SW																										+250	+300	—	Hz
				PIN	PIN				M												M											
FPH2	Horizontal pull-in range 2	SY	SGc f Variable	SW	SW																										—	-300	-250	Hz
				PIN	PIN				M												M											
FPT1	Horizontal pulse timing 1	SY	SGa	SW	SW																										7.5	8.5	9.5	μsec
				PIN	PIN				M												M											
FPT2	Horizontal pulse timing 2	SY	SGa	SW	SW																										-2.0	-1.5	-1.0	μsec
				PIN					M												M												
FPT3	Horizontal pulse timing 3	SY	SGa	SW	SW																										1.0	1.5	2.0	μsec
				PIN	PIN				M												M											
TH	Horizontal pulse width	—	—	SW	SW																										21	25	29	μsec
				PIN	PIN				M																	6.7						
VH	Horizontal pulse amplitude	—	—	SW	SW																										3	4	—	V
				PIN	PIN					M																							
HSTO	Horizontal stop operation	—	—	SW	SW																										3	4	—	V
				PIN	PIN					M																							
AFCG	AFC gain operation	SY	SGa	SW	SW		0																								2.8	5.4	8.9	dB
				PIN	PIN						M																						
fV	Vertical free running frequency	—	—	SW	SW																										41	44	47	Hz
				PIN	PIN									M																			
VVL	Minimum vertical output voltage	—	—	SW	SW																										0	0.3	0.7	V
				PIN	PIN									M																			
CoinL	Minimum coincidence detection voltage	—	—	SW	SW														M												—	0	1.5	V
				PIN	PIN																												
SW	Service switch operation	—	—	SW	SW																										—	0	0.5	V
				PIN	PIN									M																			

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ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test conditions: Input signal: Input pin	Test conditions: Input signal: SG name conditions	Test conditions: SW conditions	Test conditions: PIN conditions	Test conditions: S/P 1	Test conditions: S/P 2	Test conditions: S/P 3	Test conditions: S/P 4	Test conditions: S/P 16	Test conditions: S/P 31	Test conditions: S/P 12	Test conditions: S/P 40	Test conditions: S/P 13	Test conditions: S/P 44	Test conditions: S/P 16	Test conditions: S/P 45	Test conditions: S/P 18	Test conditions: P 21	Test conditions: P 22	Test conditions: P 23	Test conditions: P 26	Test conditions: P 36	Test conditions: P 38	Test conditions: P 40	Test conditions: P 41	Test conditions: P 43	Test conditions: P 46	Test conditions: P 48	Test conditions: P 52	Test conditions: P 8	Test conditions: Vcc P 9	Test conditions: Vcc P 20	Test conditions: Vcc P 24	Test conditions: Vcc P 47	Limits: Min.	Limits: Typ.	Limits: Max.	Unit
FPV	Vertical pull-in range	SY	SGd f Variable	SW														M																		—	—	65	Hz
				PIN																																			
VW	Vertical output pulse width	—	—	SW														M																		0.35	0.52	0.65	msec
				PIN																																			
VBLKW	Vertical BLK width	—	—	SW																M	M															1.35	1.5	1.6	msec
				PIN																M	M																		
AVER1	50/60 confirmation 1	SY	SGd f63Hz	SW																																—	63	—	Hz
				PIN																																			
AVER2	50/60 confirmation 2	SY	SGd f57Hz	SW																																—	57	—	Hz
				PIN																																			
AVER3	50/60 confirmation 3	SY	SGd f53Hz	SW																																—	53	—	Hz
				PIN																																			
AVER4	50/60 confirmation 4	SY	SGd f47Hz	SW																																—	47	—	Hz
				PIN																																			
WVSS	Minimum sync detection width	SY	SGd f60Hz width variable	SW																																13	—	—	μsec
				PIN														M																						

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Sub address	00H	01H				02H				03H	04H		05H	06H			07H	08H	09H		0AH	0BH		0CH	0DH	0EH	0FH	10H	13H		
	Function	DLA	P/N	VCOA	AUDM	45/60	TRAP	DBF	DFA	ATT	SHARP	DEFE	CONT	DLTA	AUTO	TV/EXT	TINT	COLOR	SET	HP	BRI	DR	MUTE	DB	CR	CG	CB	TRF	SESW	HST	AFCG
	Data	A6		A6			A0			A7	A6		A6		C2		A7	A6	A7		A6	A6		A6	A8	A8	A8	A0		A0	
	Function	32	0	32	0	0	0	0	0	64	32	0	32	2	0	1	64	32	0	8	32	32	0	32	128	128	128	0	0	0	0
Icc8	Data																														
	Function																														
Icc9	Data																														
	Function																														
Icc20	Data																														
	Function																														
Icc24	Data																														
	Function																														
Icc47	Data																														
	Function																														
VIF block																															
Vdc NEG	Data																														
	Function																														
Vdc POS	Data	C6																													
	Function		1																												
Vo NEG	Data																														
	Function																														
Vo POS	Data	C6																													
	Function		1																												
P/N	Data																														
	Function																														
Vf	Data																														
	Function																														
Vin min	Data																														
	Function																														
Vin max	Data																														
	Function																														
GR	Data																														
	Function																														
V4H	Data																														
	Function																														
V4T	Data																														
	Function																														
V4L	Data																														
	Function																														
V1	Data																														
	Function																														

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ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Sub address	00H		01H			02H				03H	04H		05H	06H			07H	08H	09H		0AH	0BH		0CH	0DH	0EH	0FH	10H		13H	
	Function	DLA	P/N	VCOA	AUDM	45/60	TRAP	DBF	DFA	ATT	SHARP	DEFE	CONT	DLTA	AUTO	TVEXT	TINT	COLOR	SET	HP	BRI	DR	MUTE	DB	CR	CG	CB	TRF	SESW	HST	AFOG
μAFT N	Data																														
	Function																														
V1H N	Data																														
	Function																														
V1L N	Data																														
	Function																														
V3H	Data																														
	Function																														
V3L	Data																														
	Function																														
CRU	Data																														
	Function																														
CRL	Data																														
	Function																														
CRT	Data																														
	Function																														
IM	Data																														
	Function																														
DG	Data																														
	Function																														
DP	Data																														
	Function																														
SPN	Data																														
	Function																														
DLPH	Data	A6																													
	Function		0																												
DLPL	Data	C6																													
	Function		1																												
SIF block																															
VAF	Data																														
	Function																														
VoAF N	Data	A1																													
	Function		1																												
VoAF p	Data																														
	Function																														
VoAF S	Data																														
	Function																														
VoAF M	Data																														
	Function																														

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Sub address	00H	01H			02H			03H	04H	05H	06H			07H	08H	09H	0AH	0BH		0CH	0DH	0EH	0FH	10H	13H		
	Function	DLA	P/N	VCOA	AUDM	45/60	TRAP	DBF	DFA	ATT	SHARP	DEFE	CONT	DLTA	AUTO	TVEXT	TINT	COLOR	SET	HP	BRI	DR	MUTE	DB	CR	CG	CB	TRF	SESW	HST	AFCG
	Data	A6		A6			A0			A7	A6		A6		C2		A7	A6		A7	A6			A6				A0			
	Function	32	0	32	0	0	0	0	0	64	32	0	32	2	0	1	64	32	0	8	32	32	0	32	128	128	128	0	0	0	0
VoAF max	Data									C0																					
	Function									127																					
ATT	Data									A0																					
	Function									0																					
THD AF	Data																														
	Function																														
LIM	Data																														
	Function																														
AMR	Data																														
	Function																														
AFSN	Data																														
	Function																														
Chroma block (PAL)																															
Cn1	Data														A3																
	Function													0	0	1															
Cn2	Data																														
	Function																														
ACC1	Data																														
	Function																														
ACC2	Data																														
	Function																														
OV	Data																														
	Function																														
VIkP	Data																														
	Function																														
killP	Data																														
	Function																														
APC1	Data																														
	Function																														
R/BP	Data																														
	Function																														
θR-Y P	Data																														
	Function																														
CC	Data																														
	Function																														
DDH	Data																														
	Function																														

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ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Sub address	00H		01H		02H				03H	04H		05H	06H			07H	08H	09H		0AH	0BH			0CH	0DH	0EH	0FH	10H	13H		
	Function	DLA	P/N	VCOA	AUDM	45/60	TRAP	DBF	DFA	ATT	SHARP	DEFE	CONT	DLTA	AUTO	TV/EXT	TINT	COLOR	SET	HP	BRI	DR	MUTE	DB	CR	CG	CB	TRF	SESW	HST	AFCG
	Data	A6		A6		A0				A7	A6		A6	A3			A7	A6	A7		A6	A6			A6	A8	A8	A8	A0	A0		
	Function	32	0	32	0	0	0	0	0	64	32	0	32	0	0	1	64	32	0	8	32	32	0	32	128	128	128	0	0	0	0
Cn3	Data																		E3												
	Function																		5												
Cn4	Data																		E3												
	Function																		5												
Chroma block (NTSC)																															
VikN	Data																		E3												
	Function																		5												
killN	Data																		E3												
	Function																		5												
APC2	Data																														
	Function																														
R/BN	Data																														
	Function																														
θ R-Y N	Data																														
	Function																														
TC1	Data																C0														
	Function																127														
TC2	Data																A0														
	Function																0														
SRA	Data																		B4												
	Function																		1												
SRD	Data																		B4												
	Function																		1												
AUTO 1	Data														E0																
	Function													1	1																
AUTO 2	Data														E0																
	Function													1	1																
AUTO 3	Data														E0																
	Function													1	1																
AUTO 4	Data														E0																
	Function													1	1																
AUTO 5	Data														E0																
	Function													1	1																
AUTO 6	Data														E0																
	Function													1	1																
	Data																														
	Function																														

ELECTRICAL CHARACTERISTICS (cont.) Video and interface block SG50 should be input to SY IN. (SG60 is input for Y5 to Y7 and Y36 to Y46.)

