PRELIMINARY

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Some parametric limits are subject to change.

M52304SP/52305SP

NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION

The M52304/52305SP is a NTSC system single-chip color TV signal processing semiconductor integrated circuit that is equipped with functions for processing video IF, sound IF, video, color signals, analog RGB input and deflection signals, rationalizing set production lines through I²C bus control.

FEATURES

- I²C bus control allows rationalization of production lines.
- Large-scale single-chip integration provides set rationalization, high reliability and less power dissipation.
- PLL-employed full sync detector circuit is used as a video detector circuit to improve characteristics such as DG, DP, 920kHz beat and cross color.
- Video IF signal processing is separated from sound IF sound processing to obtain an inter carrier using VCO output (PLL-SPLIT method), thus providing higher sound sensitivity and less buzzing.
- Coilless AFT.
- Filters such as built-in chroma BPF/TRAP, Y-delay line, ACC and a killer filter, etc. are used to reduce external components remarkably.
- Built-in flesh color correction improves color reproducibility.
- RGB output. Also, built-in cut-off and drive amplifier circuits allows white balance adjustment without external components.
- Countdown system is used to eliminate adjustment of horizontal and vertical oscillators.

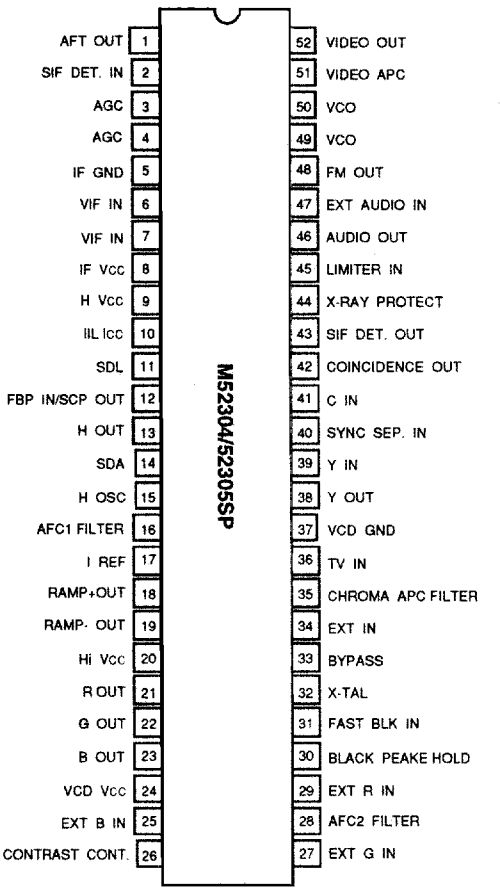
APPLICATION

NTSC system color TV set

RECOMMENDED OPERATING CONDITION

Supply voltage range .....4.5 to 5.5V (pin ⑧,㉔)
7.2 to 8.8V (pin ⑨,⑳)
Rated supply voltage .....5V (pin ⑧,㉔)
8V (pin ⑨,⑳)
Supply current range .....11.0 to 21.0mV (pin ⑩)
Rated supply current .....16.0mV (pin ⑩)

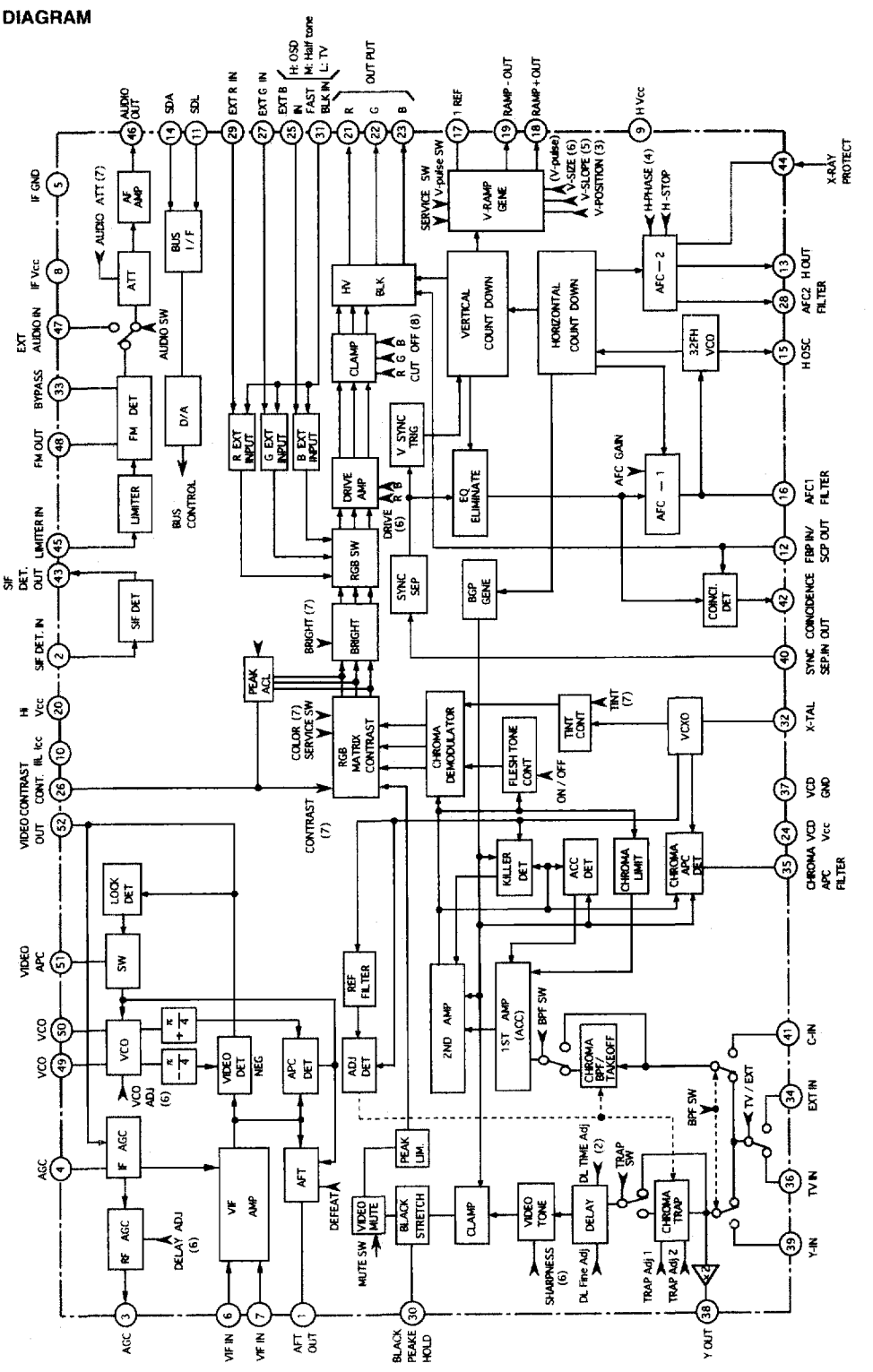
PIN CONFIGURATION (TOP VIEW)



