M52300BSP

NTSC VIDEO CHROMA DEFLECTION PROCESSOR

DESCRIPTION

M52300BSP semiconductor integrated circuit has a built-in I²C interface, and processes video signals and color signals. It also has all necessary functions to process horizontal and vertical signals, except the vertical signal ramp voltage generation circuit.

This IC can be used in all kinds of television sets, including reasonably priced ones and high-grade ones. It also helps simplify TV set production lines, thanks to the I²C-bus control.

FEATURES

- With the built-in I²C interface, this IC requires fewer peripheral components than conventional ones, helping simplify production lines.
- Black signal expanding circuit ensures dynamic image reproduction.
- Built-in flesh color compensation circuit ensures improved color reproduction.
- Sharp images are reproduced thanks to the contour compensation system with a built-in delay line.
- Provided with IQ demodulation, this IC reproduces color difference signals precisely. It can be connected to external RGB input easily because an on-screen character display circuit is built in, reducing external components such as switch circuits.
- Horizontal and vertical signals are counted down by the 32f H generator, therefore no adjustment is necessary.

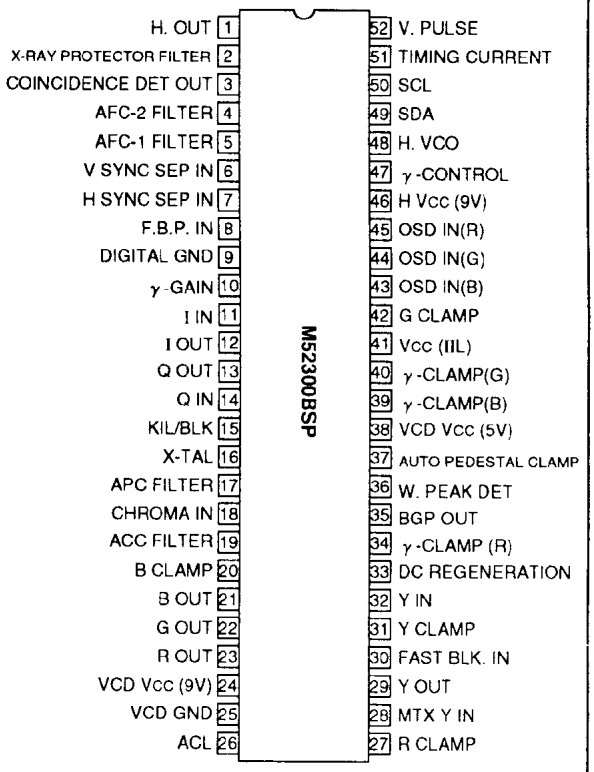
APPLICATION

NTSC color televisions

RECOMMENDED OPERATING CONDITION

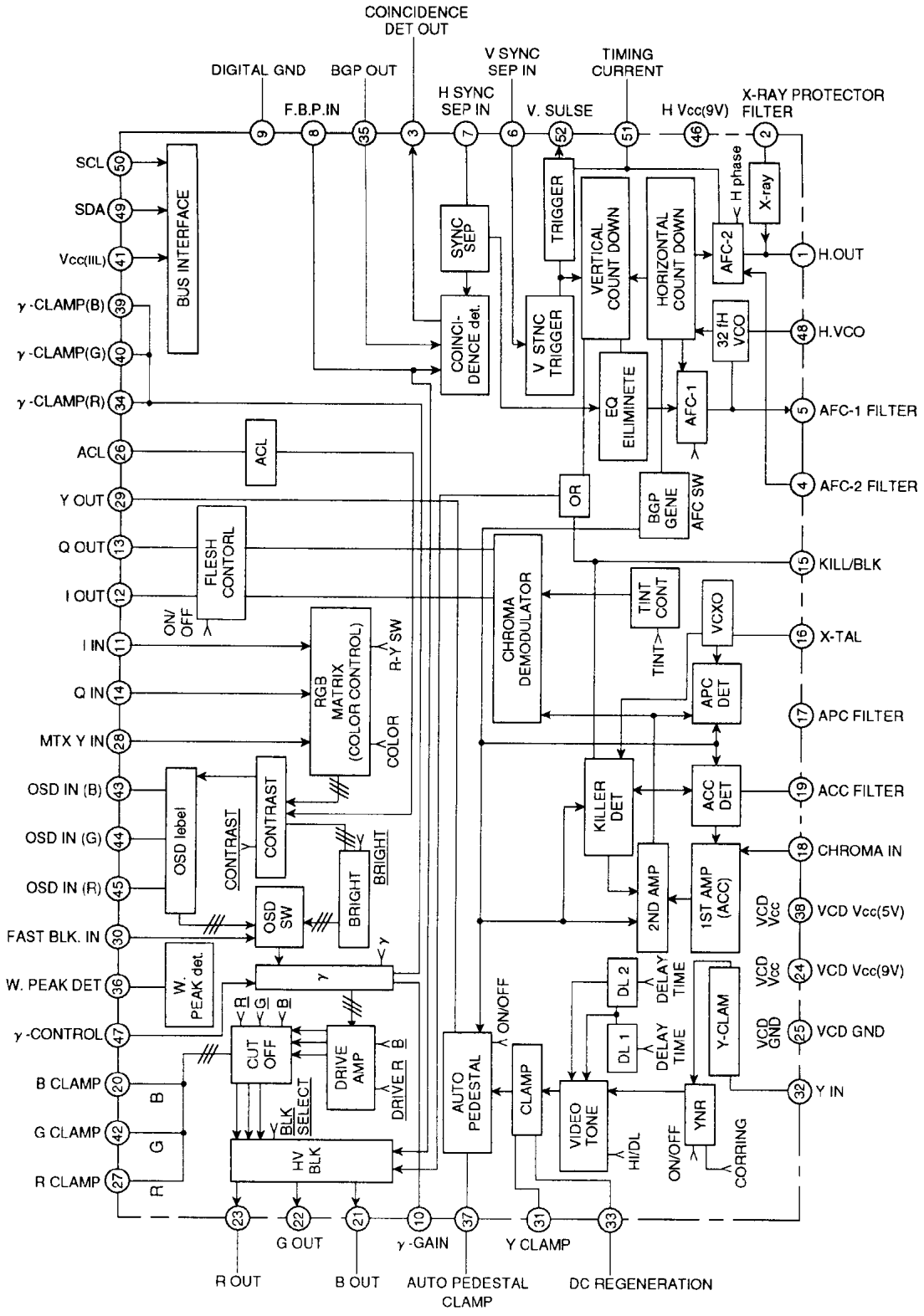
Supply voltage range ..... 4.5~5.5V (pin ㊳)
8.5-9.5V (pins ㉔ and ㊻)
Rated supply voltage ..... 5.0V (pin ㊳)
9.0V (pins ㉔ and ㊻)
Supply current range ..... 11.0~21.0mA (pin ㊶)
Reted supply current ..... 16.0mA (pin ㊶)

PIN CONFIGURATION (TOP VIEW)



Outline 52P4B

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS (Ta=25℃, For electrostatic discharge, capacitance is 200pF unless otherwise noted)

Symbol	Parameter	Ratings	Unit
Vcc	Supply voltage	5.5, 10.0	V
Pd	Power dissipation	1.35	W
Topr	Operating temperature	−20 ~65	℃
Tstg	Storage temperature	−40 ~125	℃
Surge	Electrostatic discharge	±200	V

ELECTRICAL CHARACTERISTICS (Ta=25℃, unless otherwise noted)

Symbol	Parameter	Input Signal		Test conditions																																		Limits			Unit
		SG Pin	Condition	SW condition	S 1	S 2	S 5	S 6	S 7	S 8	S 12	S 14	S 15	S 18	S 19	S 28	S 29	S 30	S 31	S 32	S 33	Sa 34	Sb 34	S 37	S 43	S 44	S 45												Min.	Typ.	Max.	
				PIN condition	P 1	P 2	P 3	P 4	P 5	P 6	P 7	P 8	P 10	P 12	P 13	P 15	P 18	P 19	P 21	P 22	P 23	P 26	P 29	P 31	P 35	P 36	P 37	P 47	P 49	P 52	P 42										
—	Video signa processing system standard conditions	SG6 SG32	i a	SW	1	1	1	2	2	1	1	1	2	2	2	1	1	2	1	1	1	1	2	2	1	1	1											—	—	—	
				PIN																																					
YMAX 1	Video maximum gain 1	SG 32	a 100k 1V	SW																																			0.9	1.1	—	VP-P
				PIN																			M																	
GY1	Video standard gain 1	SG 32	a 100k 0.35V	SW																																			0.0	3.0	6.0	dB
				PIN																			M																	
YT MAX	Video tone characteristic 1	SG 32	a 3M 0.35V	SW																																			8.2	9.9	11.4	dB
				PIN																			M																	
YT MIN	Video tone characteristic 2	SG 32	a 3M 0.35V	SW																																			−14.3	−11.3	−8.3	dB
				PIN																			M																	
BLST 3	Black expansion 3	SG 32	c 100k V10.15 V20.2	SW								1																											39	52	65	IRE
				PIN																			M																	
BLST 4	Black expansion 4	SG 32	c 100k V10.15 V20.2	SW								1																											39	52	67	IRE
				PIN																			M																	
YBV	Video frequency characteristic	SG 32	a 7M 0.35V	SW																																			−3.0	−1.0	+1.0	dB
				PIN																			M																	
DC REG1	DC regeneration rate 1	SG 32	b	SW																																			2.5	2.9	3.3	V
				PIN																			M																	
DC REG2	DC regeneration rate 2	SG 32	b	SW																	2																		130	280	430	mV
				PIN																			M																	
YLIN	Video linearity	SG 32	a 100k 0.5V	SW																2																			−0.9		0.1	dB
				PIN																			M																	
YN OISU	Video noise			SW																		1																—	—	30	mVP-P
				PIN																			M																	
NR1	YNR coring 1	SG 32	a 100k 50mV	SW																		1																2.0	3.2	4.4	dB
				PIN																			M																	
—	Chroma signal processing system standard conditions	SG 6	i	SW	1	1	1	2	2	1	1	1	2	2	2	1	2	2	1	2	1	1	2	2	1	1	1											—	—	—	
				PIN																																					
ACC1	ACC characteristic 1	SG 18	e 0dB	SW																																			310	480	655	mVP-P
				PIN										M																											
ACC2	ACC characteristic 2	SG 18	e −20dB	SW																																			−6	−1	0	dB
				PIN										M																											
ACC3	ACC characteristic 3	SG 18	E + 6dB	SW																																			−2	0	+2	dB
				PIN										M																											
KIL1	Killer operation input level 1	SG 18	e −20dB	SW																																			4.0	—	—	V
				PIN												M																									