Symbol	Sub address	00H		01H			02H			03H	04H	05H	06H		07H	08H	09H	0AH	0BH		0CH	0DH	0EH	0FH	10H	13H		
	Function	DLA	P/N	VCOA	AUDM	45/60	TRAP	DBF	DFA	ATT	SHARP	DEFE	CONT	DLTA	AUTO	TVEXT	TINT	COLOR	SET	HP	BRI	DR	MUTE	DB	CR	CG	CB	TRF	SESW	HST	AFC3
—	Data	A6		A6			A2			A0	A6	A7	A3				A6	A0	A7		A5	A5		A5	A5	A5	A5	A0		A0	
	Function	32	0	32	0	0	0	0	1	0	32	0	64	0	1	1	32	0	0	8	16	16	0	16	16	16	16	0	0	0	0
Ymax	Data												C0																		
	Function												127																		
GY	Data												A7																		
	Function												64																		
FBY	Data										E4		A7																		
	Function										51		64																		
2AGY	Data																														
	Function																														
CTR1	Data						A0/A6				E4																				
	Function						0/1				51																	A6			
TRF1	Data						A6				E4																				
	Function						1				51																	0/1			
DTR1	Data						C5				E4																				
	Function						1	1			51																				
CTR2	Data						A0/A6				E4																				
	Function						0/1				51																	A6			
TRF2	Data						A6				E4																				
	Function						1				51																	0/1			
DTR2	Data						C5				E4																				
	Function						1	1			51																				
YDL1	Data														E8																
	Function													1																		
YDL2	Data														E0																
	Function													2																		
YDL3	Data														E9																
	Function													3																		
YDL4	Data																														
	Function																														
GTmor	Data										A6																				
	Function										32																				
GTmax	Data										A0																				
	Function										0																				
GTmin	Data										B9																				
	Function										63																				
GT2M	Data										B9																				
	Function										63																				
GT5M	Data										B9																				
	Function										63																				

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Sub address	00H	01H			02H			03H	04H		05H	06H			07H	08H	09H	0AH	0BH	0CH	0DH	0EH	0FH	10H	13H		
	Function	DLA	P/N	VCOA	AUDM	45/60	TRAP	DBF	DFA	ATT	SHARP	DEFE	CONT	DLTA	AUTO	TVEXT	TINT	COLOR	SET	HP	BRI	DR	MUTE	DB	CR	CG	CB	TRF	SESW	HST	AFCG
GYnor	Data												A0																		
	Function												0																		
GYmin	Data																														
	Function																														
Lum nor	Data																														
	Function																														
Lum max	Data																				C0										
	Function																				127										
Lum min	Data																				A0										
	Function																				0										
D(R)	Data																			A0/B9											
	Function																			0/63											
D(B)	Data																					A0/B9									
	Function																					0/63									
EX(R)	Data											C0								A0											
	Function											127								0											
EX(G)	Data											C0								A0											
	Function											127								0											
EX(B)	Data											C0								A0											
	Function											127								0											
OFRG	Data																			A7											
	Function																			64											
OFBG	Data																			A7											
	Function																			64											
C(R)	Data																			A7				A0/C1							
	Function																			64				0/255							
C(G)	Data																								A0/C1						
	Function																								0/255						
C(B)	Data																									A0/C1					
	Function																									0/255					
DLF	Data						A0							E9																	
	Function								0					3																	
Coon 1	Data																	C0													
	Function																	127													
Coon 2	Data																	A0													
	Function																	0													
VMF	Data																													A0/A4	
	Function																													0/1	
MTXB	Data						A6						E4					A7													
	Function						1		0				51					64													

PRELIMINARY
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PAL/NTSC SYSTEM SHINGLE-CHIP COLOR TV SIGNAL PROCESSOR

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Sub address	00H	01H			02H			03H	04H		05H	06H			07H	08H	09H	0AH	0BH		0CH	0DH	0EH	0FH	10H		13H	
	Function	DLA	P/N	VCOA	AUDM	45/60	TRAP	DBF	DFA	ATT	SHARP	DEFE	CONT	DLTA	AUTO	TVEXT	TINT	COLOR	SET	HP	BRI	DR	MUTE	DB	CR	CG	CB	TRF	SESW	HST	AFCG
MTXG	Data							A6					E4				A7								A8	A8	A8	A0		A0	
	Function						1		0				51				64								128	128	128	0	0	0	0
MTXR	Data					A6							E4				A7														
	Function						1		0				51				64														
MTXG1	Data					A6							E4				A7														
	Function						1		0				51				64														
OSD1	Data																A0														
	Function																0														
OSD2	Data																A0														
	Function																0														
GYnor	Data												C0																		
	Function												127																		
GYmin	Data																														
	Function																														
ABR	Data																			C0					C0						
	Function																			127					127						

DEF block

	Data	A6		A6			A6			A0	C0		A6	D9			A7	A0	A7	A6	A6		A6	A8	A8	A8	A0		A0	
	Function	32	0	32	0	0	1	0	0	0	63	0	32	0	1		64	0	0	8	32	32	0	32	128	128	128	0	0	0	0
ISS	Data																														
	Function																														
BGP1	Data																														
	Function																														
BGP2	Data																														
	Function																														
BGPW	Data																														
	Function																														
fH	Data																														
	Function																														
FPH1	Data																														
	Function																														
FPH2	Data																														
	Function																														
HPT1	Data																														
	Function																														
HPT2	Data																		A0												
	Function																		0												
HPT3	Data																		C9												
	Function																		15												

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Sub address	00H		01H			02H			03H	04H		05H	06H			07H	08H	09H		0AH	0BH		0CH	0DH	0EH	0FH	10H	13H		
	Function	DLA	P/N	VCOA	AUDM	45/60	TRAP	DBF	DFA	ATT	SHARP	DEFE	CONT	DLTA	AUTO	TVEXT	TINT	COLOR	SET	HP	BRI	DR	MUTE	DB	CR	CG	CB	TRF	SESW	HST	AFCG
TH	Data																														
	Function																														
VH	Data																														
	Function																														
HSTO	Data																												A5		
	Function																												1		
AFCG	Data																												A0/A6		
	Function																												0/1		
fV	Data																														
	Function																														
VVL	Data																														
	Function																														
CoinL	Data																														
	Function																														
SW	Data																														
	Function																														
FPV	Data																												A4		
	Function																												1		
VW	Data																														
	Function																														
VBLKW	Data																														
	Function																														
AVER1	Data																														
	Function																														
AVER2	Data																														
	Function																														
AVER3	Data																														
	Function																														
AVER4	Data																														
	Function																														
WVSS	Data																														
	Function																														

PRELIMINARY
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PAL/NTSC SYSTEM SHINGLE-CHIP COLOR TV SIGNAL PROCESSOR

ELECTRICAL CHARACTERISTICS TEST METHOD

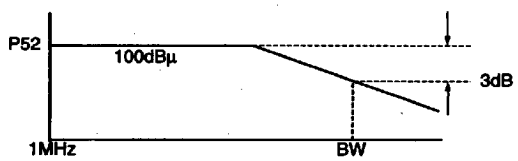
P/N Video S/N

1. Input SG3 and measure the rms value of output signal a pin ㊷.
2. P/N is defined as follows:

$$P/N = 20 \log \frac{V_{ONEG}\ \text{Measured Value}(V_{P\text{-}P}) \times 10^3}{\text{Measured Value}(mVrms)}\ (dB)$$

BW Video frequency characteristics

1. Input SG4 and set the frequency f2 to 37.9MHz so that the beat element of 1MHz is output to pin ㊷.
2. Then set the applied voltage at pin ④ so that the beat element of 1MHz at pin ㊷ may be 100dBμ.
3. Decrease f2 to the level at which the beat element becomes 3dB smaller than the element of 1MHz, and read the value at that level.



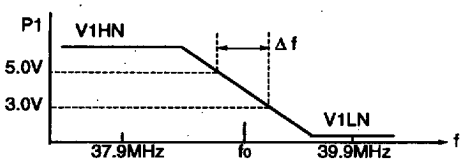
Vin min. Input sensitivity

1. Decrease SG5 level until the video detector output is 3dB smaller than the measured value of Parameter V3 "Video detector output".

Vin max. Maximum permissible input

1. Input 90dBu SG6.
2. VA is the output level at pin ㊷. Increase SG6 voltage until the output at pin ㊷ becomes 3dB smaller than VA. The input level at that time is the maximum permissible input.

μAFTN AFT detector sensitivity (NEG)
V1HN Maximum AFT voltage (NEG)
V1LN Minimum AFT voltage (NEG)
See the following figure.