Outline 52P4B

PRELIMINARY

BLOCK DIAGRAM



MITSUBISHI ELECTRIC

PRELIMINARY
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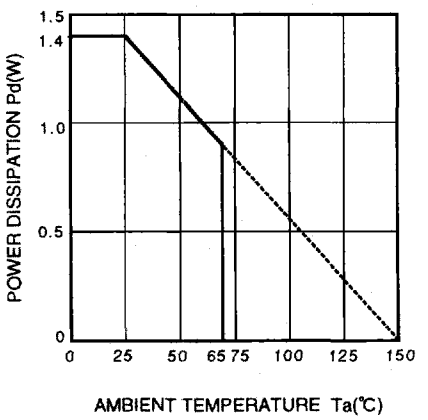
ABSOLUTE MAXIMUM RATINGS (Ta= -20℃ to 75℃ unless otherwise noted)

Symbol	Parameter	Ratings	Unit
V_{CC1}	Supply voltage	6.0, 9.0	V
P_d	Power dissipation	1.4	W
T_{opr}	Operating temperature	−20 to 65	℃
T_{stg}	Storage temperature	−40 to 150	℃
Surge	Electrostatic discharge	±200 (-150 only on pin 18 minus side)	V

Recommended supply voltage : V8, 24=5V, V9, 20, 47=8V
Operating supply voltage range : V8, 24=4.75 to 5.25V
V9, 20,47=7.6 to 8.4V
Maximum output current : Pin ⑱ 5.0mA
Pin ⑬ 5.0mA

TYPICAL CHARACTERISTICS

THERMAL DERATING (MAXIMUM RATING)



ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
VIF SYSTEM						
I_{CC8}	Pin ⑧ circuit current	Pin ⑧: Circuit current when Vcc=5V	–	35	42	mA
V_{52}	Video detection output DC voltage	Pin ④: IF AGC filter=GND	3.6	4.4	5.2	V
V_{DET}	Video detection output	VIF input : 45.75MHz, Vi=90dBu 77.78%AM	1.8	2.2	2.6	V_{P-P}
$V_{S/N}$	Video S/N	VIF input : 45.75MHz, Vi=90dBu 77.78%AM	50	56	–	dB
fv	Video frequency characteristic	VIF input f1=45.75MHz, Vi=90dBu f2=39.75+5MHz, Vi=70dBu Composite signal	5.0	6.5	–	MHz
$V_{i\,min}$	Input sensitivity	VIF input : f0=45.75MHz, Vi = Variable fm=20kHz, 77.78%AM	–	47	52	dB
$V_{i\,max}$	Maximum allowable input	VIF input : f0=45.75MHz, Vi = Variable fm=20kHz, 16%AM	102	107	–	dBu
GR	AGC control range	(Maximum allowable input) - (input sensitivity)	50	60	–	dBu
$V_{IF\,H}$	IF AGC voltage (max)	No signal input IF AGC "H"	3.9	4.5	–	V
$V_{IF\,M}$	IF AGC voltage (mid)	VIF input : f0=45.75MHz, Vi=80dBu IF AGC "M"	2.6	3.0	3.4	V
$V_{IF\,L}$	IF AGC voltage (min)	VIF input : f0=45.75MHz, Vi=110dBu IF AGC "L"	2.0	2.4	2.8	V
D_{AFT}	AFT DEFEAT voltage	Pin ④ ≧GND	3.0	4.0	5.0	V
U_{AFT}	AFT detection sensitivity	VIF input : f0=45.75±5MHz, Vi=90dBu	48	60	72	mV/kHz

ELECTRICAL CHARACTERISTICS (cont)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
V_{AFT}	AFT maximum voltage	VIF input : f0=45.75±5MHz, Vi=90dBu	7.0	7.5	–	V
V_{AFT}	AFT minimum voltage	VIF input : f0=45.75±5MHz, Vi=90dBu	–	0.5	1.0	V
V_{RFH}	RF AGC voltage (max)	VIF input : f0=45.75±5MHz, Vi=90dBu	7.0	7.5	–	V
V_{RFL}	RF AGC voltage (min)	VIF input : f0=45.75±5MHz, Vi=90dBu	–	0.5	1.0	V
PR_H	VCO pull-in range (top)	VIF input : f0=45.75±5MHz, Vi=90dBu	0.7	1.0	–	MHz
PR_L	VCO pull-in range (bottom)	VIF input : f0=45.75±5MHz, Vi=90dBu	1.3	2.0	–	MHz
PR_T	VCO pull-in range (total)	PRT=PRH+PRL	2.2	3.0	–	MHz
IM	Inter-modulation	f1=45.75MHz, Vi=90dBu f1=42.17MHz, Vi=80dBu f1=41.25MHz, Vi=90dBu	30	35	–	dBu
DG	DG	f0=45.75MHz 10-step modulated signal Sync=28.6%, m=87.5% video modulation Sync chip level 90dBu	–	2	5	%
DP	DP	f0=45.75MHz 10-step modulated signal Sync=28.6%, m=87.5% video modulation Sync chip level 90dBu	–	2	5	deg
SR	SYNC ratio	f0=45.75MHz 10-step modulated signal Sync=28.6%, m=87.5% video modulation Sync chip level 90dBu	25.0	28.5	32.0	%
$V_{4.5M}$	SIF detection 4.5MHz output 1	VIF input : 45.75MHz, Vi=90dBu SIF Det input : 41.25MHz, Vi=80dBu	95	100	105	dBu
$V_{4.5H}$	SIF detection 4.5MHz output 2	VIF input : 45.75MHz, Vi=90dBu SIF Det input : 41.25MHz, Vi=100dBu	95	100	105	dBu
R_{VIF}	VIF input resistance	No signal input	–	1.2	–	Kohm

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
C_{VIF}	VIF input capacitance	No signal input	—	4.0	—	pF
R_{SIF}	SIF input resistance	No signal input	—	1.5	—	Kohm
C_{SIF}	SIF input capacitance	No signal input	—	4.0	—	pF
SIF SYSTEM						
V_{46}	AF output DC voltage	No signal input	2.5	2.9	3.3	V
A_{DO}	AF direct output	f0=4.5MHz±25kHz dev Vi=100dBu, fm=400Hz	250	360	470	mV rms
A_{MAX}	AF maximum output	f0=4.5MHz±25kHz dev Vi=100dBu, fm=400Hz	500	720	940	mV rms
ATT	ATT maximum attenuation	Pin ㊻ : Sound output Maximum attenuation at ATT Min.	60	70	—	dB
THD	AF output distortion	f0=4.5MHz±25kHz dev Vi=100dBu, fm=400Hz	—	0.5	1.5	%
LIM	Input limiting sensitivity	f0=4.5MHz±25kHz dev Vi=100dBu, fm=400Hz	—	42	52	dBu
AMR	AMR	f0=4.5MHz Vi=100dBu 30%AM, fm=400Hz	40	55	—	dB
$A_{S/N}$	Audio S/N	f0=4.5MHz±25kHz dev Vi=100dBu, fm=400Hz	50	60	—	dB
CHROMA SYSTEM						
I_{CC24}	Pin ㉔ circuit current	Pin ㉔: Circuit current when Vcc=5V	—	60	80	mA
C_{MAX}	Modulated maximum output	Pin ㉞: Standard color bar signal input Color & contrast Max Pin ㉓: B output measurement	3.6	4.0	4.4	V_{PP}