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Input Signal SG Pin	Input Signal Condition	SW condition	S1	S2	S5	S6	S7	S8	S12	S14	S15	S18	S19	S28	S29	S30	S31	S32	S33	Sa34	Sb34	S37	S43	S44	S45					Limits Min.	Limits Typ.	Limits Max.	Unit
				PIN condition	P1	P2	P3	P4	P5	P6	P7	P8	P10	P12	P13	P15	P18	P19	P21	P22	P23	P26	P29	P31	P35	P36	P37	P47	P49	P52	P42				
KIIL2	Killer operation input level 2	SG 18	e −40dB	SW																												–	–	3.5	V
				PIN												M																			
DKIL	Killer color residual	SG 18	e eb= −∞dB	SW																												–	–	60	mVP-P
				PIN											M																				
T1	Tint control 1	SG 18	0	SW																												−60	−40	−20	deg
				PIN											M																				
T2	Tint control 2	SG 18	0	SW																												28	48	68	deg
				PIN										M																					
TT	Tint control range	SG 18	–	SW																												70	68	110	deg
				PIN																															
FL	FLESH	SG 18	0	SW																												0.5	4	10	deg
				PIN										M																					
AIQ	Demodulation angle	SG 18	–	SW																												80	90	100	deg
				PIN																															
RIQ	Demodulation rate	SG 18	h	SW																												065	0.9	1.25	–
				PIN										M	M																				
–	Interface system standard conditions	SG6 SG12	i a	SW	1	1	1	2	2	1	3	3	2	2	2	1	2	2	1	2	1	1	2	2	1	1	1					–	–	–	–
				PIN																															
MTX1	Matrix gain 1	SG 12	a	SW								2																				6.9	9.0	12.0	dB
				PIN																		M													
MTX2	Matrix gain 2	SG 12	a	SW								2																				8.0	11.0	14.0	dB
				PIN																M															
MTX3	Matrix gain 3	SG 12	a	SW								2																				−8.0	−5.0	−2.0	dB
				PIN																	M														
MTX4	Matrix gain 4	SG 12	a	SW								2																				5.0	8.0	11.0	dB
				PIN																		M													
MTX5	Matrix gain 5	SG 12	a	SW									2																			8.0	11.0	14.0	dB
				PIN																M															
MTX6	Matrix gain 6	SG 12	a	SW									2																			−0.8	2.2	5.2	dB
				PIN																	M														
MTX7	Matrix gain 7	SG 12	a	SW									2																			−0.3	2.7	5.7	dB
				PIN																		M													
CC1	Color control characteristic 1	SG 12	a	SW								2																				240	380	550	mVP-P
				PIN																		M													
CC2	Color control characteristic 2	SG 12	a	SW								2																				7	9	11	dB
				PIN																		M													
CC3	Color control characteristic 3	SG 12	a	SW								2																				–	−40	−30	dB
				PIN																		M													
CC4	Color control characteristic 4	SG 12	a	SW									2																			140	230	340	mVP-P
				PIN																		M													
CC5	Color control characteristic 5	SG 12	a	SW									2																			7	9	11	dB
				PIN																		M													
CCC	Color control characteristic 6	SG 12	a	SW									2																			–	−40	−30	dB
				PIN																		M													
CCN1	Contrast control characteristic 1	SG 28	a	SW													2															3.0	3.5	4.0	VP-P
				PIN																M	M	M													

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Input Signal		Test conditions																																				Limits			Unit
		SG Pin	Condition	SW condition	S 1	S 2	S 5	S 6	S 7	S 8	S 12	S 14	S 15	S 18	S 19	S 28	S 29	S 30	S 31	S 32	S 33	Sa 34	Sb 34	S 37	S 43	S 44	S 45														Min.	Typ.	Max.	
				PIN condition	P 1	P 2	P 3	P 4	P 5	P 6	P 7	P 8	P 10	P 12	P 13	P 15	P 18	P 19	P 21	P 22	P 23	P 26	P 29	P 31	P 35	P 36	P 37	P 47	P 49	P 52	P 42													
CCN4	Contrast control characteristic 4	SG 28	a	SW												2																								−7.6	−4.6	−1.6	dB
				PIN															M	M	M																					
CCN7	Contrast control characteristic 7	SG 28	a	SW												2																								−29	−22	−14	dB
				PIN															M	M	M																					
CCN10	Contrast control characteristic 10	SG 28	a	SW												2																								−	−44	−34	dB
				PIN															M	M	M																					
BR1	Brightness control characteristic 1			SW												1				2																				1.75	2.03	2.30	V
				PIN															M	M	M																					
BR4	Brightness control characteristic 4			SW												1				2																				1.35	1.55	1.75	V
				PIN															M	M	M																					
BR7	Brightness control characteristic 7			SW												1				2																				2.30	2.55	2.70	V
				PIN															M	M	M																					
OSD4	ODS level 4	SG42 SG30	n 3VP-P	SW												1								2																3.8	5.0	6.4	V
				PIN															M																							
OSD8	ODS level 8	SG42 SG32	n 3VO-P	SW														1							2															3.8	5.0	6.4	V
				PIN																M																						
OSD12	ODS level 12	SG42 SG32	n 3VO-P	SW														1									2													3.8	5.0	6.4	V
				PIN																	M																						
ACL	ACL			SW												2				1																				330	550	770	mV
				PIN																		M																					
DAG1	Drive amplifier gain 1	SG 28	a 0.5V	SW												2																								1.3	1.9	2.7	VP-P
				PIN																M																						
DAG2	Drive amplifier gain 2	SG 28	a 0.5V	SW												2																								−3.4	−2.4	−1.4	dB
				PIN															M																							
DAG3	Drive amplifier gain 3	SG 28	a 0.5V	SW												2																								−3.4	−2.4	−1.4	dB
				PIN																	M																						
DAG4	Drive amplifier gain 4	SG 28	a 0.5V	SW												2																								1.3	1.9	2.7	VP-P
				PIN																M																						
DAG5	Drive amplifier gain 5	SG 28	a 0.5V	SW												2																								2.4	3.4	4.4	dB
				PIN															M																							
DAG6	Drive amplifier gain 6	SG 28	a 0.5V	SW												2																								2.4	3.4	4.4	dB
				PIN																	M																						
CUT1	Cutoff 1			SW																																			2.0	2.3	2.6	V
				PIN															M	M	M																						
CUT4	Cutoff 4			SW																																			2.35	2.65	2.95	V
				PIN															M	M	M																						
CUT7	Cutoff 7			SW																																			1.65	1.95	2.25	V
				PIN															M	M	M																						
RGB BW1	RGB frequency characteristic 1	SG 28	a f=4M	SW												2																								−4	−	−	dB
				PIN															M	M	M																						
OSD S1	OSD speed 1	SG 43	n	SW														3							2	2	2													−	−	100	nsec
				PIN															M	M	M																						
FAST S1	FAST BLK speed 1	SG 30	n	SW														1							3	3	3													−	−	100	nsec
				PIN															M	M	M																						
WP	White peak det. 1	SG 28	n 0.5V	SW														2		1																				3.0	3.6	4.2	V
				PIN																						M																