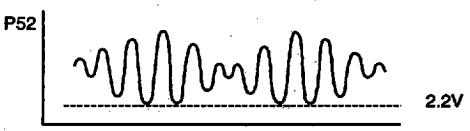


μAFTN is defined as follows:

$$\mu AFTN = \frac{(5.0\text{-}3.0) \times 10^3 mV}{\Delta f\ KHz}\ (mV/KHz)$$

IM Intermodulation

1. Adjust the applied voltage at pin ④ so that the lowest output signal voltage at pin ㊷ is 2.2V.



2. Measure elements of 1.07MHz and 4.43MHz of output at pin ㊷.
3. IM is defined as follows:

$$IM = 20 \log \frac{\text{Element of 1.07MHz}}{\text{Element of 4.43MHz}}\ (dB)$$

ATT Maximum attenuation

1. Measure the element of 400Hz of output at pin ㊻.
2. ATT is defined as follows:

$$ATT = 20 \log \frac{V_{OAFmax}}{\text{Measured value}}\ (dB)$$

LIM Input limiting sensitivity

Decrease the input level of SG18. Measure the input level when the element of 400Hz at pin ㊻ is 3dB smaller than V_{OAFM} (S6:Maximum AF output (6.0M)).

AMR AMR

1. Vam is the element of 400Hz at pin ㊻.
2. AMR is defined as follows:

$$AMR = 20 \log \frac{V_{OAFS}(mVrms)}{V_{am}(mVrms)}\ (dB)$$

AF S/N AF S/N

1. Measure the noise (20Hz to 100KHz) of output at pin ㊻.
2. AF S/N is defined as follows:

$$AF\ S/N = 20 \log \frac{V_{OAFmax}}{\text{Measured value}}\ (dB)$$

Cn1 Standard chroma output 1 (PAL)
Cn2 Standard chroma output 2 (PAL)

1. Input SS4P to VI IN.
2. Measure output amplitude, Cn1 and Cn2, at pins ㊶ and ㊸ respectively.

ACC1 ACC characteristics 1

1. Input VS4P (eb=570mV:level+6dB) to VI IN.
2. Measure the output amplitude at pin ㊶.
3. ACC1 is defined as follows:

$$ACC1 = 20 \log \frac{\text{Measured value } (V_{P\text{-}P})}{Cn1\ (V_{P\text{-}P})}\ (dB)$$

ACC2 ACC characteristics 2

1. Input VS4P (input level:-20dB) to VI IN.
2. Measure the output amplitude at pin ㊶.
3. ACC2 is defined as follows:

$$ACC2 = 20 \log \frac{\text{Measured value } (V_{P\text{-}P})}{Cn1\ (V_{P\text{-}P})}\ (dB)$$

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OL Overload characteristics

1. Input VS4P (ec=800mVP-P:chroma+3dB) to VI IN.
2. Measure the output amplitude at pin ㊶.
3. OL is defined as follows:

$$OL = 20 \log \frac{\text{Measured value } (V_{P\text{-}P})}{\text{Cn1 } (V_{P\text{-}P})} \text{ (dB)}$$

VikP Killer operating input level (PAL)

1. Input VS4P (level:variable) to VI IN at input level 0dB.
2. Lower the input level with monitoring the output amplitude at pin ㊶ and measure the input level when output amplitude is not found.

KillP Killer color residual (PAL)

1. Input VS4P (level:-40dB) to VI IN.
2. Measure the output amplitude at pin ㊶.

APC1 APC pull-in range 1

1. Input VS4P (f=eb=ec=variable) to VI IN.
2. Change the input signal frequency and measure the frequency range from the point at which signal is output to pin ㊶ and to the point that no signal is output to the pin. The reference value is 4.433619MHz.

R-Y/B-YP Demodulation output ratio

1. Input VS4P (eb=single chroma=ec+50KHz) to VI IN.
2. V41 is the output amplitude at pin ㊶.
3. V43 is the output amplitude at pin ㊸.
4. R-Y/B-YP is defined as follows:

$$\text{R-Y/B-YP} = 20 \log \frac{V43\ (V_{P\text{-}P})}{V41\ (V_{P\text{-}P})} \text{ (dB)}$$

R-YP Demodulated phase angle

1. Input VS4P (eb=single chroma=ec+50KHz) to VI IN.
2. V41 is the output amplitude at pin ㊶.
3. V43 is the output amplitude at pin ㊸.
4. R-YP is defined as follows:

$$\theta \text{ R-YP} = \tan^{-1} \frac{V43 \times 3.8}{(V41 \times 1.9) + 45^\circ} \text{ (deg)}$$

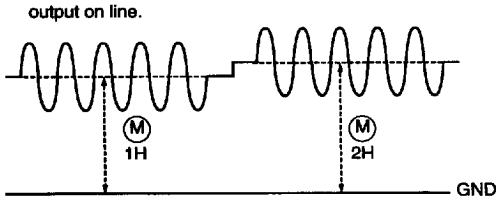
* Vector should be found with taking the gain ratio of a demodulator into consideration.

CC Demodulated output carrier leak

Measure the element of 4.43MHz of the demodulated output in no-input state.

DDH Difference of demodulated output on line

1. Input 4.2MHZ CW (Vi=575mVP-P) to VI IN.
2. Measure the center DC voltage of output beat amplitude for two lines at pins ㊶ and ㊸. The absolute value of the difference in DC voltage is the difference of demodulated output on line.



Cn3,Cn4 Standard chroma output 3,4 (NTSC)

1. Input SS3N to VI IN
2. Cn3 and Cn4 are output amplitude measured at pins ㊶ and ㊸ respectively.

VikN Killer operating input level (NTSC)

1. Input VS3N (level:variable) to VI IN at input level 0dB.
2. Lower the input level with monitoring the output amplitude at pin ㊶ and measure the input level when output amplitude is not found.

KillN Killer color residual (NTSC)

1. Input VS3N (level:-40dB) to VI IN.
2. Measure the output amplitude at pin ㊶.

APC2 APC pull-in range 2

1. Input VS3N (f=eb=ec=variable) to VI IN.
2. Change the input signal frequency and measure the frequency range from the point at which no signal is output to pin ㊶ and to the point at which signal is output to the pin. (Pull-in state) The reference value is 3.579545MHz.

R-Y/B-YN Demodulated output ratio

1. Input VS3N (eb=single chroma=ec+50KHz) to VI IN.
2. V41 is the output amplitude at pin ㊶.
3. V43 is the output amplitude at pin ㊸.
4. R-Y/B-YN is defined as follows:

$$\text{R-Y/B-YN} = 20 \log \frac{V43(V_{P\text{-}P})}{V41(V_{P\text{-}P})} \text{ (dB)}$$

θ R-YN Demodulated phase angle

1. Input VS3N (eb=single chroma=ec+50KHz) to VI IN.
2. V41 is the output amplitude at pin ㊶.
3. V43 is the output amplitude at pin ㊸.
4. R-YN is defined as follows:

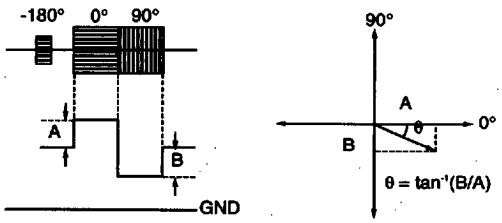
$$\theta \text{ R-YP} = \tan^{-1} \frac{V43 \times 3.8}{(V41 \times 1.9) + 45^\circ} \text{ (deg)}$$

* Vector should be found with taking the gain ratio into consideration.

TC1 Tint control characteristics 1

TC2 Tint control characteristics 2

1. Input VS3N (see the following figure) to VI IN. Based on the output voltage at pin ㊶, find the absolute angle as shown in the above figure.



2. Tint data center (63) is defined as the reference angle (TC). Find angles at tint data max. and tint data min. TC1 and TC2 are differences in angle between TCMAX and TC and between TCMIN and TC and defined as follows.
   TC1 = TCMAX-TC (deg)
   TC2 = TC-TCMIN (deg)

SRA SECAM REF output AC voltage

SRD SECAM REF output DC voltage

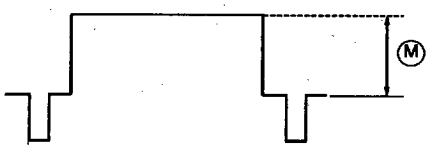
Measure the amplitude (SRA) and DC voltage (SRD) of the element of 4.43MHz of output at pin ㊷.

AUTO 1 to 6 System confirmation 1 to 6

Set to AUTO mode and confirm that bus for each output signal is read correctly.

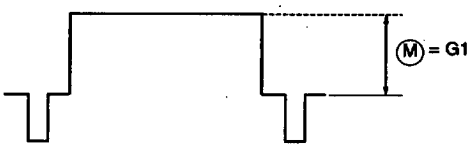
Ymax Maximum video output

1. Input SGA to VI IN
2. Measure the amplitude (V_{P-P}) except that at blanking part of output at pins ㉑, ㉒ and ㉓.



GY Video Standard video output

1. Input SGA to VI IN
2. Measure the amplitude (V_{P-P}) except that at blanking part of output at pins ㉑, ㉒ and ㉓.This amplitude is defined as G1.