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
C_{TYP}	Modulated standard output	Pin ㉞: Standard color bar signal input Color & contrast center Pin ㉓: B output measurement	1.8	2.0	2.2	V_{PP}
A_{CC1}	ACC characteristic 1	Pin ㉞: +6dB color bar signal input Color & contrast center Pin ㉓: B output measurement	−3	0	3	dB
A_{CC2}	ACC characteristic 2	Pin ㉞: -20dB color bar signal input Color & contrast center Pin ㉓: B output measurement	−6	−3	0	dB
V_{KILL}	Killer operation input level	Pin ㉞: Color bar signal input (variable) Color & contrast center Pin ㉓: B output measurement	−50	−45	−40	dB
Kill	Killer color residual	Pin ㉞: Color bar signal input (variable) Color & contrast center Pin ㉓: B output color residual measurement	—	30	60	mV_{P-P}
Leak	Modulated output carrier leak	Pin ㉞: Standard color bar signal input Color Max & contrast center Pin ㉓: B output carrier leak measurement	—	50	100	mV_{P-P}
C_{Cmax}	Color control characteristic 1	Pin ㉞: Standard color bar signal input Color Max & contrast center Pin ㉓: B output measurement (ratio to color center)	2.0	4.0	8.0	dB
C_{Cmin}	Color control characteristic 2	Pin ㉞: Standard color bar signal input Color Min & contrast center Pin ㉓: B output measurement (ratio to color center)	—	−30	−25	dB
P_{IQ}	Modulated phase angle	Pin ㉞: Standard color bar signal input Color center & contrast center Measurement of modulated phase angle	80	90	100	deg
I/Q	Modulation ratio	Pin ㉞: Standard color bar signal input Color Min & contrast center Measurement of I/Q ratio	0.84	1.14	1.14	—
APC	APC pull-in range	Pin ㉞: Standard color bar signal input Color & contrast center Pin ㉓: APC pull-in range when burst is variable	±300	±600	—	Hz
TC_1	TINT control characteristic 1	Pin ㉞: Standard color bar signal input Color & contrast center, when varying TINT Pin ㉑,㉒,㉓: Color output phase change measurement	+30	+45	+60	deg
TC_2	TINT control characteristic 2	Pin ㉞: Standard color bar signal input Color & contrast center, when varying TINT. Pin ㉑,㉒,㉓: Color output phase change measurement	−30	−45	−60	deg
R/B	Modulation ratio R/B	Pin ㉞: Standard color bar signal input Color, contract & TINT center Pin ㉑,㉓: Output amplitude ratio	0.80	0.84	0.90	—

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
G/B	Modulation ratio G/B	Pin ㉞: Standard color bar signal input Color, contrast, TINT center Pin ㉒,㉓: Output amplitude ratio	0.25	0.29	0.33	—
VIDEO & RGB INTERFACE SYSTEMS						
I_{CC20}	Pin ⑳ circuit current	Pin ⑳: Circuit current when Vcc=8V	—	10	13	mA
Y_{MAX}	Video maximum output	Pin ㊱: Standard Y signal 1V_{P-P} input TV mode, contrast Max Pin ㉑,㉒,㉓: Output Y amplitude measurement	3.4	4.0	4.4	V_{PP}
GY	Video standard gain	Pin ㊱: Standard Y signal 1V_{P-P} input TV mode, contrast Typ Pin ㉑,㉒,㉓: Output Y amplitude measurement	2.1	2.5	3.2	V_{PP}
f_{VY}	Video frequency characteristic	Pin ㊱: 100kHz/5MHz Y signal 1V_{P-P} input TV mode, contrast, sharpness Typ Pin ㉒: Output Y amplitude measurement $\frac{V\ 5MHz}{v100kHz}$	−4	−2	—	dB
GY_{2A}	x2 amplifier standard output	Pin ㊱: Standard Y signal 1V_{P-P} input TV mode Pin ㊳: Output Y amplitude measurement	1.4	2.0	2.6	V_{PP}
f_{2A}	x2 amplifier frequency characteristic	Pin ㊱: 100kHz/5MHz Y signal 1V_{P-P} input TV mode Pin ㊳: Output Y amplitude measurement $\frac{V\ 5MHz}{v100kHz}$	−4	−2	—	dB
G_{TRAP}	Chroma TRAP attenuation	Pin ㊱: Standard color bar signal 1V_{P-P} input TV mode, contrast, color Typ, trap Pin ㉒: Output 3.58M attenuation measurement $\frac{V\ ON}{V\ OFF}$	—	−30	−25	dB
DL0	Y-DL amount 0	Pin ㊱: Standard Y signal 1V_{P-P} input TV mode, DL mode= through Pin ㉒: Output Y delay time measurement	140	180	220	ns
DL1	Y-DL amount 1	Pin ㊱: Standard Y signal 1V_{P-P} input TV mode, DL mode=1 Pin ㉒: Output Y delay time measurement	230	270	310	ns
DL2	Y-DL amount 2	Pin ㊱: Standard Y signal 1V_{P-P} input TV mode, DL mode=2 Pin ㉒: Output Y delay time measurement	320	360	400	ns
DL3	Y-DL amount 3	Pin ㊱: Standard Y signal 1V_{P-P} input TV mode, DL mode=3 Pin ㉒: Output Y delay time measurement	410	450	490	ns
VT_{TP}	Video tone control characteristic 1	Pin ㊱: 3MHz Y signal 1V_{P-P} input, TV mode, contrast, sharpness Typ, trap Off Pin ㉑,㉒,㉓: Output Y amplitude measurement	1.6	2.0	2.4	V_{PP}