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Input Signal		Test conditions																																		Limits			Unit
		SG Pin	Condition	SW condition	S1	S2	S5	S6	S7	S8	S12	S14	S15	S18	S19	S28	S29	S30	S31	S32	S33	Sa34	Sb34	S37	S43	S44	S45												Min.	Typ.	Max.	
				PIN condition	P1	P2	P3	P4	P5	P6	P7	P8	P10	P12	P13	P15	P18	P19	P21	P22	P23	P26	P29	P31	P35	P36	P37	P47	P49	P52	P42											
BLK W1	Blanking width 1		a	SW																																8	12	16	μsec
				PIN															M	M	M																		
—	Deflection system standard conditions	SG 6	i	SW	1	1	1	2	2	1	1	1	2	2	2	1	2	2	1	1	1	1	2	2	1	1	1														
				PIN																																					
FH	Horizontal signal oscillation frequency			SW				3	3																													15.5	15.734	16.1	MHz
				PIN	M					9V	9V																													
V46 MINF	Horizontal signal frequency starting voltage			SW				3	3																											7.5 v		13	15	17	MHz
				PIN	M					9V	9V																													
FPH1	Horizontal signal pull-in range 1	SG 6	k	SW																																—	—	−500	Hz
				PIN	M																																	
FPH2	Horizontal signal pull-in range 2	SG 6	k	SW																																500	—	—	Hz
				PIN	M																																	
TH	Horizontal signal pulse width	SG 6	i	SW																																20	24	26	μsec
				PIN	M																																	
VH	Horizontal signal output voltage	SG 6	i	SW																																4.0	4.7	5.4	V
				PIN	M																																	
FV	Vertical signal oscillation frequency			SW				3	3																													51.5	53.0	55.5	Hz
				PIN																																			
TV	Vertical signal pulse width	SG 6	i	SW																																300	350	—	μsec
				PIN																																			
FPV	Vertical signal pull-in range	SG 6	i	SW																																65	67.5	70	Hz
				PIN																																			
TGP	Burst gate pulse position	SG 6	i	SW															2																	3.8	5.8	7.8	μsec
				PIN																					M														
TBP1	Burst gate timing 1	SG 6	i	SW															2																	0.2	0.4	0.6	μsec
				PIN																					M														
TBP2	Burst gate timing 2	SG 6	i	SW															2																	2.8	3.7	4.6	μsec
				PIN																					M														
FBP	FBP IN TH voltage	SG 6	i	SW						6																										5	—	—	V
				PIN							5V								M																				
VOH	Vertical signal output HI voltage	SG 6	i	SW																																7.0	8.0	9.0	V
				PIN																															M				
VOL	Vertical signal output LO voltage			SW																																—	—	0.5	V
				PIN																															M				
HISS	Horizontal signal sync separation input circuit current			SW				3	3																												100	—	—	μA
				PIN																																			
VISS	Vertical signal sync separation input circuit current			SW				3	3																												100	—	—	μA
				PIN																															M				
X	X-ray protection operation voltage			SW		2																														0.4	0.7	1.0	V
				PIN	M																																	
V3L	Coincidence detection LO voltage			SW					3	3																											—	—	0.5	V
				PIN				M																															
AFC	AFC gain	SG 6	i	SW				2																													1.1	1.4	1.8	V
				PIN					M																														
HP	Horizontal signal phase	SG 6	i	SW																																3.2	4.7	6.2	μsec
				PIN	M																																	

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Input Signal		Test conditions																																		Limits			Unit
		SG Pin	Condition	SW condition	S1	S2	S5	S6	S7	S8	S12	S14	S15	S18	S19	S28	S29	S30	S31	S32	S33	Sa34	Sb34	S37	S43	S44	S45												Min.	Typ.	Max.	
				PIN condition	P1	P2	P3	P4	P5	P6	P7	P8	P10	P12	P13	P15	P18	P19	P21	P22	P23	P26	P29	P31	P35	P36	P37	P47	P49	P52	P42											
VW	Minimum vertical signal sync detection width	SG 6	i	SW																																		20	–	–	Hz
				PIN																																	M				
VV	Minimum vertical signal sync inpu voltage	SG 6	i	SW																																		–	60	–	Hz
				PIN																																	M				
SS1	Service SW 1			SW																																		–	–	–	
				PIN																																	M				
SS2	Service SW 2			SW																																		–	–40	–	dB
				PIN															M																						

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Sub address	02H			03H	04H	05H	07H	08H	0AH		0BH	0CH	0DH	0EH	0FH	10H	11H					12H			
		Function	D1	D2		SH	CON	COR	COL	TIM	HP	γ	BR1	D(R)	C(G)	C(R)	C(G)	C(B)	B(R)	B(G)	B(B)	FLE	DEM	SER	AF1	AUT	YNR
–	Video signal processing system standard conditions	Sub address	0								4								2					11			
		Function	0	0		32	64	64	4	64	0	4	64	32	32	127	127	127	ON 0	ON 0	ON 0	OFF 1	100% 0	OFF 1	HI 0	OFF 1	OFF 1
YMAX 1	Video maximum gain 1	Sub address																									
		Function																									
GY1	Video standard gain 1	Sub address																									
		Function																									
YT MAX	Video tone characteristic 1	Sub address	40																								
		Function	2	2		64																					
YT MIN	Video tone characteristic 2	Sub address	40																								
		Function	2	2		0																					
BLST3	Black expansion 3	Sub address																									
		Function																									
BLST4	Video expansion 4	Sub address																						1			
		Function																						ON 1	LOW 0	ON 0	ON 0
YBV	Video frequency characteristic	Sub address																									
		Function																									
DC REG1	DC regeneration rage 1	Sub address																									
		Function																									
DC REG2	DC regeneration rage 2	Sub address																									
		Function																									
YLIN	Video linearity	Sub address																									
		Function																									
YN OISU	Video noise	Sub address																									
		Function																									
NR1	YNR coring 1	Sub address						A0																A2			
		Function						0																ON 1	LOW 0	OFF 0	ON 0
–	Chroma signal processing system standard conditions	Sub address	0								4								2					11			
		Function	0	0		32	64	4	64	64	0	4	64	32	32	127	127	127	ON 0	ON 0	ON 0	OFF 1	90° 0	OFF 1	LO 0	OFF 1	OFF 1
ACC1	ACC characteristic 1	Sub address																									
		Function																									
ACC2	ACC characteristic 2	Sub address																									
		Function																									

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter		Sub address	02H			03H	04H	05H	07H	08H	0AH		0BH	0CH	0DH	0EH	0FH	10H	11H					12H			
			Function	D1	D2		SH	CON	COR	COL	TIM	HP	γ	BR1	D(R)	C(G)	C(R)	C(G)	C(B)	B(R)	B(G)	B(B)	FLE	DEM	SER	AF1	AUT	YNR
ACC3	ACC characteristic 3		Sub address																									
			Function																									
KIL1	Killer operation input level 1		Sub address																									
			Function																									
KIL2	Killer operation input level 2		Sub address																									
			Function																									
DKIL	Killer color residual		Sub address																									
			Function																									
T1	Tint control 1		Sub address																									
			Function								0																	
T2	Tint control 2		Sub address																									
			Function								127																	
TT	Tint control range		Sub address																									
			Function																									
FL	FLESH		Sub address																	0/2								
			Function								80/96									ON 0	ON 0	ON 0	OFF /ON	90° 0				
ALQ	Regeneration angle		Sub address																									
			Function																									
RIQ	Regeneration ratio		Sub address																									
			Function																									
—	Interface system standard conditon		Sub address	0								4								112					11			
			Function	0	0		32	64	4	64	64	0	4	64	32	32	127	127	127	OFF 1	OFF 1	OFF 1	ON 0	90° 0	OFF 1	LO 0	OFF 1	OFF 1
MTX1	Matrix gain 1		Sub address																	113								
			Function																	OFF 1	OFF 1	OFF 1	ON 0	100° 0				
MTX2	Matrix gain 2		Sub address																									
			Function																									
MTX3	Matrix gain 3		Sub address																									
			Function																									
MTX4	Matrix gain 4		Sub address																									
			Function																									
MTX5	Matrix gain 5		Sub address																									
			Function																									
MTX6	Matrix gain 6		Sub address																									
			Function																									
MTX7	Matrix gain 7		Sub address																									
			Function																									
CC1	Color control characteristic 1		Sub address																									
			Function																									
CC2	Color control characteristic 2		Sub address																									
			Function							0																		
CC3	Color control characteristic 3		Sub address																									
			Function							127																		
CC4	Color control characteristic 4		Sub address																									
			Function																									
CC5	Color control characteristic 5		Sub address																									
			Function							0																		
CC6	Color control characteristic 6		Sub address																									
			Function							127																		