3. GY is defined as follows:
   $GY = 20 \log (G1V_{P-P}/0.714V_{P-P})$ (dB)

BW Video frequency characteristics

1. Input SGB (5MHz, $0.4V_{P-P}$) to VI IN.
2. Measure the amplitude (V_{P-P}) except that at blanking part of the output at pin ㉒. The amplitude is defined as YB.
3. BW is defined as follows:
   $BW = 20 \log (YB\ V_{P-P}/GY\ V_{P-P})$ (dB)

2AGY Standard double-width amplifier output

1. Input SGA to VI IN.
2. Measure the amplitude (V_{P-P}) except that at blanking part of output at pin ㉒.

CTR1 Chroma trap attenuation 1 (common to R/G/B output)

1. Input SS3N to VI IN. Measure the frequency level of 3.58MHz at trap data 0. The level is defined as No.
2. Then, measure the level at trap data 1.
3. CTR1 is defined as follows.

$$CRT1 = 20 \log \frac{\text{Measured value } (mV_{P-P})}{No\ (mV_{P-P})} \text{ (dB)}$$

TRF1 Trap fine adj. attenuation 1 (common to R/G/B output)

1. Input SS3N to VI IN.
2. Measure the output amplitude of the element of 3.58MHz when trap fine adj. switch is on. (TRFon)
3. TRF1 is defined as follows.

$$TRF1 = 20 \log \frac{TRFon\ (mV_{P-P})}{No\ (mV_{P-P})} \text{ (dB)}$$

DTR1 D. trap attenuation 1 (common to R/G/B output)

1. Input SS3N to VI IN.
2. Measure the output amplitude of the element of 3.58MHz when D. trap switch is on. (DTRon)
3. DTR1 is defined as follows.

$$DTR1 = 20 \log \frac{DTRon\ (mV_{P-P})}{No\ (mV_{P-P})} \text{ (dB)}$$

CTR2 Chroma trap attenuation 2 (common to R/G/B output)

1. Input SS4P to VI IN and measure the frequency level of 4.43MHz at trap data 0. The level is defined as Po.
2. Then, measure the level at trap data 1.
3. CTR2 is defined as follows.

$$CTR2 = 20 \log \frac{\text{Measured value } (mV_{P-P})}{Po\ (mV_{P-P})} \text{ (dB)}$$

TRF2 Trap fine adj. attenuation 2

1. Input SS4P to VI IN.
2. Measure the output amplitude of the element of 4.43MHz when trap fine adj. switch is on. (TRFon)
3. TRF2 is defined as follows.

$$TRF2 = 20 \log \frac{TRFon\ (mV_{P-P})}{Po\ (mV_{P-P})} \text{ (dB)}$$

DTR2 D. trap attenuation 2

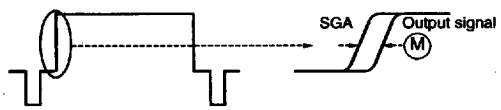
1. Input SS4P to VI IN.
2. Measure the output amplitude of the element of 4.43MHz when D. trap switch is on. (DTRon)
3. DTR2 is defined as follows.

$$DTR2 = 20 \log \frac{DTRon\ (mV_{P\text{-}P})}{Po\ (mV_{P\text{-}P})}\ (dB)$$

Note: In parameters Y5, Y6, Y8 and Y9, limits are defined based on the maximum attenuation by comparing each one.

YDL1 YDL value 1

1. Input SGA to VI IN.
2. Measure the delay time from signal input to output at pins ㉑, ㉒ and ㉓.



Measure the delay time at the center point of rise.

YDL2, 3 and 4 YDL value 2, 3 and 4.

1. Input SGA to VI IN.
2. Measure the delay time from signal output at pins ㉑, ㉒ and ㉓ to YDL1.

GTnor Video tone 1

1. Input SGB (f=3MHz) to VI IN.
2. Measure output amplitude at pins ㉑, ㉒ and ㉓.

GTmax Video tone 2

1. Input SGB (f=3MHz) to VI IN.
2. Measure output amplitude at pins ㉑, ㉒ and ㉓.
3. GTmax is defined as follows:

$$GTmax = 20 \log \frac{Measured\ value\ (V_{P\text{-}P})}{GTnor\ (V_{P\text{-}P})}\ (dB)$$

GTmin Video tone 3

1. Input SGB (f=3MHz) to VI IN.
2. Measure output amplitude at pins ㉑, ㉒ and ㉓.
3. GTmin is defined as follows:

$$GTmin = 20 \log \frac{Measured\ value\ (V_{P\text{-}P})}{GTnor\ (V_{P\text{-}P})}\ (dB)$$

GT2M Video tone 4

1. Input SGB (f=2MHz) to VI IN.
2. Measure output amplitude at pins ㉑, ㉒ and ㉓.
3. GT2M is defined as follows:

$$GT2M = 20 \log \frac{Measured\ value\ (V_{P\text{-}P})}{GTnor\ (V_{P\text{-}P})}\ (dB)$$

GT5M Video tone 5

1. Input SGB (f=5MHz) to VI IN.
2. Measure output amplitude at pins ㉑, ㉒ and ㉓.
3. GT5M is defined as follows:

$$GT5M = 20 \log \frac{Measured\ value\ (V_{P\text{-}P})}{GTnor\ (V_{P\text{-}P})}\ (dB)$$

GYnor Contrast characteristics 1

1. Input SGB (f=100KHz) to VI IN.
2. Measure output amplitude at pins ㉑, ㉒ and ㉓.

GYmin Contrast characteristics 2

1. Input SGB (f=100KHz) to VI IN.
2. Measure output amplitude at pins ㉑, ㉒ and ㉓.
3. GYmin is defined as follows:

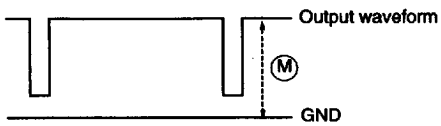
$$GYmin = 20 \log \frac{Measured\ value\ (V_{P\text{-}P})}{GYnor\ (V_{P\text{-}P})}\ (dB)$$

Lum nor Brightness control characteristics 1

Lum max Brightness control characteristics 2

Lum min Brightness control characteristics 3

1. No signal is input. (Only SG50 is input to SY IN.)
2. Measure DC voltage of output at pins ㉑, ㉒ and ㉓ except that at blanking part.



D(R) Drive control characteristics R

1. Input SGA to VI IN.
2. Measure DRmin and DRmax which are output amplitude at pin ㉑ at D(R) data min and D(R) data max respectively.
3. D(R) is defined as follows:

$$D(R) = 20 \log \frac{DRmax(V_{P\text{-}P})}{DRmin\ (V_{P\text{-}P})}\ (dB)$$

D(B) Drive control characteristics B

1. Input SGA to VI IN.
2. Measure DBmin and DBmax which are output amplitude at pin ㉓ at D(B) data min and D(B) data max respectively.
3. D(B) is defined as follows:

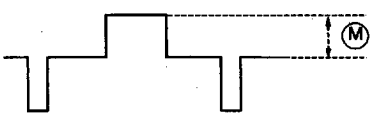
$$D(B) = 20 \log \frac{DBmax(V_{P\text{-}P})}{DBmin\ (V_{P\text{-}P})}\ (dB)$$

EXR EXT(R) I/O characteristics

EXG EXT(G) I/O characteristics

EXB EXT(B) I/O characteristics

1. Input SGD to FB, ER, EG and EB.
2. Measure output amplitude which is higher than the pedestal level at pins ㉑, ㉒ and ㉓. The amplitude at blanking part should not be measured.



OFRG Offset voltage between R and G

OFBG Offset voltage between B and G

1. Measure DC voltage of output at pins ㉑, ㉒ and ㉓ except that at blanking part.
2. OFRG and OFBG are defines as follows:
   OFRG =
   (pin ㉑ Measured voltege)-(pin ㉒ Measured voltege) (mV)
   OFBG =
   (pin ㉓ Measured voltege)-(pin ㉒ Measured voltege) (mV)

R(C) R cutoff characteristics

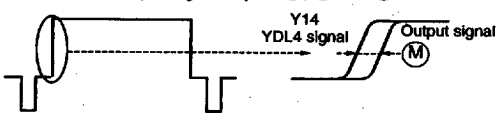
G(C) G cutoff characteristics

B(C) B cutoff characteristics

1. Measure DC voltage of output at pins ㉑, ㉒ and ㉓ when R(C), G(C) and B(C) data are maximum and minimum respectively. The DC voltage at blanking part should be measured.
2. R(C), G(C) and B(C) are defined as follows:
   R(C), G(C), and B(C) =
   (Voltage at data max.) - (Voltage at data min.) (V)

DLF DL fine delay

1. Input SGA to VI IN.
2. Measure the time lag (absolute value) between signal YDL4 and output signal at pins ㉑, ㉒ and ㉓.



Measure the time lag at the center point of rise.

Ccon1 Color control characteristics 1

Ccon2 Color control characteristics 2

1. Input SGE to -R IN (pin ㊺).
2. Measure output amplitude at pins ㉑, ㉒ and ㉓ under each condition.

VMF Video mute characteristics

1. Input SGF to VI IN.
2. Measure output amplitude of the element of 4.43MHz when the mute switch is on and off. (VMFon, VMFoff)
3. VMF is defined as follows:

$$VMF = 20 \log \frac{TRFon\ (V_{P\text{-}P})}{TRFoff\ (V_{P\text{-}P})}\ (dB)$$

MTXB Matrix characteristics 1

MTXG Matrix characteristics 2

1. Input SGE to -B IN (pin ㊹).
2. Measure output amplitude at pins ㉒ and ㉓.
   (P23 = MTXB, P22 = MTXG)

MTXR Matrix characteristics 3

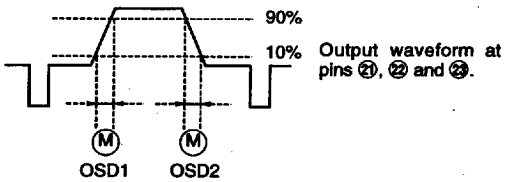
MTXG1 Matrix characteristics 4

1. Input SGE to -R IN (pin ㊺).
2. Measure output amplitude at pins ㉑ and ㉒.
   (P21 = MTXR, P22 = MTXG1)

OSD1 OSD speed characteristics 1

OSD2 OSD speed characteristics 2

1. Input SGD to FB, ER, EG and EB.
2. Measure rise time and fall time of the signal of output at pins ㉑, ㉒ and ㉓. Measurement points should be higher than the pedestal level and blanking part should not be measured.