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
VT_{MX}	Video tone control characteristic 2	Pin ㊱: 3MHz Y signal 1$V_{P\text{-}P}$ input, TV mode, contrast, trap Off, sharpness Max; Pin ㉑,㉒,㉓: Output Y amplitude measurement; $\frac{Vmeasure}{Tone(typ)}$	3.0	6.0	10.0	dB
VT_{MN}	Video tone control characteristic 3	Pin ㊱: 2MHz Y signal 1$V_{P\text{-}P}$ input, TV mode, contrast, trap Off, sharpness Min; Pin ㉑,㉒,㉓: Output Y amplitude measurement; $\frac{Vmeasure}{Tone(typ)}$	−10.0	−6.0	−3.0	dB
VT_{2M}	Video tone control characteristic 4	Pin ㊱: 2MHz Y signal 1$V_{P\text{-}P}$ input, TV mode, contrast, trap off, sharpness Max/Min; Pin ㉑,㉒,㉓: Output Y amplitude measurement; $\frac{Tone(min)}{Tone(max)}$	−5.6	−2.8	−0.2	dB
VT_{5M}	Video tone control characteristic 5	Pin ㊱: 5MHz Y signal 1$V_{P\text{-}P}$ input, TV mode, contrast, trap Off, sharpness Max/Min; Pin ㉑,㉒,㉓: Output Y amplitude measurement; $\frac{Tone(min)}{Tone(max)}$	−4.0	−1.4	−1.2	dB
BLS_1	Black expansion 1	Pin ㊱: Y signal 0.5$V_{P\text{-}P}$ input setup variable, TV mode, contrast Typ; Pin ㉑,㉒,㉓: Start point of output black expansion	35	50	65	IRE
BLS_2	Black expansion 2	Pin ㊱: Y signal 0.5$V_{P\text{-}P}$ input setup variable, TV mode, contrast Typ, Pin ㉑,㉒,㉓: Gain of output maximum black expansion	3.5	6.0	7.5	dB
CT_{MX}	Contrast control characteristic 1	Pin ㊱: Standard Y signal 1$V_{P\text{-}P}$ input, TV mode, contrast Max; Pin ㉑,㉒,㉓: Output Y amplitude measurement	3.4	4.0	4.4	V_{PP}
CT_{TP}	Contrast control characteristic 2	Pin ㊱: Standard Y signal 1$V_{P\text{-}P}$ input, TV mode, contrast Typ; Pin ㉑,㉒,㉓: Output Y amplitude measurement	2.1	2.5	3.2	V_{PP}
CT_{MN}	Contrast control characteristic 3	Pin ㊱: Standard Y signal 1$V_{P\text{-}P}$ input, TV mode, contrast Min; Pin ㉑,㉒,㉓: Attenuation of output Y amplitude	—	−40	−35	dB
BT_{TP}	Brightness control characteristic 1	Pin ㊱: Standard Y signal 1$V_{P\text{-}P}$ input, TV mode, cutoff Min, contrast Typ, bright Typ; Pin ㉑,㉒,㉓: Output pedestal DC measurement	2.6	3.0	3.4	V
BT_{MX}	Brightness control characteristic 2	Pin ㊱: Standard Y signal 1$V_{P\text{-}P}$ input, TV mode, cutoff Min, contrast Typ, bright Max; Pin ㉑,㉒,㉓: Output pedestal increment measurement	0.7	1.0	1.3	V
BT_{MN}	Brightness control characteristic 3	Pin ㊱: Standard Y signal 1$V_{P\text{-}P}$ input, TV mode, cutoff Min, contrast Typ, bright Min; Pin ㉑,㉒,㉓: Output pedestal decrement measurement	−1.3	−1.0	−0.7	V
DR_R	Drive control characteristic R	Pin ㊱: Standard Y signal 1$V_{P\text{-}P}$ input, TV mode, contrast, bright Typ, R drive Max/Min; Pin ㉑: Output Y amplitude measurement; $\frac{Vmax}{Vmin}$	3.9	5.5	7.1	dB
DR_B	Drive control characteristic B	Pin ㊱: Standard Y signal 1$V_{P\text{-}P}$ input, TV mode, contrast, bright Typ, B drive Max/Min; Pin ㉓: Output Y amplitude measurement; $\frac{Vmax}{Vmin}$	3.9	5.5	7.1	dB

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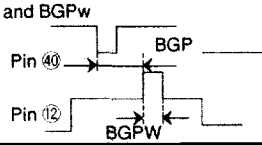
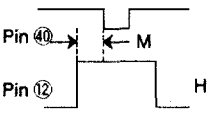
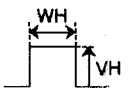
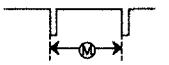
ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
EXT_R	EXT input characteristic R	Pin ㉛: 1V (OSD input mode) Pin ㉙: 0.7V_{P-P} analog signal input Pin ㉑: Output EXT signal amplitude measurement	4.8	5.2	6.0	V_{PP}
EXT_G	EXT input characteristic G	Pin ㉛: 1V (OSD input mode) Pin ㉗: 0.7V_{P-P} analog signal input Pin ㉒: Output EXT signal amplitude measurement	4.8	5.2	6.0	V_{PP}
EXT_B	EXT input characteristic B	Pin ㉛: 1V (OSD input mode) Pin ㉕: 0.7V_{P-P} analog signal input Pin ㉓: Output EXT signal amplitude measurement	4.8	5.2	6.0	V_{PP}
OSD_r	OSD rising speed characteristic	Pin ㉛: 1V (OSD input mode) Pin ㉙,㉗,㉕: 0.7V_{P-P} analog signal input Pin ㉑,㉒,㉓: Output OSD signal rise	–	70	120	ns
OSD_f	OSD falling speed characteristic	Pin ㉛: 1V (OSD input mode) Pin ㉙,㉗,㉕: 0.7V_{P-P} analog signal input Pin ㉑,㉒,㉓: Output OSD signal fall	–	70	120	ns
CO_R	Cutoff control characteristic R	Contrast Min, bright Typ, cutoff R Max/Min Pin ㉑: Output pedestal level Max-Min	1.5	1.8	2.1	V
CO_G	Cutoff control characteristic G	Contrast Min, bright Typ, cutoff G Max/Min Pin ㉒: Output pedestal level Max-Min	1.5	1.8	2.1	V
CO_B	Cutoff control characteristic B	Contrast Min, bright Typ, cutoff B Max/Min Pin ㉓: Output pedestal level Max-Min	1.5	1.8	2.1	V
OF_{RG}	DC offset between R-G Ch.	Bright, cutoff Min, contrast Max Pin ㉑,㉒: DC offset of output pedestal level	−100	0	+100	mV
OF_{GB}	DC offset between G-B Ch.	Bright, cutoff Min, contrast Max Pin ㉒,㉓: DC offset of output pedestal level	−100	0	+100	mV
DEFLECTION SYSTEM						
I_{CC9}	H Vcc circuit current	Pin ⑨: Circuit current when HVcc=8V	–	35	42	mA
I_{SS}	Sync separation input sensitivity current	Pin ⑫: Current flow when BGP is not produced	–	0.1	0.2	mA
BGP	BGP timing	Pin ㊵: Sync input Measurement of BGP and BGPw	4.0	5.0	6.0	us
BGPw	BGP pulse width		3.6	4.5	5.4	us