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter		02H			03H	04H	05H	07H	08H	0AH		0BH	0CH	0DH	0EH	0FH	10H	11H					12H			
		Function	D1	D2		SH	CON	COR	COL	TIM	HP	γ	BR1	D(R)	C(G)	C(R)	C(G)	C(B)	B(R)	B(G)	B(B)	FLE	DEM	SER	AF1	AUT	YNR
CCN1	Contrast control characteristic 1	Sub address																									
		Function					0																				
CCN4	Contrast control characteristic 4	Sub address																									
		Function					64																				
CCN7	Contrast control characteristic 7	Sub address																									
		Function					126																				
CCN10	Contrast control characteristic 10	Sub address																									
		Function					OFF 127																				
BR1	Brightness control characteristic 1	Sub address																									
		Function																									
BR4	Brightness control characteristic 4	Sub address																									
		Function											0														
BR7	Brightness control characteristic 7	Sub address																									
		Function											127														
OSD4	OSD level 4	Sub address																									
		Function																									
OSD8	OSD level 8	Sub address																									
		Function																									
OSD12	OSD level 12	Sub address																									
		Function																									
ACL	ACL	Sub address																									
		Function							0																		
DAG1	Drive amplifier gain 1	Sub address																									
		Function												0	0												
DAG2	Drive amplifier gain 2	Sub address																									
		Function												0	0												
DAG3	Drive amplifier gain 3	Sub address																									
		Function												0	0												
DAG4	Drive amplifier gain 4	Sub address																									
		Function												63	63												
DAG5	Drive amplifier gain 5	Sub address																									
		Function												63	63												
DAG6	Drive amplifier gain 6	Sub address																									
		Function												63	63												
CUT1	Cutoff 1	Sub address																									
		Function														64	64	64									
CUT4	Cutoff 4	Sub address																									
		Function														0	0	0									
CUT7	Cutoff 7	Sub address																									
		Function														127	127	127									
RGB BW1	RGB frequency characteristic 1	Sub address																	112								
		Function																	OFF 1	OFF 1	OFF 1	ON 0	ON 0				
OSD S1	OSD speed 1	Sub address																									
		Function																									
FAST S1	FAST BLK speed 1	Sub address																									
		Function																									
WP	White peak det. 1	Sub address																									
		Function																									

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter		02H			03H	04H	05H	07H	08H	0AH		0BH	0CH	0DH	0EH	0FH	10H	11H					12H			
		Sub address																									
		Function	D1	D2		SH	CON	COR	COL	TIM	HP	γ	BR1	D(R)	C(G)	C(R)	C(G)	C(B)	B(R)	B(G)	B(B)	FLE	DEM	SER	AF1	AUT	YNR
BLKK W1	Blanking width 1	Sub address																									
		Function																									
—	Deflection system standard conditions	Sub address	0								4								115					11			
		Function	0	0		32	64	4	64	64	0	4	64	32	32	127	127	127	OFF 1	OFF 1	OFF 1	ON 1	100% 0	OFF 1	LO 0	OFF 1	OFF 1
FH	Horizontal signal oscillation frequency	Sub address																									
		Function																									
V46 MINF	Horizontal signal oscillation starting voltage	Sub address																									
		Function																									
FPH1	Horizontal signal pull-in range 1	Sub address																									
		Function																									
FPH2	Horizontal signal pull-in range 2	Sub address																									
		Function																									
TH	Horizontal signal pulse width	Sub address																									
		Function																									
VH	Horizontal signal output voltage	Sub address																									
		Function																									
FV	Vertical signal oscillation frequency	Sub address																									
		Function																									
TV	Vertical signal pulse width	Sub address																									
		Function																									
FPV	Vertical signal pull-in range	Sub address																									
		Function																									
TGP	Burst gatte pulse position	Sub address																									
		Function																									
TBP1	Burst gate timing 1	Sub address																									
		Function																									
TB GP2	Burst gate timing 2	Sub address																									
		Function																									
FBP	FBP IN TH voltage	Sub address																						0			
		Function																						ON 0	LO 0	ON 0	ON 0
VOH	Vertical signal output HI voltage	Sub address																									
		Function																									
VOL	Vertical signal output LO voltage	Sub address																									
		Function																									
HISS	Horizontal signal sync separation input circuit current	Sub address																									
		Function																									
VISS	Vertical signal sync separation input circuit current	Sub address																									
		Function																									
X	X-ray protection votage	Sub address																									
		Function																									
V3L	Coincidence detection LO voltage	Sub address																									
		Function																									
AFC	AFC gain	Sub address																						112			
		Function																						OFF 1	HI 1	ON 0	ON 0
HP	Horizontal signal phase	Sub address									/120																
		Function									15	0															
VW	Minimum vertical signal sync detection width	Sub address																									
		Function																									

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Sub address	02H			03H	04H	05H	07H	08H	0AH		0BH	0CH	0DH	0EH	0FH	10H	11H						12H			
		Function	D1	D2		SH	CON	COR	COL	TIM	HP	γ	BR1	D(R)	C(G)	C(R)	C(G)	C(B)	B(R)	B(G)	B(B)	FLE	DEM	SER	AF1	AUT	YNR
VV	Minimum vertical signal sync input voltage	Sub address																									
		Function																									
SSI	Service SW 1	Sub address																						/3			
		Function																						ON 0	LO 0	OFF 1	OFF 1
SS2	Service SW 2	Sub address																						3			
		Function					0																	ON 0	LO 0	OFF 1	OFF 1

ELECTRICAL CHARACTERISITCS TEST METHODS

YMAX 1

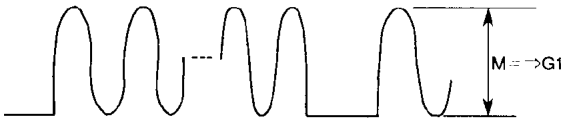
(1) Set signal a to 100kHz and 1.0V P-P, and input it via SG32.

(2) Measure pin㉙ output amplitude(P-P) ,as shown below:

GY1

(1) Set signal a to 100kHz and 0.35V P-P, and input it via SG32.

(2) Measure pin㉙ output amplitude(P-P). It is called G1.



(3)GY1=20log(G1(V_{P-P})/0.35(V_{P-P}) [dB]

YTMAX

(1) Input signal a (f=3MHz) via SG32.

(2) Measure pin ㉙ output amplitude. It is called TY1.

(3) YTMID1=20log (YT1/input amplitude) [dB]

YTMIN

(1) Input signal a (f=3MHz) via SG32.

(2) Measure pin ㉙ output ammplitude. It is called YT2.

(3) YTMID2=20log (YT2/input amplitude) [dB]

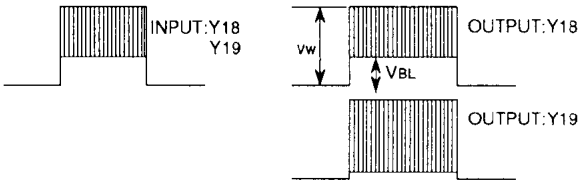
BLST3 and BLST4

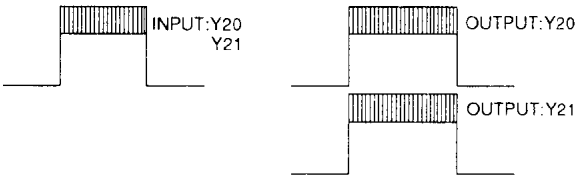
(1) Set signal c to 100kHz, V_1=0.15V and V_2=0.2V, and input it via SG32.

(2) Input signal n via SG15.

(3) Measure pin ㉙ output amplitude (voltage from pedestal to "white" peak). It is called Vw. Measure setup voltage (voltage from pedestal and sine wave bottom.) It is called V_{BL}.

(4) Calculate BLSTn as follows:BLSTn=V_{BL}/Vw×100[IRE]





YBW

(1) Set signal a to 7 MHz and 0.35V P-P, and input it via SG32.

(2) Measure pin ㉙ output amplitude (sine-wave portion). It is called YB.

(3) YBW=20log [YB (V_{P-P})/GY1 (V_{P-P})][dB]

DC REG1

(1) Set signal b to sync level 0, and input it via SG32.

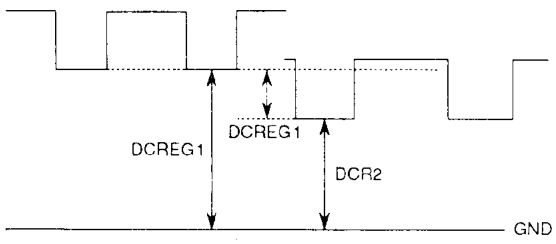
(2) Measure DC voltage at where pin ㉙ output is lowest.

DC REG2

(1) Set signal b to sync level 0, and input it via SG32.

(2) Measure DC voltage at where pin ㉙ output is lowest.This voltage is called DCR2.

(3) DCREG2=DCREG1 - DCR2



YLIN

(1) Set signal a to 100kHz and 0.7V P-P, and input it via SG32.
(2) Measure pin ㉙ output amplitude(sine wave portion). It is called YL.
(3) YLIN=20log (1-YL/2G1)[dB]

NRC1

(1) Set signal a to 100kHz and 50mV P-P, and input it via SG32.
(2) Measure pin ㉙ output amplitude. It is called NR1.
(3) NRC1=20log [NR1 (mVP-P)/50 (mVP-P)][dB]

ACC1

(1) Input signal e via SG18.
(2) Measure pin ⑫ output amplitude.

ACC2

(1) Set signal e to −20dB, and input it via SG18.
(2) Measure pin ⑫ output amplitude. It is called AC2.
(3) ACC2=20log [AC2(mVP-P)/ACC1(mVP-P)][dB]

ACC3

(1) Set signal e to +6dB, and input it via SG18.
(2) Measure pin ⑫ output amplitude. It is called AC3.
(3) ACC3=20log [AC3(mVP-P)/ACC1(mVP-P)][dB]

KIL1

(1) Set signal e to−20dB, and input it via SG18.
(2) Measure pin ⑮ DC voltage.

KIL2

(1) Set signal e to −51dB, and input it via SG18.
(2) Measure pin ⑮ DC voltage.