GYmax1 Contrast control characteristics 3

GYmin1 Contrast control characteristics 4

1. Input SGA to VI IN.
2. Measure output amplitude at pins ㉑, ㉒ and ㉓ when 2.9V and 0V are externally applied to pin ㉘.

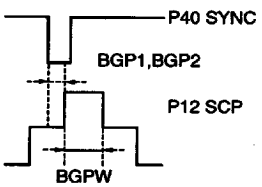
ISS Sync separation input sensitivity current

Make current flow out from pin ㊵ and measure the flow current when the burst gate pulse is not found at pin ⑫.

BGP1 BGP timing 1

BGP2 BGP timing 2

BGPW BGP pulse width



FH Horizontal free run frequency

Measure the output frequency at pin ⑬ when no signal is input.

FPH1 Horizontal pull-in range 1

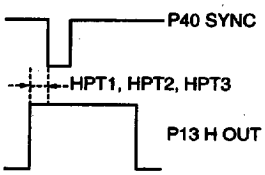
FPH2 Horizontal pull-in range 2

Change the frequency of SGc and measure the frequency at the moment when the output signal at pin ⑬ and the input signal at pin ㊵ are pulled in. The horizontal pull-in range is measured by comparing with the horizontal free run frequency.

HPT1 Horizontal pulse timing 1

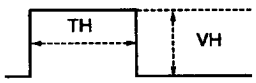
HPT2 Horizontal pulse timing 2

HPT3 Horizontal pulse timing 3



TH Horizontal pulse width

VH Horizontal pulse amplitude



HSTO Horizontal stop operation

Confirm that the horizontal output is high when the horizontal stop switch is on.

AFCG AFG gain operation

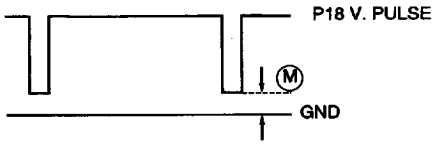
1. Measure AFCon which is the output amplitude of pin ⑯ when AFC switch is on and AFCoff which is that when the switch is off.
2. AFCG is defined as follows:

$$AFCG = 20 \log \frac{AFCon\ (V_{P\text{-}P})}{AFCoff\ (V_{P\text{-}P})}\ (dB)$$

FV Vertical free run frequency

Measure the output frequency at pin ⑱ when no signal is input.

VVL Minimum vertical output voltage



CoinL Minimum coincidence detection voltage

Measure the output DC voltage at pin ㉘ when no signal is input.

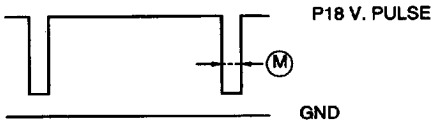
SW Service SW operation

Measure the output DC voltage at pin ⑲ when the service switch is on.

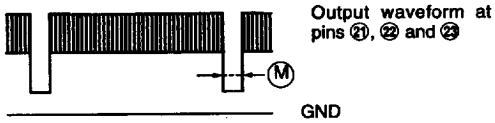
FPV Vertical pull-in range

Decrease the frequency of SGd and measure the frequency when output waveform at pin ⑱ is pulled in.

VVL Vertical pulse width



VBLKW Vertical BLK width



AVER1 50/60 confirmation 1

AVER2 50/60 confirmation 2

AVER3 50/60 confirmation 3

AVER4 50/60 confirmation 4

Confirm that the frequency of output at pin ⑱ is the same at each input frequency (pull-in state). Also, confirm the state of the bus write mode (D7).

WVSS Minimum sync detection width

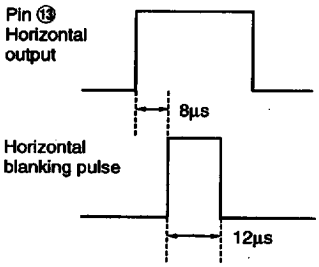
Reduce the width of signal SGd and measure the width of input signal when the output waveform at pin ⑱ disappears.

INPUT SIGNAL

VIF/SIF

SG. No.	Input signal (Value at pin terminal is 50Ω)
SG. 1	f_0 = 38.9MHz, 90dBμ, fm = 20KHz, AM77.8%
SG. 2	f_0 = 38.9MHz, 90dBμ, fm = 50KHz, AM77.8%
SG. 3	f_0 = 38.9MHz, 80dBμ, CW
SG. 4	f_1 = 45.75MHz, 90dBμ, CW f_2 = 44±5MHz, 90dBμ, CW } Mixed signal
SG. 5	f_0 = 38.9MHz, Variable, fm = 20KHz, AM77.8%
SG. 6	f_0 = 38.9MHz, fm = 20KHz, AM16%, Level variable
SG. 7	f_0 = 38.9MHz, 80dBμ, CW
SG. 8	f_0 = 38.9MHz, 110dBμ, CW
SG. 9	f_0 = 38.9±5MHz, 90dBμ, CW
SG. 10	f_0 = 37.9MHz, 90dBμ, CW
SG. 11	f_0 = 39.9MHz, 90dBμ, CW
SG. 12	f_1 = 38.9MHz, 90dBμ, CW f_2 = 34.47MHz, 80dBμ, CW f_3 = 33.4MHz, 80dBμ, CW } Mixed signal
SG. 13	f_0 = 38.9MHz, Standard 10-step modulation, Sync ratio:28.6%, AM = 87.5% video modulation, Sync chip level 90dBμ
SG. 14	f_0 = 38.9MHz, 93dBμ, CW
SG. 15	f_0 = 38.9MHz, 73dBμ, CW
SG. 16	f_0 = 4.5MHz, 100dBμ, fm = 400Hz, FM±25KHz dev
SG. 17	f_0 = 5.5MHz, 100dBμ, fm = 400Hz, FM±50KHz dev
SG. 18	f_0 = 6.0MHz, 100dBμ, fm = 400Hz, FM±50KHz dev
SG. 19	f_0 = 6.5MHz, 100dBμ, fm = 400Hz, FM±50KHz dev
SG. 20	f_0 = 6.0MHz, 100dBμ, fm = 400Hz, AM30%
SG. 21	f_0 = 6.0MHz, 100dBμ, CW

Note 1: The timing and pulse width of the horizontal blanking pulse should be as shown in the following figure by adjusting the variable resistor of the single shot multi vibrator.

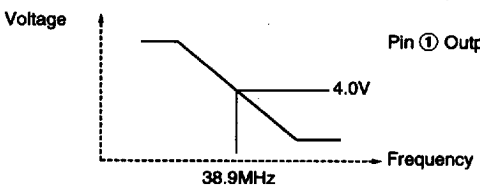


The variable resistor at pin ⑮ of the TTL IC, M74LS221P, is used to fix the timing at 8μs and that at pin ⑦ is used to fix the pulse width at 12μs.

Coil adjustment

VCO coil

1. Set the test conditions as shown in the parameter V14.
2. Input CW (f_0=38.9MHz, Vi=90dBμ) to input pin A.
3. Set the DC voltage at pin ① (AFT OUT) to 1/2Vcc (4.0V) by adjusting VCO coil.



Note) VCO coil should always be adjusted as above before using this IC.

INPUT SIGNAL PARAMETERS INCLUDING INPUT SIGNALS

1. Input signal name is four alphanumeric characters.

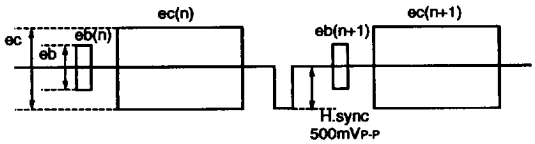
Ex.) S S 4 P Standard Signal 4.43MHz PAL system

- Fourth character
- Third character
- Second character
- First character

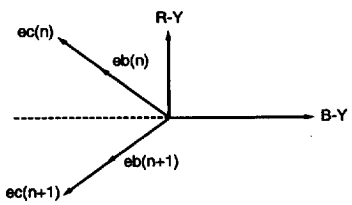
First character:	Standard=S, Nonstandard=V (Modified parts should be specified.)
Second character:	Meaning of signal
Third character:	Frequency of burst and chroma
	4(4.433619MHz), 3(3.579545MHz) (In case of "S", SECAM standard signal is applied.)
Fourth character:	Color system
	N(NTSC), P(PAL)

2. Structure of input color signal

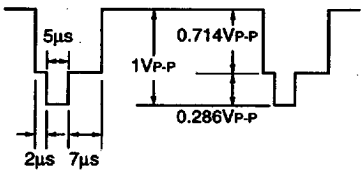
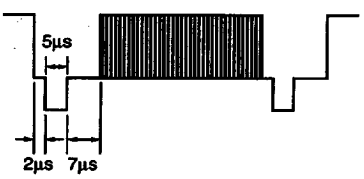
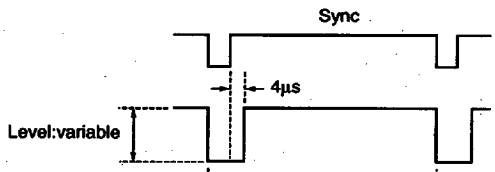
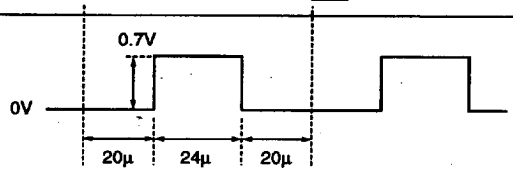
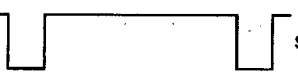
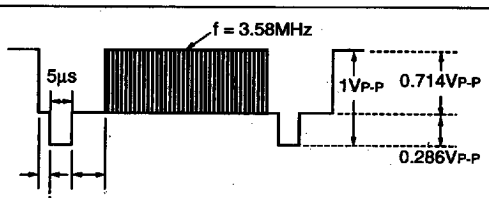
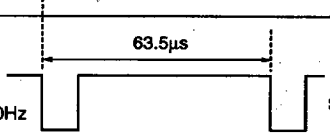
The following figure shows the structure of color signal.