MITSUBISHI ELECTRIC

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
f_H	Horizontal free-run frequency	No signal input Pin ⑬: Measurement of oscillator frequency	15.3	15.7	16.1	kHz
FP_{H1}	Horizontal pull-in range 1	Pin ㊵: Horizontal sync signal (frequency variable) Pin ⑬: Measurement of horizontal output signal pull-in frequency range	+250	+300	–	Hz
FP_{H2}	Horizontal pull-in range 2	Pin ㊵: Horizontal sync signal (frequency variable) Pin ⑬: Measurement of horizontal output signal pull-in frequency range	–	−300	−250	Hz
HPT_1	Horizontal pulse timing 1	Pin ㊵: Horizontal sync signal input H Phase Data=Typ	7.5	8.5	9.5	us
HPT_2	Horizontal pulse timing 2	 H Phase Data=Min	+1.0	+1.5	+2.0	us
HPT_3	Horizontal pulse timing 3	H Phase Data=Max	−2.0	−1.5	−1.0	us
W_H	Horizontal pulse width	Pin ㊵: Sync input Pin ⑬: Measurement of horizontal pulse width and amplitude	20	25	30	us
V_H	Horizontal pulse amplitude		3.0	3.5	–	V_{PP}
H_{STP}	Horizontal stop operation	Pin ㊵: Sync input H Stop SW ON Pin ⑬: Output DC measurement	3.0	3.5	–	V
G_{AFC}	AFC 1 gain	Pin ㊵: Sync input AFC GAIN SW On/Off Pin ⑯: Output measurement $G=20\log\frac{ON}{OFF}$	5.4	6.8	8.2	dB
f_V	Vertical free-run frequency	Pin ⑱: Free-run frequency measurement (at pulse)  Pin ㊵: No signal input	53.5	54.7	56.0	Hz
FP_V	Vertical pull-in range	Pin ㊵: Vertical sync signal (frequency variable) Pin ⑱: Measurement of vertical pulse output signal pull-in frequency range	65.0	67.0	69.0	Hz
W_{VP}	Vertical output pulse width	Pin ㊵: Vertical sync signal Pin ⑱: Vertical pulse output signal width	0.45	0.54	0.65	ms
W_{BLK}	Vertical blanking width	Pin ㊵: Vertical sync signal Pin ㉑,㉒,㉓: Vertical BLK width of RGB output	1.10	1.35	1.6	ms

PRELIMINARY
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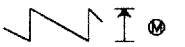
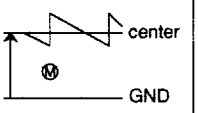
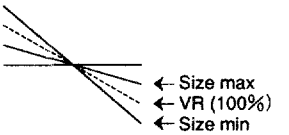
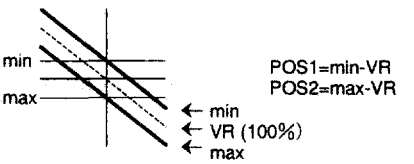
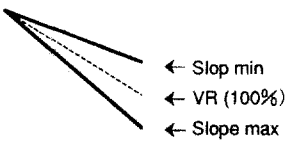
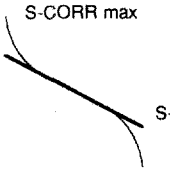
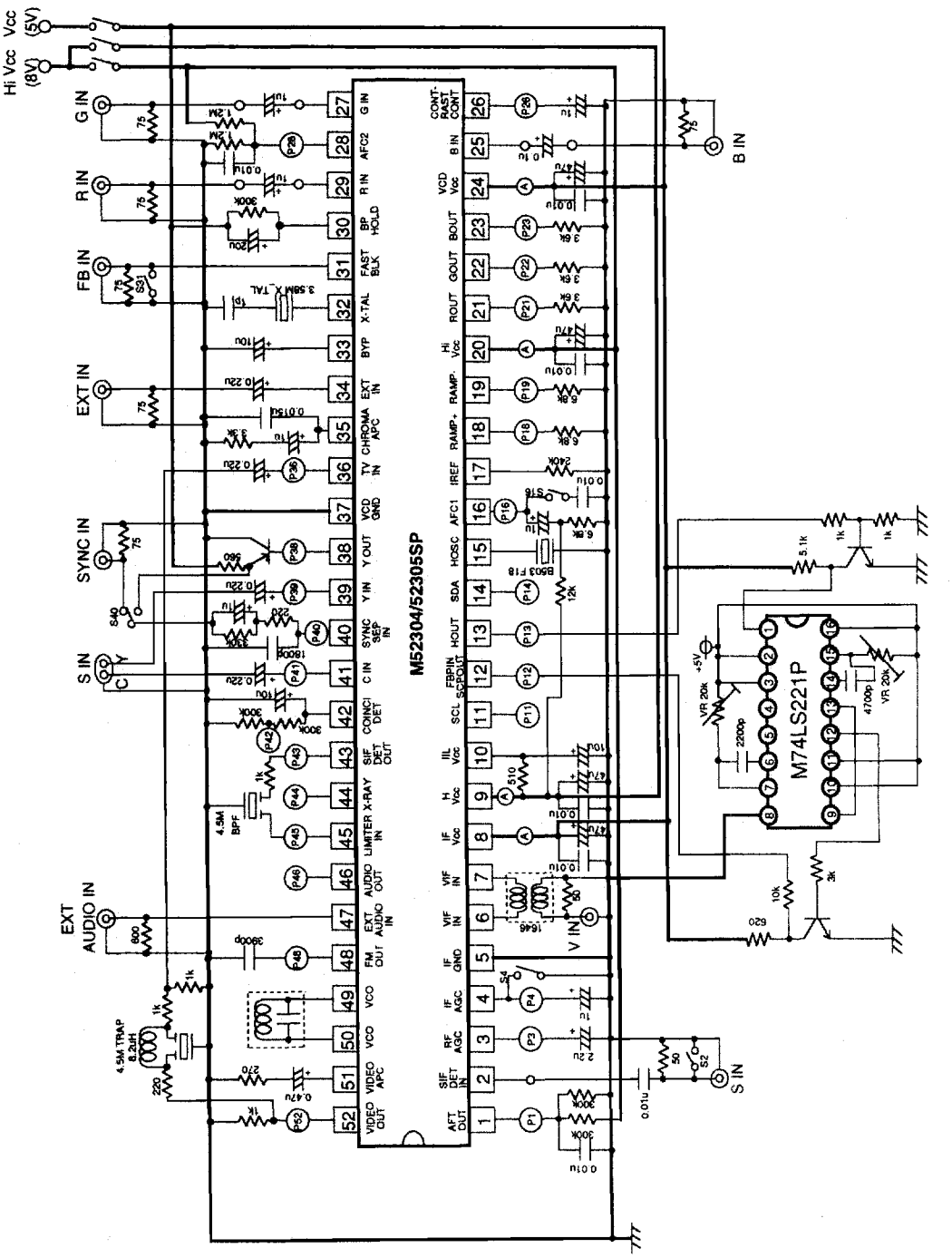
ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test conditions	Limits Min.	Limits Typ.	Limits Max.	Unit
I_{RAMP}	Vertical standard RAMP current	Pin ㊵: Vertical sync signal input Pin ⑱,⑲: Output ramp current 	100	120	140	uA_{p-p}
I_{BIAS}	Vertical RAMP standard bias current	Pin ㊵: Vertical sync signal input Pin ⑱,⑲: Output bias current measurement 	240	300	360	uA
SZ_1	V-SIZE function 1 Data=Max	Pin ㊵: Vertical sync signal input Pin ⑱,⑲: Output ramp current size 	+30	+35	+40	%
SZ_2	V-SIZE function 2 Data=Min		−40	−35	−30	%
POS_1	V-POSITION function 1 Data=Max	Pin ㊵: Vertical sync signal input Pin ⑱,⑲: Output ramp current position 	2.5	5	7.5	uA
POS_2	V-POSITION function 2 Data=Min		−7.5	−5	−2.5	%
SL_1	V-SLOPE function 1 Data=Max	Pin ㊵: Vertical sync signal input Pin ⑱,⑲: Output ramp current slope 	+10	+15	+20	%
SL_2	V-SLOPE function 2 Data=Min		−20	−15	−10	%
COR_1	S-CORRECTION function 1 Data=Max	Pin ㊵: Vertical sync signal input Pin ⑱,⑲: Output ramp current linearity 	+30	+40	+50	%
COR_2	S-CORRECTION function 2 Data=Min		−50	−40	−30	%