DKIL

(1) Set eb of signal e (burst portion) to −∞ dB, and input it via SG18.
(2) Measure pin ⑫ output amplitude.

T1

(1) Set eb of signal e (burst portion) to −∞ dB, and input it via SG18.
(2) Obtain the angle based on pin ⑫ output waveform, in the same way as for TCEN. This angle is called IT1.
(3) T1=IT1−A1

T2

(1) Set eb of signal e (burst portion) to −∞ dB, and input it via SG18.
(2) Obtain the angle based on pin ⑫ output waveform, in the same way as for TCEN. This angle is called IT2.
(3) T2=IT2−A1

TT

(1) TT=IT1−IT2

FL

(1) Input signal 0 via SG18.
(2) Obtain the angle based on pin ⑫ output waveform, in the same way as for TCEN. This angle is called IF.
(3) FL=AI−IF

AIQ

(1) AIQ=AI−AQ

RIQ

(1) Set signal h fsc to 3.679545MHz (100kHz higher than normal), and input it via SG18.
(2) Measure pin ⑫ output amplitude. It is called RI.
(3) Measure pin ⑬ output amplitude. It is called RQ.
(4) RIQ=RI/RQ

MTX1 through MTX7

(1) Set signal a to 100kHz and 0.35V P-P, and input it SG12.
(2) Measure output amplitude (sine-wave portion) under appropriate switch/data conditions. The amplitude is called MTn (n=1, 2, ... or 7).
(3) MTX1 through MTX7=20log(MTn(V P-P)/0.35(VP-P))[dB]

CC1

(1) Set signal a to 100kHz and 0.35V P-P, and input it via SG12.
(2) Measure pin ㉓ output amplitude (sine-wave portion). It is called Vcc1.
(3) Calculate CC1 as follows: CC1=20log (V cc1/input)[dB]

CC2

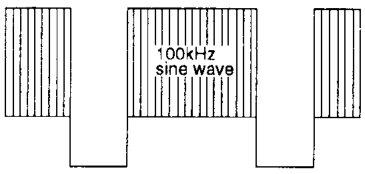
(1) Set signal a to 100kHz and 0.35V P-P, and input it via SG12.
(2) Measure pin ㉓ output amplitude (sine-wave portion). It is called CR1.
(3) CC2=20log (CB1/CC1)[dB]

CC3

(1) Set signal a to 100kHz and 0.35V P-P, and input it via SG12.
(2) Measure pin ㉓ output amplitude (sine-wave portion). It is called CR2.
(3) CC3=20log (CB2/CC1)[dB]

CC4

(1) Set signal a to 100kHz and 0.35V P-P, and input it via SG12.
(2) Measure pin ㉓ output amplitude (sine-wave portion). It is called Vcc4.
(3) CC4=20log (Vcc4/input)



COMMON OUTPUT WAVEFORM

CC5

(1) Set signal a to 100kHz and 0.35, and input it via SG12.
(2) Measure pin ㉓ output amplitude (sine-wave portion). It is called CR3.
(3) CC5=20log (CR3/Vcc4)[dB]

CC6

(1) Set signal a to 100kHz and 0.35V P-P, and input it via SG12.
(2) Measure pin ㉓ output amplitude (sine-wave portion) . It is called CR4.
(3) CC6=20log (CR4/Vcc4)[dB]

CON1

(1) Set signal a to 100kHz and 0.5V P-P, and input it via SG28.
(2) Measure pin ㉑, ㉒ and ㉓ output amplitudes (sine-wave portionn).
(3) Measure pin ㉖ voltage, It is called VCON1.

CON4

(1) Set signal a to 100kHz and 0.5V P-P, and input via SG28.
(2) Measure pin ㉑, ㉒ and ㉓ output amplitudes (sine-wave portion). The amplitudes are called, respectively, COB1, COG1 and COR1.
(3) CON4B=20log (COB1/CON1B)[dB]
(4) CON4G=20log (COG1/CON1B)[dB]
(5) CON4R=20log (COR1/CON1B)[dB]

CON7

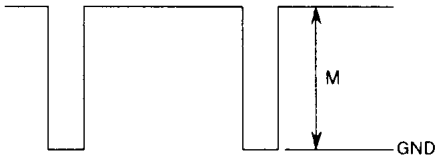
(1) Set signal a to 100kHz and 0.5V P-P, and input it via SG28.
(2) Measure pin ㉑, ㉒ and ⑬ output amplitudes (sinne-wave portion). The amplitudes are called, respectively, COB2, COG2 and COR2.
(3) CON7B=20log (COB2/CON1B)[dB]
(4) CON7G=20log (COG2/CON1B)[dB]
(5) CON7R=20log (COR2/CON1B)[dB]
(6) Measure pin ㉖. This is called VCON2.

CON10

(1) Set signal a to 100kHz and 0.5V P-P, And input it via SG28.
(2) Measure pin ㉑, ㉒ and ㉓ output amplitudes (sine-wave portion). The amplitudes are called, respectively, COB3, COG3 and COR3.
(3) CON10B=20log (COB3/CON1B)[dB]
(4) CON10G=20log (COG3/CON1B)[dB]
(5) CON10R=20log (COR3/CON1B)[dB]

BR1 through BR9

(1) Input SG6 sync signal only.
(2) Measure pin ㉑, ㉒ and ㉓ output DC voltage, except at blanking portions.



OSD4 through DC12

(1) Input SG6 sync signal only.
(2) Measure pin ㉑, ㉒ and ㉓ output DC voltages, except at blanking portions.

ACL

(1) ACL=VCON1−VCON2 [mV]

DAG1 and DAG4

(1) Set signal a to 100kHz and 0.5V P-P, and input it via SG28.
(2) Measure pin ㉒ output amplitudes (sine-wave portion) twice.

Drive Amplifier Gains: DAG2, DAG3, DAG5 and DAG6

(1) Set signal a to 100 kHz and 0.5V P-P, and input it via SG28.
(2) Measure pin ㉑ (B OUT) and pin ㉓ (R OUT) output amplitudes (sine-wave portion). Repeat the measurement. The amplitudes are called DAGB1, DAGR1, DAGB2 and DAGR2.
(3) DAG2=20log (DAGB1/DAG1)[dB]
DAG3=20log (DAGR1/DAG1)[dB]
DAG5=20log (DAGB2/DAG4)[dB]
DAG6=20log (DAGR2/DAG4)[dB]

CUT1 through CUT9

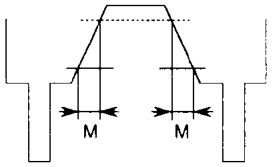
(1) Input SG6 sync signal only.
(2) Measure pin ㉑, ㉒ and ㉓ output DC voltage, except at blanking portions.

RGB BW1 through BW3

(1) Set signal a to 4MHz and 0.5 VP-P, and input it via SG28.
(2) Measure ㉑, ㉒ and ㉓ output amplitudes (sine-wave portion). They are called, respectively, BWB, BWG and BWR.
(3) RGB BW1=20log (BWB/CON4)[dB]
RGB BW2=20log (BWB/CON5)[dB]
RGB BW3=20log (BWB/CON6)[dB]

OSD S1

(1) Set signal n to 5 VO-P, and input it via SG43.
(2) Measure pin ㉑, ㉒ and ㉓ output rise time and fall time, as shown below:



FAST S1

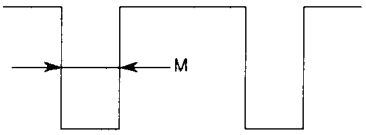
(1) Set signal n to 5VO-P, and input it via SG30.
(2) Measure pin ㉑, ㉒ and ㉓ output rise time and fall time, in the same way as for I43.

W and P

(1) Set signal a to 100kHz and 0.5V P-P, and input it via SG28.
(2) Measure pin ㊱ output DC voltage.

BLKW1 to BLKW3

(1) Measure pin ㉑, ㉒ and ㉓ horizontal signal blanking width.



FH

(1) Apply no input.
(2) Measure pin ① output frequency.

V46MIN

(1) Apply no input.
(2) Set pin ㊻ voltage to 7.5V
(3) Measure pin ① output frequency.

FPH1

(1) Set signal k to 14.0kHz and input it via SG6. Check if pin ③ DC voltage is no more than 4.0V.
(2) Increase signal k frequency gradually. Measure it when pin ③ DC voltage exceeds 5.0V. This frequency is called PL.
(3) FPH1=PL−15.734 [kHz]

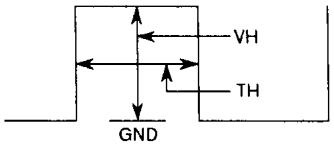
FPH2

(1) Set signal k to 17.5kHz, and input it via SG6. Check if pin ③ DC voltage is no more than 4.0V.

(2) Decrease signal k frequency gradually. Measure it when pin ③ DC voltage exceeds 5.0V. This frequency is called PH.

(3) FPH2=PH−15.734 [kHz]

TH and VH

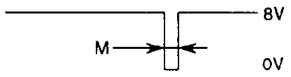


PIN ① OUTPUT WAVEFORM

FV

(1) Apply no input.

(2) Measure pin ㉜ frequency.