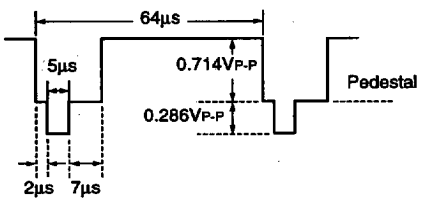
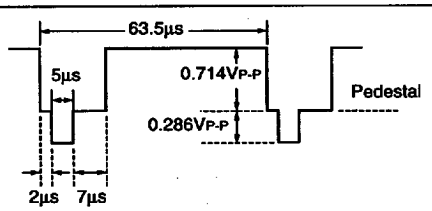
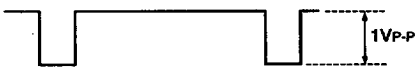
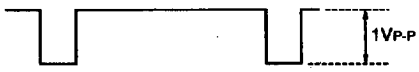
1. When S (standard) is used as the first character, the standard color bar signal of each system is applied. H.sync should be added for input clamp. (The frequency of H.sync is fixed according to the fourth character. P:50Hz, N:60Hz)
2. Amplitude and frequency of burst are represented as eb. In case of standard signal, the amplitude is 285mVP-P and the frequency is shown by the third character.
3. Amplitude and frequency of chroma are represented as ec. In case of standard signal, the amplitude is 570mVP-P and the frequency is shown by the third character.
4. The following figure shows the phase of a PAL system signal.



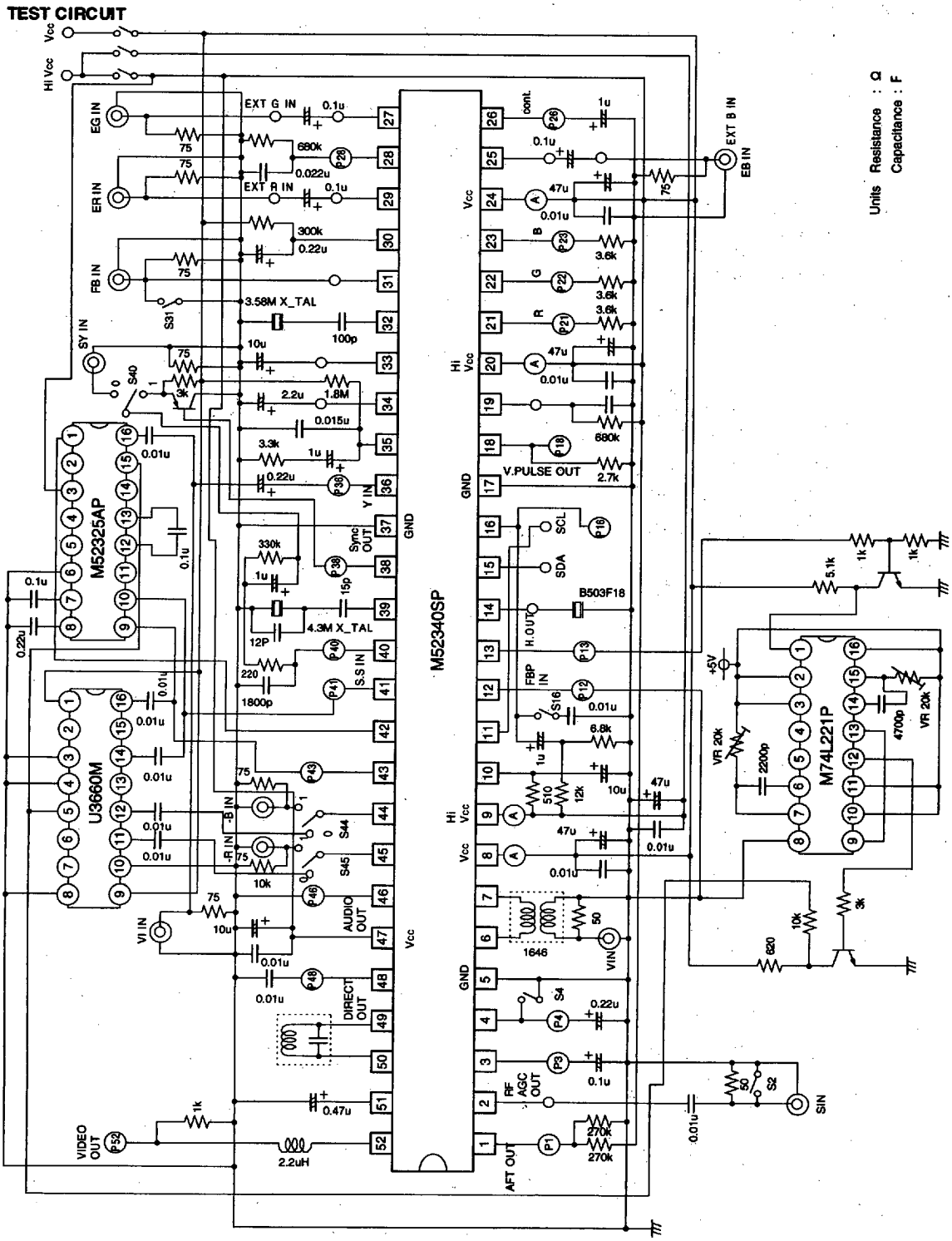
VIDEO/INTERFACE

SG. No.	Input signal (Value at pin terminal is 50Ω)
SG. A	PAL system PAL system APL 100% standard video signal should be input as sync separation input as shown in the figure. The vertical signal should be interlaced at 50Hz. 
SG. B	The frequency and amplitude of signal Lumi can be changed by signal SGA. The typical amplitude is 0.714mVP-P. 
SG. C	
SG. D	
SG. E	
SG. 50	Level:variable typ = 0.3VP-P H = 15.625KHz, V = 50Hz 
SG. F	
SG. 60	NTSC system Level:variable typ = 0.3VP-P H = 15.734KHz, V = 60Hz 

DEFLECTION

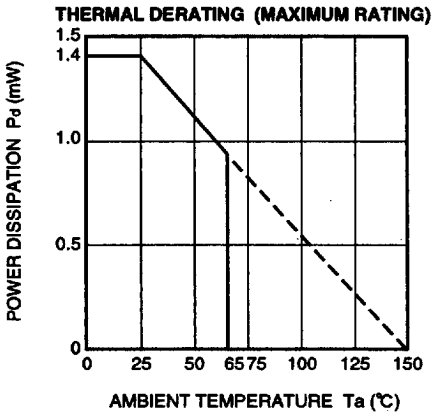
SG. No.	Input signal (Value at pin terminal is 50Ω)
SG. a	The input signal should be PAL system APL-variable video signal. Vertical signal should be interlaced at 50Hz. 
SG. b	The input signal should be NTSC APL-variable video signal. Vertical signal should be interlaced at 60Hz. 
SG. c	Duty 90% Frequency:variable Level:variable (Typ. : 1VP-P) 
SG. d	Duty 95% Frequency:variable Level:variable (Typ. : 1VP-P) Duty : variable (Typ. : 95%) 