TEST CIRCUIT



PRELIMINARY
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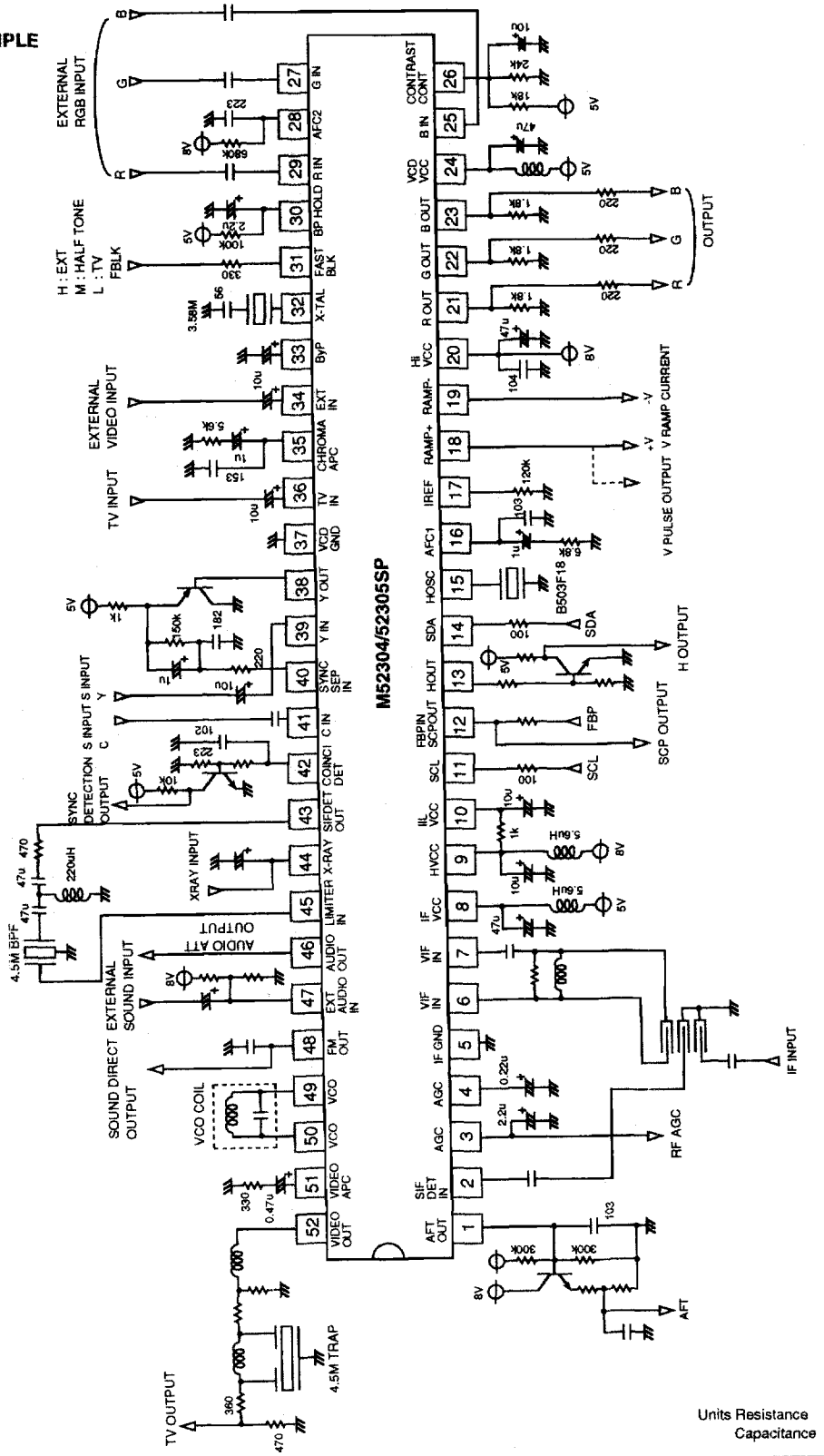
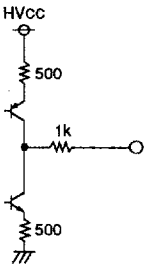
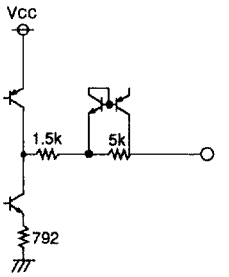
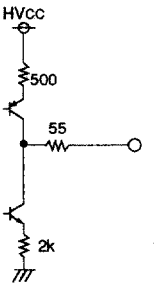
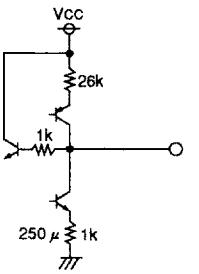
NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

APPLICATION EXAMPLE



MITSUBISHI ELECTRIC

DESCRIPTION OF PIN

Pin No.	Name	Peripheral circuit of pins	DC voltage
①	AFT OUT		
②	SIF DET. IN		2.45V
③	AGC		
④	AGC		1.85V
⑤	IF GND	———	