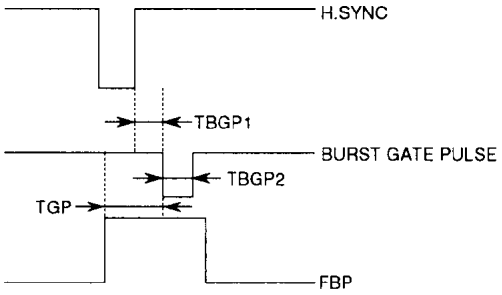
FPV

(1) Set signal 1 to 100Hz. Input via SG6.

(2) Monitoring pin ㉜ output frequency, lower signal 1 frequency.

(3) Measure the frequency when pin ㉜ output frequency meets signal 1 frequency.

TGP, TBGP1 and TBGP2



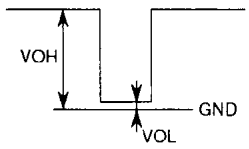
FBP

(1) Pin ㉑ output DC voltage.

VOH, VOL and HISS

(1) Flow 1μA current out of pin ⑦,and increase the current.

(2) Measure pin ① output frequency, and measure pin ⑦ outflow current when the frequency reaches a level that is below FH by 50Hz or more.



VISS

(1) Flow 1μA current out of pin ⑥, and increase the current.

(2) Measure pin ㉜ output frequency, and measure pin ⑥ outflow current when the frequency reaches a level that is above FV by 5Hz or more.

X

(1) Apply 1.0V to pin ②.

(2) Check if pin ① output is LO.

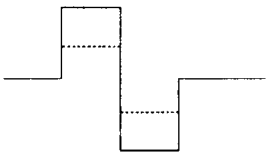
V3L

(1) Apply no input.

(2) Measure pin ③ DC voltage.

AFC

(1) Measure pin ⑤ output amplitude difference when AFC SW setting is changed. (Sub-address 12 data is changed to C6 and C2.)



HP

(1) Shift horizontal signal phase from the maximum to the minimum (by switching from A3 to B6 at sub-address 0A), and measure the change in the period between pin 1 pulse reise and sync fall.

VW

(1) Input signal 1 to 20μsec 60Hz, and input it via SG6.

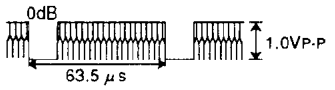
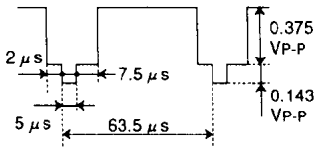
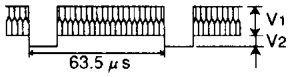
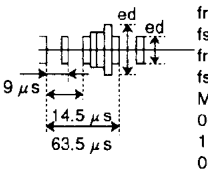
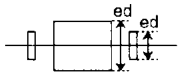
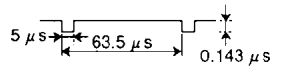
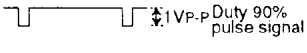
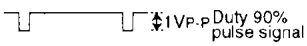
(2) Measure pin ㉜ output frequency.

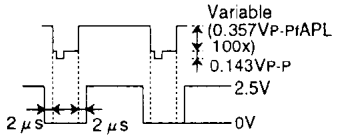
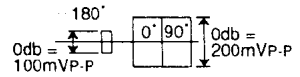
VV

(1) Set signal 1 to 60Hz and 100mV P-P, and input it via SG6.

(2) Measure pin ㉜ output frequency.

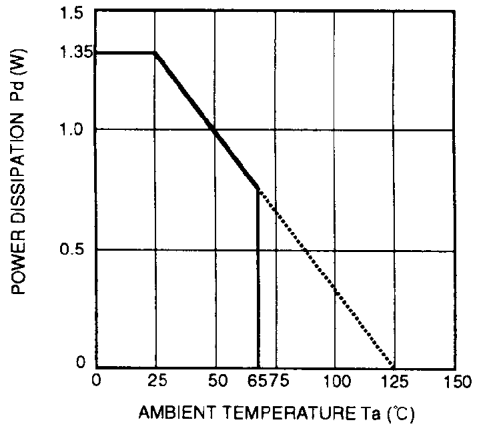
INPUT SIGNALS

Symbol	Name	Description
a	Video signal (sine wave)	
b	APL 100% reference signal	
c	Video signal (sine wave)	
d	Sine wave	200mVP-P=0dB Frequency should be variable.
e	Chroma standard signal (color bar)	 fss: Burst signal frequency fsc: Chroma signal frequency fss=fsc=3.579545 MHz 0dB:eb= 100mVP-P 0dB:ee= 200mVP-P
f	Chroma signal-1	 fss=fsc=3.579545 MHz (frequency) 0dB:eb= 100mVP-P 0dB:ee= 200mVP-P
g	Chroma signal-2	Compared with chroma signal-1(f), both burst and chroma frequencies are variable with this signal.
h	Chroma signal-3	The same as chroma signal1-1 (f), except that fsc=5.529545MHz. (fss=3.579545MHz)
i	Standard reference signal	
j	APL 50% reference signal	
k	Periodic signal 1	
l	Periodic signal 2	
m	5MHz sine wave	0dB→100mVP-P

Symbol	Name	Description
n	Blanking pulse	
o	0° 90° chroma signal	

TYPICAL CHARACTERISTICS

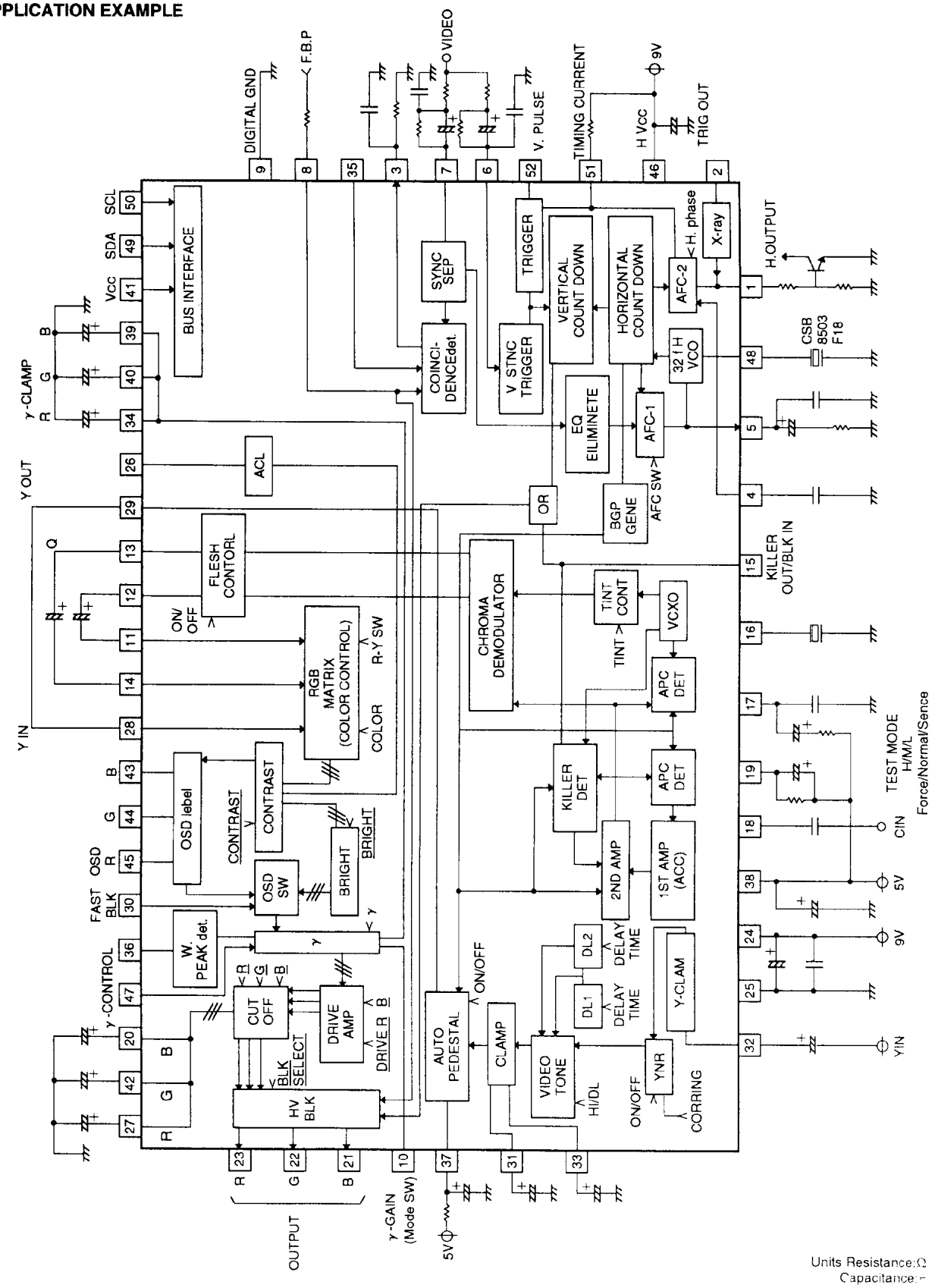
THERMAL DERATING (MAXIMUM RATING)