TEST CIRCUIT

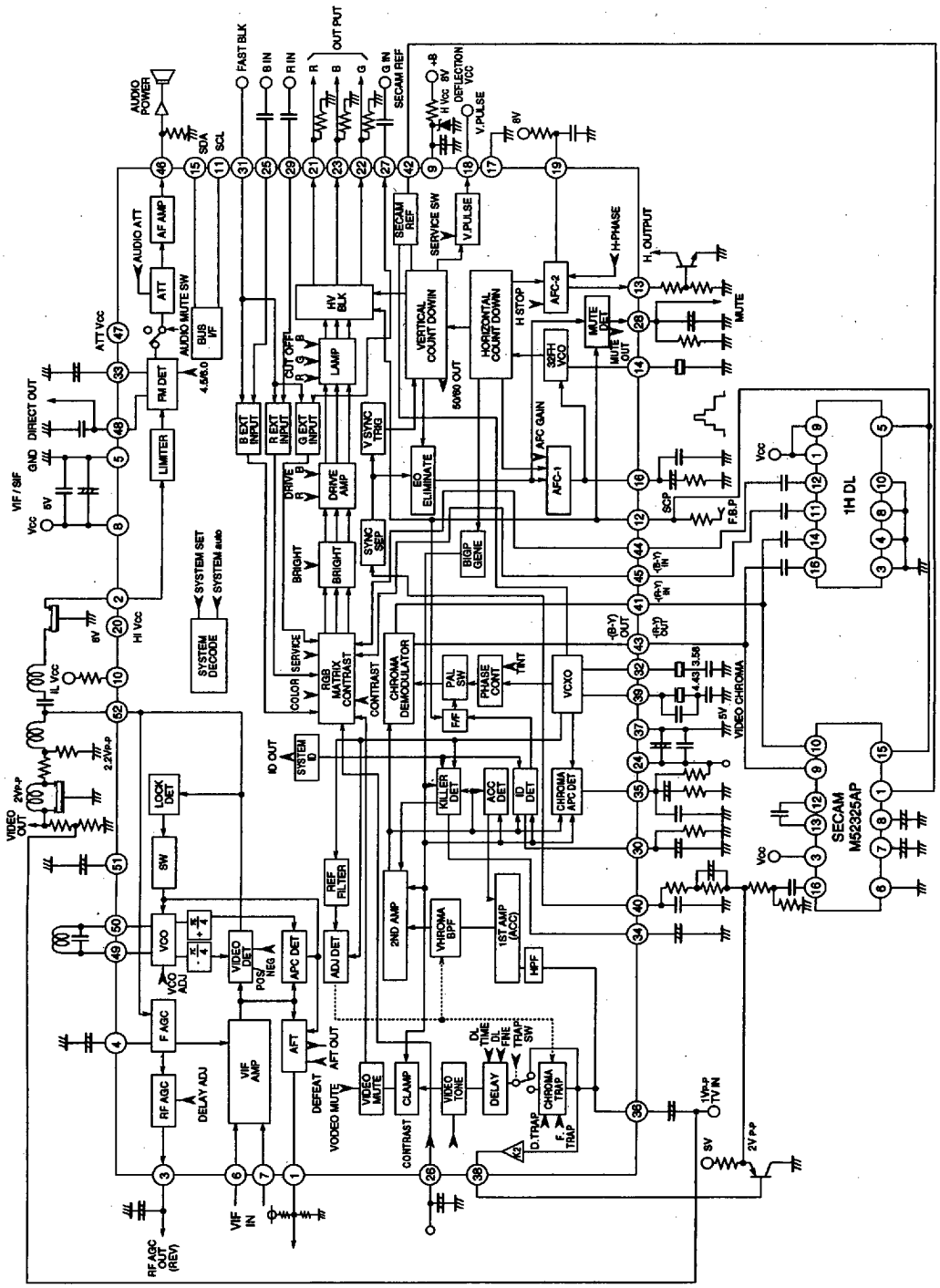


MITSUBISHI ELECTRIC 6249826 0019391 637

TYPICAL CHARACTERISTICS



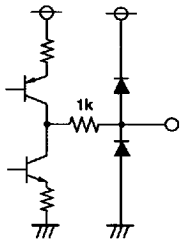
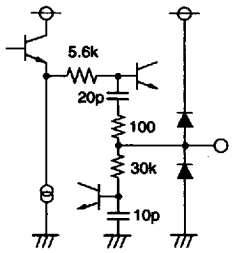
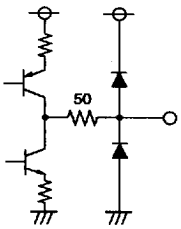
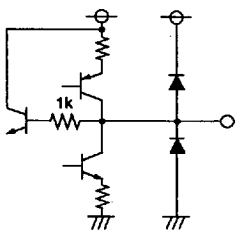
APPLICATION EXAMPLE



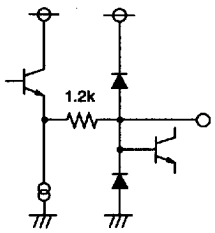
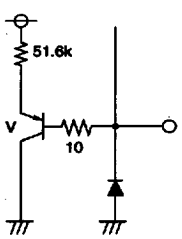
MITSUBISHI ELECTRIC

6249826 0019393 40T

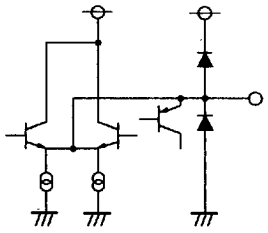
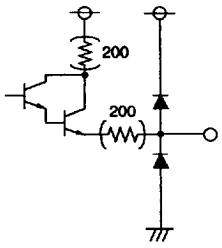
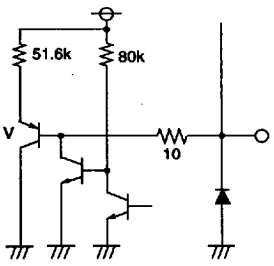
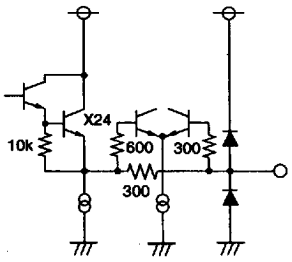
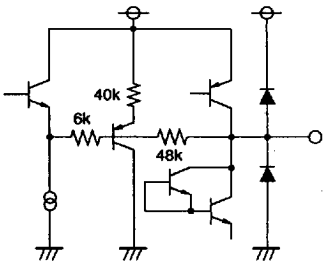
DESCRIPTION OF PIN

Pin No.	Name	Description	Peripheral circuit of pin	DC voltage
①	AFT OUT			4.0V
②	LIMITER IN			3.0V
③	RE AGC OUT			7.5V to 0.5V
④	IF AGC FILTER			4.5V to 2.5V
⑤	VIF GND			

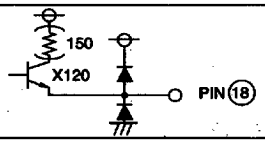
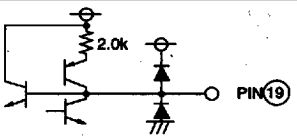
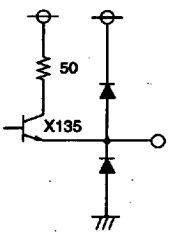
DESCRIPTION OF PIN (cont.)

Pin No.	Name	Description	Peripheral circuit of pin	DC voltage
⑥ ⑦	VIF IN			1.5V
⑧	VIF Vcc	Power supply for VIF	———	5.0V
⑨	H Vcc	Power supply for all circuits in the deflection block	———	8.0V
⑩	IIL Vcc	Power supply for I²C bus IIL	———	1.5V
⑪	SCL	I²C bus clock input		5V to 0V

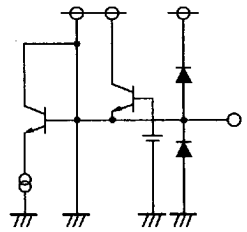
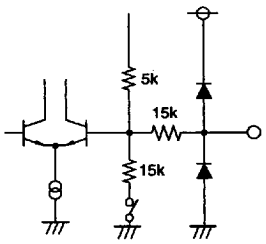
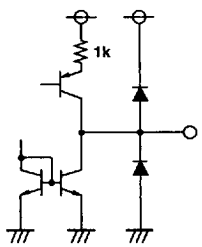
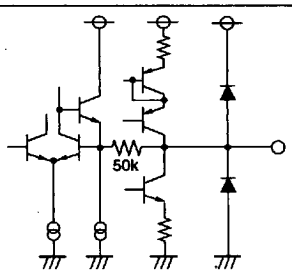
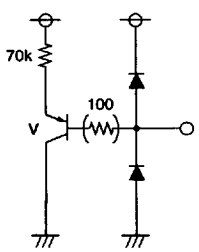
DESCRIPTION OF PIN (cont.)

Pin No.	Name	Description	Peripheral circuit of pin	DC voltage
⑫	SCP OUT	Sandcastle pulse output		5V to 0V
⑬	H OUT	MAX 4mA Horizontal frequency pulse output		4V to 0V
⑮	SDA	I²C bus data input		5V to 0V
⑭	H OSC	CSB-503 F18 is used.		3.1V
⑯	AFC 1 FILTER			5.5V

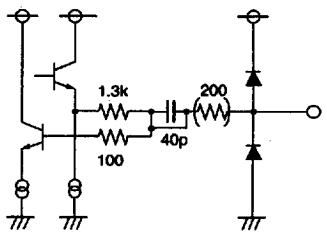
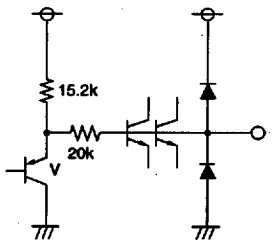
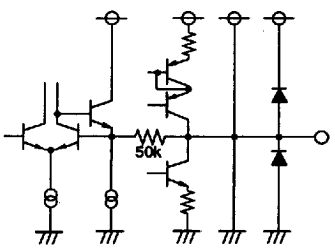
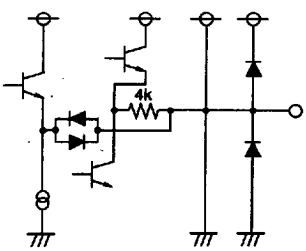
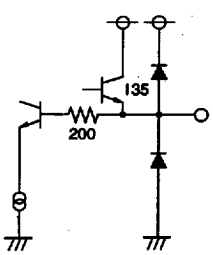
DESCRIPTION OF PIN (cont.)