PRELIMINARY
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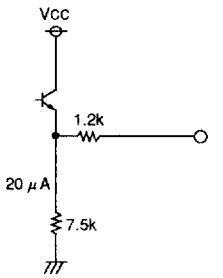
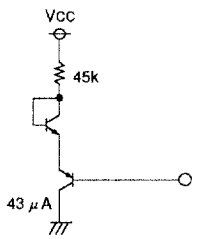
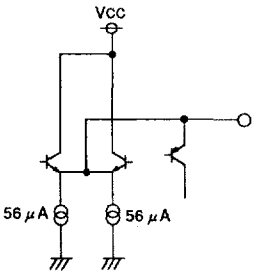
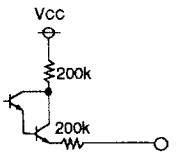
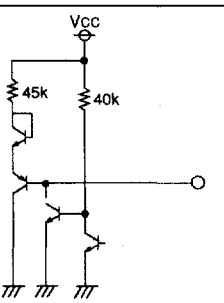
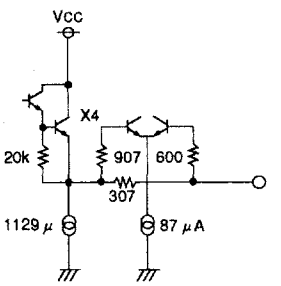
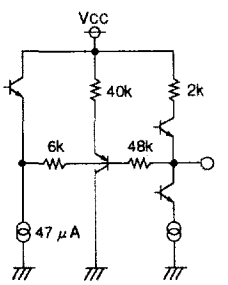
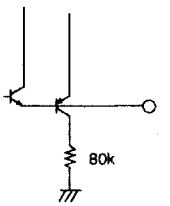
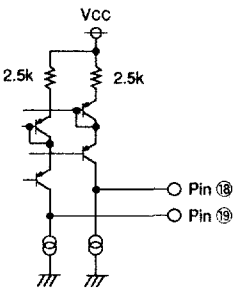
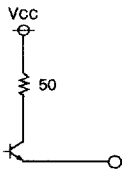
DESCRIPTION OF PIN (cont.)

Pin No.	Name	Peripheral circuit of pins	DC voltage
⑥ ⑦	VIF IN		1.46V
⑧	IF Vcc	———	
⑨	H Vcc	———	
⑩	IIL Icc	———	
⑪	SDL		2.5V

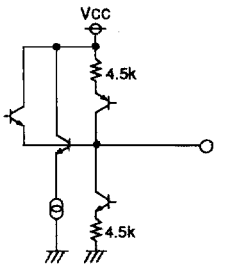
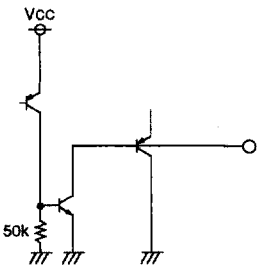
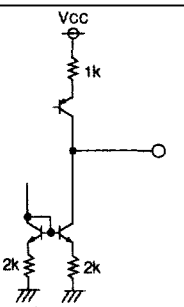
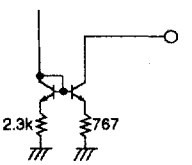
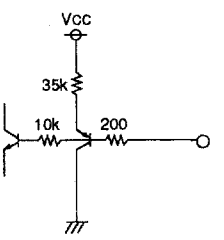
DESCRIPTION OF PIN (cont.)

Pin No.	Name	Peripheral circuit of pins	DC voltage
⑫	FBP IN/SCP OUT		1.23V
⑬	H OUT		
⑭	SDA		2.5V
⑮	H OSC		
⑯	AFC1		

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Peripheral circuit of pins	DC voltage
⑰	I REF		5.0V
⑱ ⑲	+RAMP OUT −RAMP OUT		
⑳	Hi Vcc	———	
㉑ ㉒ ㉓	R OUT G OUT B OUT		2.5V
㉔	VCD Vcc	———	

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Peripheral circuit of pins	DC voltage
㉕ ㉗ ㉙	EXT B IN EXT G IN EXT R IN		2.5V
㉖	CONTRAST CONT.		
㉘	AFC2 FILTER		2.46V
㉚	BLACK PEAKE HOLD		
㉛	FAST BLK IN		3.5V

PRELIMINARY
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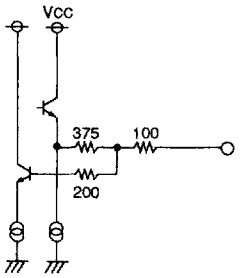
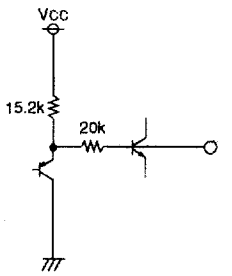
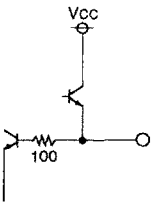
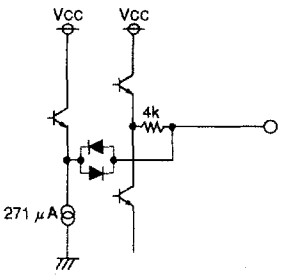
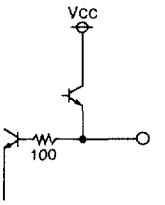
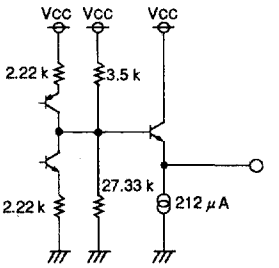
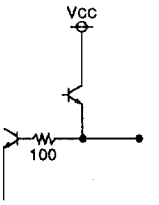
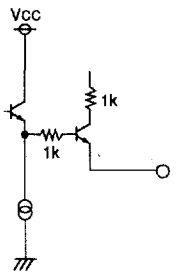
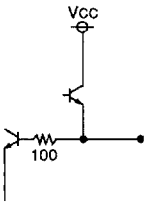
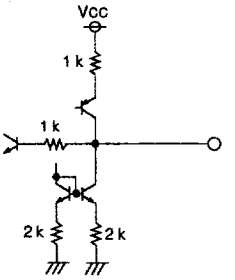
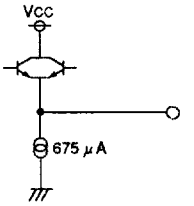
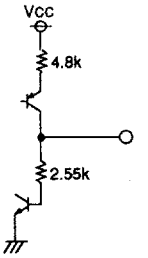
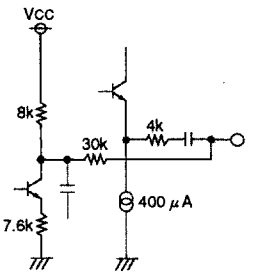
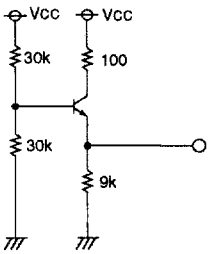
DESCRIPTION OF PIN (cont.)