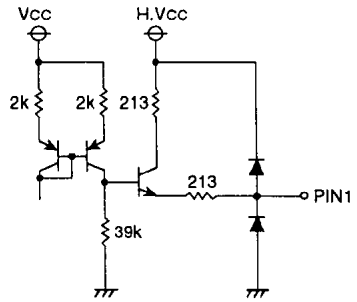
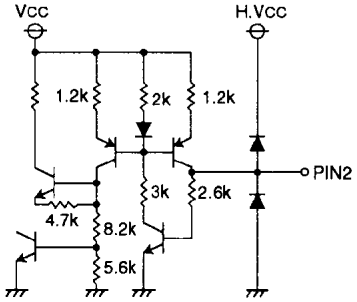
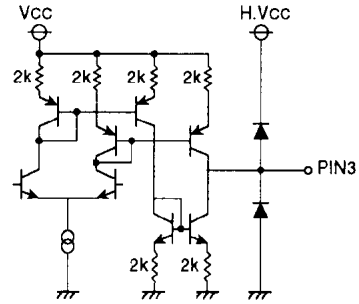
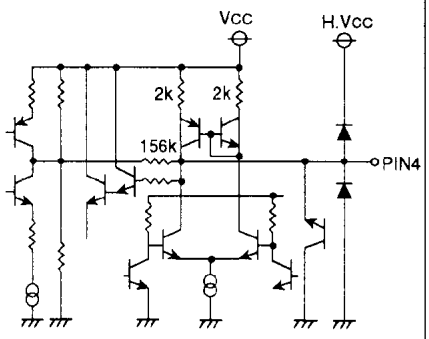
M52300BSP

NTSC VIDEO CHROMA DEFLECTION PROCESSOR

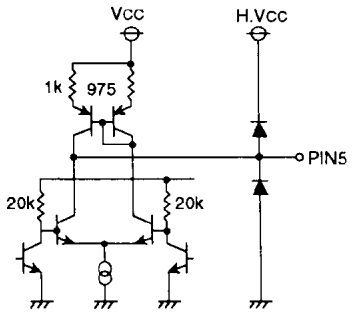
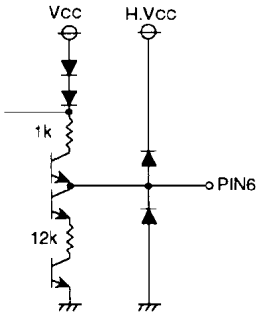
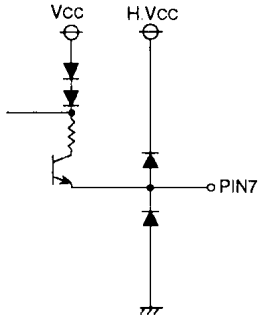
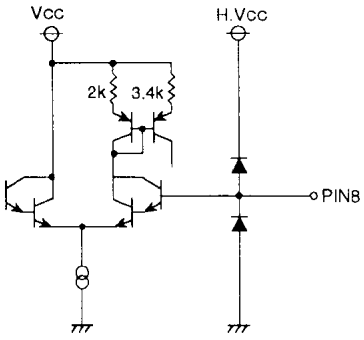
APPLICATION EXAMPLE



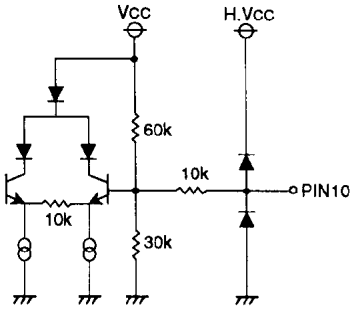
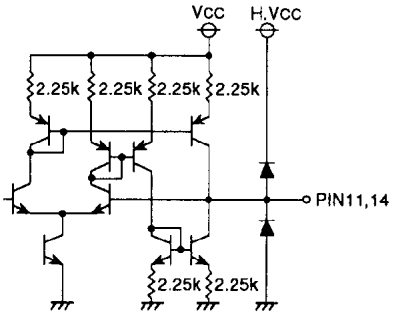
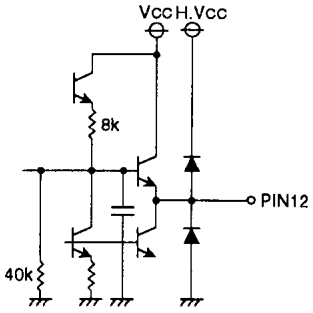
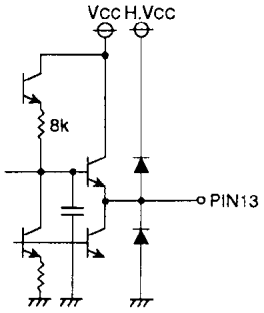
DESCRIPTION OF PIN

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins	DC voltage
①	H.OUT	———		———
②	X-RAY PROTECTOR FILTER	———		———
③	COINCI-DENCE DET.OUT	———		———
④	AFC-2 FILTER	———		4.5V

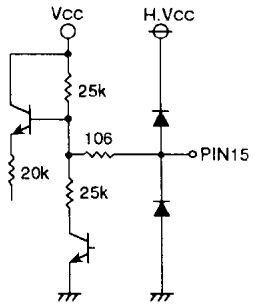
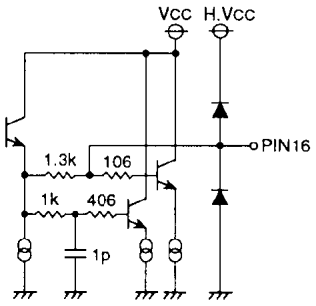
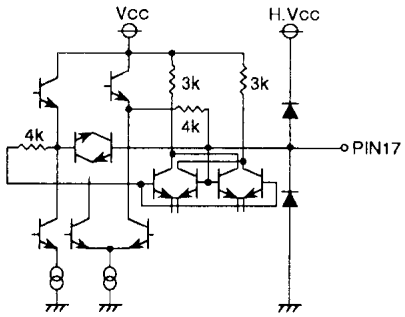
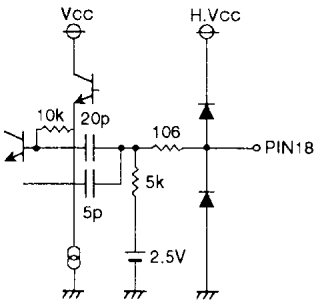
DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins	DC voltage
⑤	AFC-1 FILTER	———		6.3V
⑥	V.SYNC SEP.IN	———		6.8V
⑦	H.SYNC SEP.IN	———		6.5V
⑧	FBP IN	———		———

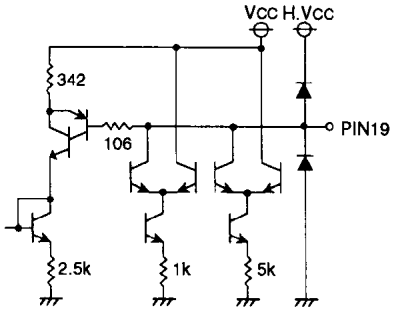
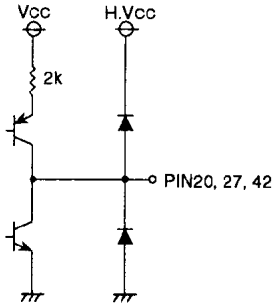
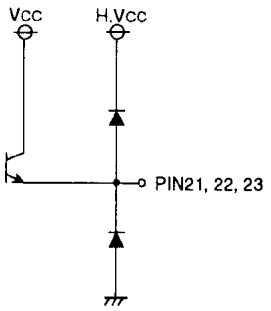
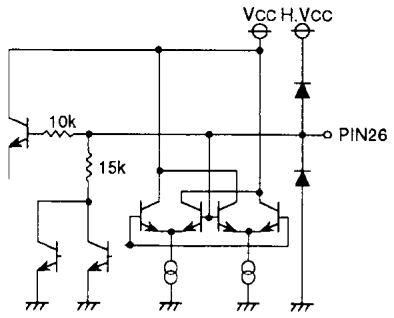
DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins	DC voltage
⑨	DIGITAL GND	———	———	———
⑩	γ-GAIN	———		3.0V
⑪ ⑭	I IN Q IN	———		3.0V
⑫	I OUT	———		2.5V
⑬	Q OUT	———		2.5V

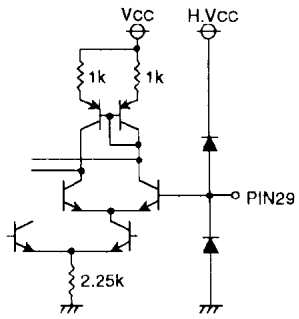
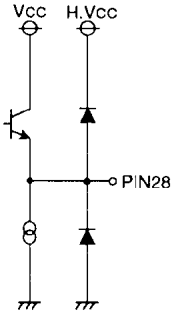
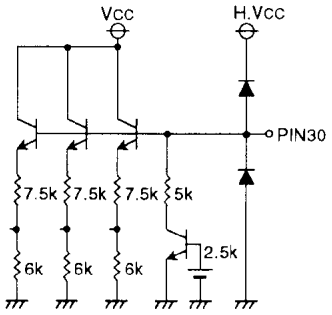
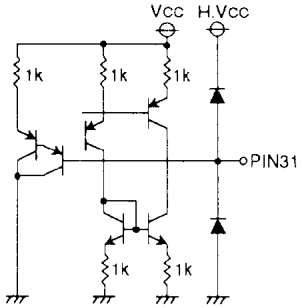
DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins	DC voltage
⑮	KILL/BLK	———		2.5V
⑯	X-TAL	3.58MHz of X-TAL		3.0V
⑰	APC FILTER	———		3.0V
⑱	CHROMA IN	———		———