Pin No.	Name	Description	Peripheral circuit of pin	DC voltage
⑰	GND	Power supply for R/G/B output	———	
⑱	V pulse	Open emitter input		2.5V
⑲	AFC 2 FILTER			
⑳	Hi Vcc	Power supply for R/G/B output	———	8V
㉑ ㉒ ㉓	B OUT G OUT R OUT	MAX 4mA Primary-color (R, G and B) signal output pin		2.9V TYP
㉔	VCD Vcc	Power supply for video chroma	———	5V

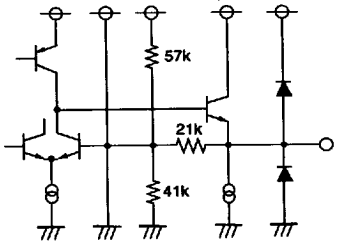
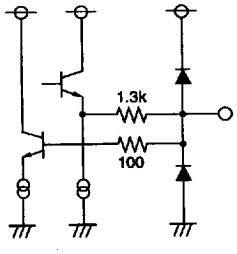
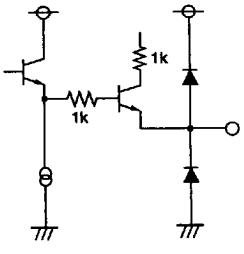
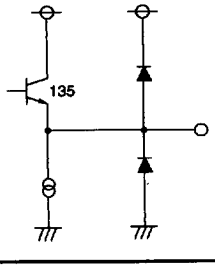
DESCRIPTION OF PIN (cont.)

Pin No.	Name	Description	Peripheral circuit of pin	DC voltage
(25) (27) (29)	B IN G IN R IN	External R/G/B input pin		
(26)	CONTRAST	Pin to adjust contrast externally		
(28)	COINCIDENCE	Sync detection pin Sync → Hi Async → Lo		7.5V to 0.5V
(30)	KILLER FILTER			
(31)	FAST BLK			0V

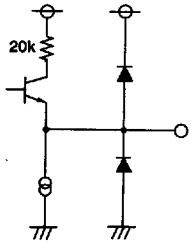
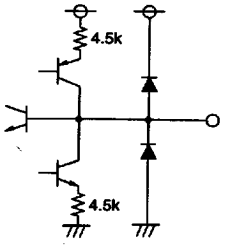
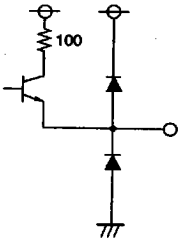
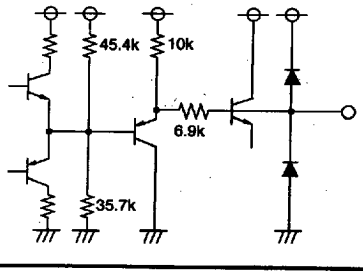
DESCRIPTION OF PIN (cont.)

Pin No.	Name	Description	Peripheral circuit of pin	DC voltage
㉜	3.58MHz X-tal	Pin used to connect an oscillator (3.58MHz)		0V
㉝	AUDIO BYPASS			2.5V
㉞	ID Filter			2.3V
㉟	CHROMA APC FILTER			3.3V
㊱	TV IN (Y IN)			2.3V

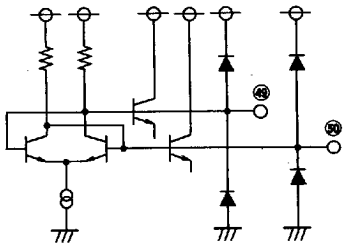
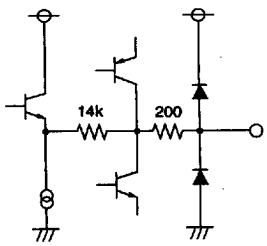
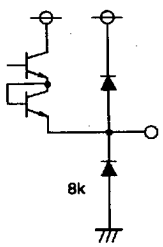
DESCRIPTION OF PIN (cont.)

Pin No.	Name	Description	Peripheral circuit of pin	DC voltage
(37)	VCD GND			
(38)	V(Y) SW OUT	Pin to output 6dB amplifier		1.75V
(39)	X-TAL 4.43MHz	Pin used to connect an oscillator (4.43MHz)		3.2V
(40)	SYNC SEP IN	Emitter input		5.7V
(41) (43)	-(B-Y) OUT -(R-Y) OUT			2.3V

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Description	Peripheral circuit of pin	DC voltage
(42)	SECAM REF			4.4V to 1.3V
(44) (45)	-(B-Y) IN -(R-Y) IN			3.0V
(46)	AUDIO OUT			3.2V
(47)	AUDIO Vcc			8.0V
(48)	FM DIRECT OUT			3.0V

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Description	Peripheral circuit of pin	DC voltage
(49) (50)	VCO			4.0V
(51)	VIDEO APC FILTER			2.9V
(52)	VIDEO OUT			2.2V or 5.7V

[DATA list]

Data No.	Data									Data No.	Data								
	D7	D6	D5	D4	D3	D2	D1	D0	Decimal		D7	D6	D5	D4	D3	D2	D1	D0	Decimal
A0	0	0	0	0	0	0	0	0	0	C3	0	0	0	0	1	1	0	0	12
A1	0	0	0	0	0	0	0	1	1	C4	0	0	0	1	1	0	0	0	24
A2	0	0	0	0	0	0	1	0	2	C5	0	0	1	1	0	0	0	0	48
A3	0	0	0	0	0	1	0	0	4	C6	0	1	1	0	0	0	0	0	96
A4	0	0	0	0	1	0	0	0	8	C7	0	0	0	0	1	1	1	0	14
A5	0	0	0	1	0	0	0	0	16	C8	0	0	0	1	1	1	0	0	28
A6	0	0	1	0	0	0	1	0	32	C9	0	0	1	1	1	0	0	0	56
A7	0	1	0	0	0	0	0	1	64	D0	0	1	1	1	0	0	0	0	112
A8	1	0	0	0	0	0	0	0	128	D1	0	0	0	1	1	1	1	0	30
A9	0	0	0	0	0	0	1	1	3	D2	0	0	1	1	1	1	0	0	60
B0	0	0	0	0	0	1	0	1	5	D3	0	1	1	1	1	0	0	0	120
B1	0	0	0	0	1	0	0	1	9	D4	0	0	0	0	1	0	1	0	10
B2	0	0	0	1	0	0	0	1	17	D5	0	0	0	1	0	1	0	0	20
B3	0	0	1	0	0	0	0	1	33	D6	0	0	1	0	1	0	0	0	40
B4	0	1	0	0	0	0	0	1	65	D7	0	1	0	1	0	0	0	0	80
B5	1	0	0	0	0	0	0	1	129	D8	0	0	0	1	0	0	1	0	18
B6	0	0	0	0	0	1	1	1	7	D9	0	0	1	0	0	1	0	0	36
B7	0	0	0	0	1	1	1	1	15	E0	0	0	1	0	0	1	1	0	38
B8	0	0	0	1	1	1	1	1	31	E1	0	0	1	0	0	0	1	0	34
B9	0	0	1	1	1	1	1	1	63	E2	0	0	1	0	0	0	1	1	35
C0	0	1	1	1	1	1	1	1	127	E3	0	1	0	0	0	1	1	0	69
C1	1	1	1	1	1	1	1	1	255	E4	0	0	1	1	0	0	1	1	51
C2	0	0	0	0	0	1	1	0	6	E5	0	0	1	1	0	0	1	0	50
E7	0	0	1	1	0	1	1	0	54	E6	0	1	0	0	0	1	0	0	68
E8	0	0	1	0	0	1	0	1	37	E9	0	0	1	0	0	1	1	1	39

INITIAL CONDITION ■ No

	D7	D6	D5	D4	D3	D2	D1	D0	DATA
00H	■	POS/NEG	DELAY ADJ						
	0	0	1	0	0	0	0	0	A6
01H	■	A MUTE	VCO ADJ						
	0	0	1	0	0	0	0	0	A6
02H	■	■	TRAP	DBF	■	■	DFA	4.5/6.0	
	0	0	0	0	0	0	0	0	A0
03H	■	AUDIO ATT							
	0	1	0	0	0	0	0	0	A7
04H	■	DEFEAT	SHARPNESS						
	0	0	1	0	0	0	0	0	A6
05H	■	CONTRAST							
	0	0	1	0	0	0	0	0	A6
06H	■	■	AUTO	■	■	TV/EXT	DL TIME		
	0	0	0	0	0	1	1	0	C2
07H	■	TINT							
	0	1	0	0	0	0	0	0	A7
08H	■	COLOR							
	0	0	1	0	0	0	0	0	A6
09H	■	HPHASE				3.58	NTSC	SECAM	
	0	1	0	0	0	0	0	0	A7
0AH	■	BRIGHT							
	0	0	1	0	0	0	0	0	A6
0BH	■	MUTE	DRIVE R						
	0	0	1	0	0	0	0	0	A6
0CH	■	■	DRIVE B						
	0	0	1	0	0	0	0	0	A6
0DH	CUT OFF R								
	1	0	0	0	0	0	0	0	A8
0EH	CUT OFF G								
	1	0	0	0	0	0	0	0	A8
0FH	CUT OFF B								
	1	0	0	0	0	0	0	0	A8
10H	■	■	F TRAP	■	■	■	■	■	
	0	0	0	0	0	0	0	0	A0
13H	■	■	AFCG	HST	SERSW	■	■	■	
	0	0	0	0	0	0	0	0	A0