Pin No.	Name	Peripheral circuit of pins	DC voltage
㉜	X-tal		
㉝	BYPASS		2.5V
㉞	EXT IN		2.58V
㉟	CHROMA APC FILTER		
㊱	TV IN		2.58V

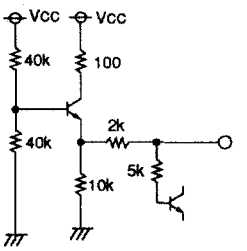
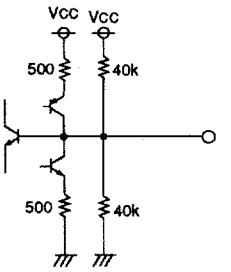
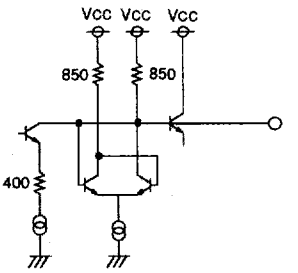
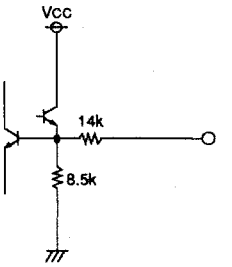
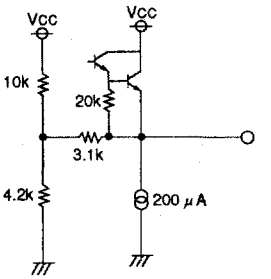
DESCRIPTION OF PIN (cont.)

Pin No.	Name	Peripheral circuit of pins	DC voltage
㊲	VCD GND		
㊳	Y OUT		
㊴	Y IN		2.58V
㊵	SYNC SEP. IN		5.71V
㊶	C IN		2.58V

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Peripheral circuit of pins	DC voltage
㊷	COINCIDENCE OUT		
㊸	SIF DET. OUT		2.3V
㊹	X-RAY PROTECT		0.75V
㊺	LIMITER IN		2.3V
㊻	AUDIO OUT		4.75V

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Peripheral circuit of pins	DC voltage
㊼	EXT AUDIO IN		4.75V
㊽	FM OUT		
㊾ ㊿	VCO		4.3V
(51)	VIDEO APC		3.0V
(52)	VIDEO OUT		3.5V

PRELIMINARY
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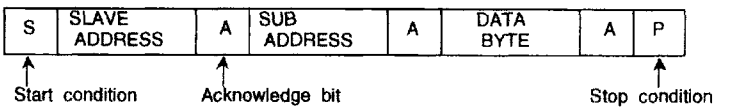
NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

OPTIONAL INFORMATION

(1) Slave address :

A6	A5	A4	A3	A2	A1	A0	R/W	
1	0	1	1	1	0	1	0	(= B A H)

(2) Slave address format :
read



(3) Sub address byte and data byte format :
read

	Functions	BIT	SUB ADD	Data byte								M52304SP	M52305SP
				D7	D6	D5	D4	D3	D2	D1	D0	○	○
VIF/SIF	DELAY ADJ	6	00H	0	—	A05	A04	A03	A02	A01	A00	○	○
	VCO ADJ	6	01H	0	—	A15	A14	A13	A12	A11	A10	○	○
	AUDIO SW	1	01H		AUDIO SW							○	○
	DEFEAT	1	04H		DEFEAT							○	○
	AUDIO ATT	7	03H	0	A36	A35	A34	A33	A32	A31	A30	○	○
VIDEO	VIDEO TONE	6	04H	0	—	A45	A44	A43	A42	A41	A40	○	○
	CONTRAST	7	05H	0	A56	A55	A54	A53	A52	A51	A50	○	○
	DL time ADJ	2	06H	0	0	0	—	—	—	A61	A60	○	○
	TV/EXT SW	1	06H						TV/EXT			○	○
	Y/C SW	1	06H					YCSEP				○	○
	Black Stretch	1	06H				black					—	○
	TRAP SW	1	02H			TRAP						○	○
	TRAP ADJ 1	1	10H			TADJ1						○	○
	TRAP ADJ 2	1	02H				TADJ2					○	○
	VIDEO MUTE	1	0BH		VMUTE							○	○
CHROMA	TINT	7	07H	0	A76	A75	A74	A73	A72	A71	A70	○	○
	COLOR	7	08H	0	A86	A85	A84	A83	A82	A81	A80	○	○
	FLESH TONE	1	06H		FLESH							○	○
INTERFACE	BRIGHT	7	0AH	0	AA6	AA5	AA4	AA3	AA2	AA1	AA0	○	○
	DRIVE (R)	6	0BH	0	0	AB5	AB4	AB3	AB2	AB1	AB0	○	○
	DRIVE (B)	6	0CH	0	0	AC5	AC4	AC3	AC2	AC1	AC0	○	○
	CUT OFF (R)	8	0DH	AD7	AD6	AD5	AD4	AD3	AD2	AD1	AD0	○	○
	CUT OFF (G)	8	0EH	AE7	AE6	AE5	AE4	AE3	AE2	AE1	AE0	○	○
	CUT OFF (B)	8	0FH	AF7	AF6	AF5	AF4	AF3	AF2	AF1	A100	○	○
	PEAK ACL	1	02H						PACL			○	○
DEFLECTION	AFC-2 H PHASE	4	09H	0	A96	A95	A94	A93	—	—	—	○	○
	V-SLOPE	5	10H	0	0	0	A104	A103	A102	A101	A100	○	○
	V-SIZE	6	11H	0	0	A115	A114	A113	A112	A111	A110	○	○
	S-CORRECTION	5	12H	0	0	0	A124	A123	A122	A121	A120	—	○
	V-POSITION	3	13H	0	A136	—	—	—	A132	A131	A130	○	○
	V PULSE out SW	1	12H			VPS						○	○
	SERVICE SW	1	13H					Service SW				○	○
	H STOP	1	13H				H STOP					○	○
	AFC GAIN	1	13H			AFC GAIN						○	○

MITSUBISHI ELECTRIC

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

M52305SP DATA BYTE CONDITIONS AT SW

	Functions	Data		Condition	Initial condition
I F	AUDIO SW	AUDIO SW	0	TV	TV
			1	EXT	
	DEFEAT	DEFEAT	0	OFF	OFF
			1	ON	
VIDEO	DL time ADJ	A71 , A70	0 0	100nsec	300nsec
			0 1	200nsec	
			1 0	300nsec	
			1 1	400nsec	
	DL time fine ADJ		0	+50nsec	+0nsec
			1	+0nsec	
	TV/EXT	TV/EXT	0	TV	TV
			1	EXT	
	Y/C IN	Y/C IN	0	TV or EXT	TV or EXT
			1	Y/C	
	black stretch	black	0	OFF	OFF
			1	ON	
	TRAP SW	TRAP	0	OFF	OFF
			1	ON	
	TRAP fine ADJ1	FTRAP1	0	OFF	OFF
			1	ON	
	TRAP fine ADJ2	FTRAP2	0	OFF	OFF
			1	ON	
INTERFACE	peak ACL	ACL	0	120IRE	150IRE
			1	150IRE	
CHROMA	AUTO FLESH	FLESH	0	OFF	OFF
			1	ON	
DEF-LECTION	Servise SW	Servise SW	0	Normal mode	Normal mode
			1	Servise mode	
	H STOP	H STOP	0	H out	H out
			1	H stop	
	AFC GAIN	AFC GAIN	0	NORMAL	NORMAL
			1	HIGH	
	V pulse SW	VPS	0	V ramp out	V ramp out
			1	V pulse out	