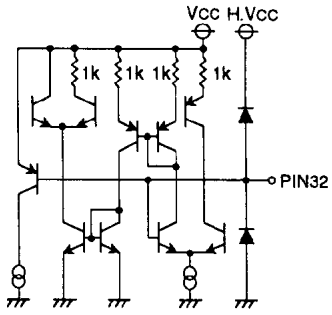
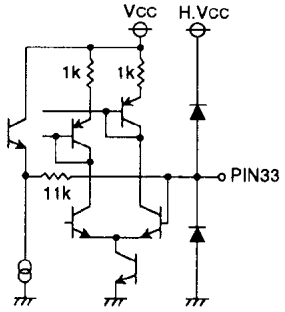
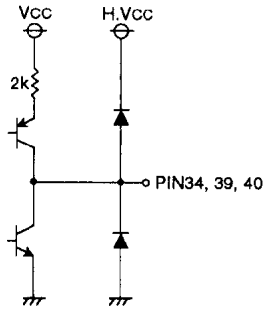
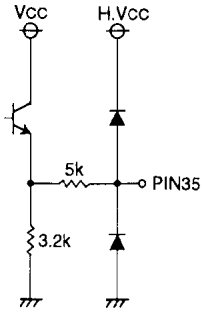
DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins	DC voltage
⑲	ACC FILTER	———		3.6V
⑳ ㉗ ㊷	B CLAMP R CLAMP G CLAMP	———		3.5V
㉑ ㉒ ㉓	B OUT G OUT R OUT	———		2.75V
㉔	VCD Vcc (9V)	———	———	———
㉕	VCD GND	———	———	———
㉖	ACL	———		3.0V

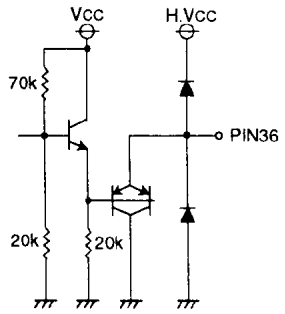
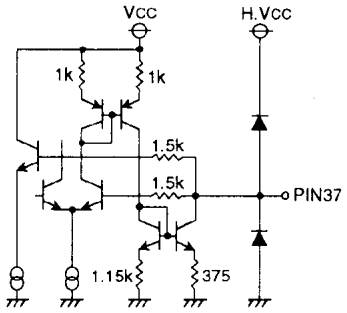
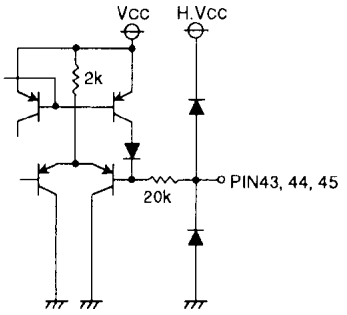
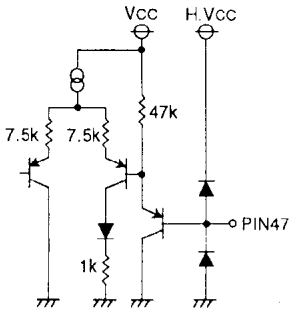
DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins	DC voltage
㉘	MTX Y IN	———		———
㉙	Y OUT	———		3.0V
㉚	FAST BLK. IN	———		5.3V
㉛	Y CLAMP	———		———

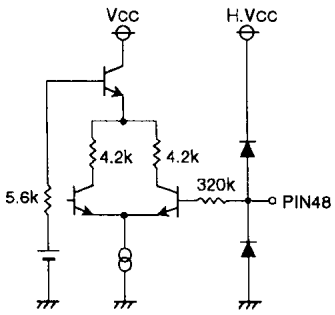
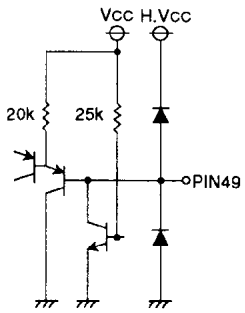
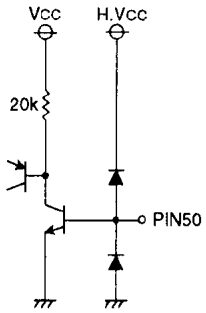
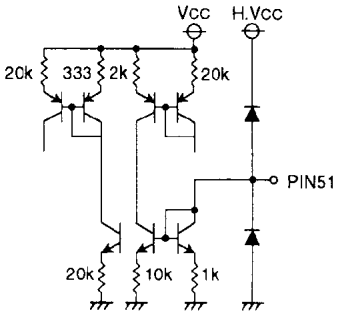
DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins	DC voltage
㉜	Y IN	———		2.5V
㉝	DC REGENE-RATION	———		2.5V
㉞ ㉟ ㊵	γ-CLAMP (R) γ-CLAMP (B) γ-CLAMP (G)	———		3.5V
㉟	BGP OUT	———		3.7V

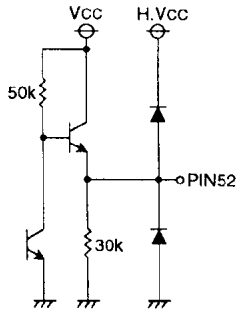
DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins	DC voltage
㊱	W.PEAK DET.	———		6.8V
㊲	AUTO PEDESTAL CLAMP	———		2.9V
㊳	VCD Vcc 5V	———	———	———
㊶	IIL GND	———	———	———
㊸ ㊹ ㊺	OSD IN (B) OSD IN (G) OSD IN (R)	———		———
㊻	H Vcc (9V)	———	———	———
㊼	γ-CONTROL	———		———

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins	DC voltage
㊽	H VCO	f=Approx. 500kHz		———
㊾	SDA	———		4.4V
㊿	SCL	———		4.4V
(51)	TIMING CURRENT	———		———

DESCRIPTION OF PIN (cont.)

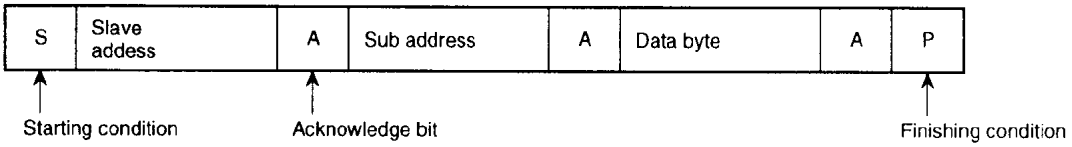
Pin No.	Name	Voltage and wave information	Peripheral circuit of pins	DC voltage
㊷	V PULSE	———		8.0V

I²C-BUS ADDRESS LIST

(1) Slave address

A6	A5	A4	A3	A2	A1	A0	R/W	
1	0	1	1	1	0	1	0	(=BAH)

(2) Data format



FUNCTIONS AND SUB ADDRESSED CONTROLLED BY I²C-BUS SYSTEM

No.	Parameter	Sub address	DC voltage							
			D7	D6	D5	D4	D3	D2	D1	D0
1	DL aperture cont. 1	02H	0	0	A25	A24	—	—	0	0
2	DL aperture cont. 2	02H	0	0	—	—	A23	A22	0	0
3	sharpness	03H	0	0	A35	A34	A33	A32	A31	A30
4	contrast cont	04H	0	A46	A45	A44	A43	A42	A41	A40
5	NR corring level	05H	0	0	0	0	0	A52	A51	A50
6	color cont	07H	0	A76	A75	A74	A73	A72	A71	A70
7	tint cont	08H	0	A86	A85	A84	A83	A82	A81	A80
8	AFC-2 H phase	0AH	0	AA6	AA5	AA4	AA3	—	—	—
9	r-position	0AH	0	—	—	—	—	AA2	AA1	AA0
10	bright cont	0BH	0	AB6	AB5	AB4	AB3	AB2	AB1	AB0
11	drive (R)	0CH	0	0	AC5	AC4	AC3	AC2	AC1	AC0
12	drive (B)	0DH	0	0	AD5	AD4	AD3	AD2	AD1	AD0
13	cut off (R)	0EH	0	AE6	AE5	AE4	AE3	AE2	AE1	AE0
14	cut off (G)	0FH	0	AF6	AF5	AF4	AF3	AF2	AF1	AF0
15	cut off (B)	10H	0	A106	A105	A104	A103	A102	A101	A100
16	BLK select (R)	11H		B-s(R)						
17	BLK select (G)	11H			B-s(G)					
18	BLK select (B)	11H				B-s(B)				
19	fresh cont on/off	11H							fresh cont	
20	demod axis	11H								demo
21	Service SW	12H					Servise SW			
22	AFC-1 speed	12H						AFC-1		
23	auto pedestal on/off	12H							auto ped	
24	YNR on/off	12H								YNR