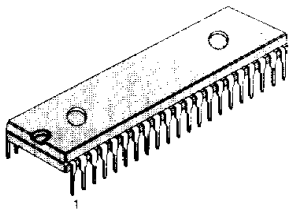
VIDEO-CHROMA DEFLECTION SYSTEM FOR A COLOR TELEVISION (PAL/NTSC)

The KA2154 combines a PAL/NTSC video-chroma subsystem and a deflection combination on a single monolithic integrated circuit to provide a PAL or PAL/NTSC color television.

This device includes a video amplifier, PAL and NTSC color demodulator. These are designed to provide color differential signal outputs, and an improved sync separator, horizontal oscillator with saw tooth wave type AFC, horizontal pre-driver with X-ray protection circuit vertical oscillator and vertical pre-driver in a 42-lead, dual in-line type plastic package.

42 DIP



FUNCTIONS

- Inverter-amplifiers
- Contrast control
- Pedestal clamps
- Brightness control
- ACC-amplifiers (peak Acc)
- Tint controls
- Uni-color controls
- fsc VCO
- APC
- Color-killers
- Color demodulators
- Matrix circuits
- Sync-separator (H.V. sync in)
- $2f_H$ horizontal oscillators
- Flip-flops
- Stabilized horizontal V_{CC} by zener diodes
- Horizontal pre drivers
- Gate pulse generators
- Vertical sync input
- Vertical oscillators
- Ramp generators

FEATURES

- **Video-Chroma Section**
- **Simple PAL/NTSC System Switch (Demodulator, Flip-flop, Tint control for NTSC).**
- **Suitable to a Multi-CTV System: KA2154 PAL/NTSC Dual System Suitable to a Multi-CTV System: KA2154 SECAM Combination 3 or more System.**
- **A minimum Number of External Parts are Required.**
- **Stabilized with Respect to Variation of Temperature and Supply Voltage.**
- **A Few Initial Adjustment Required.**

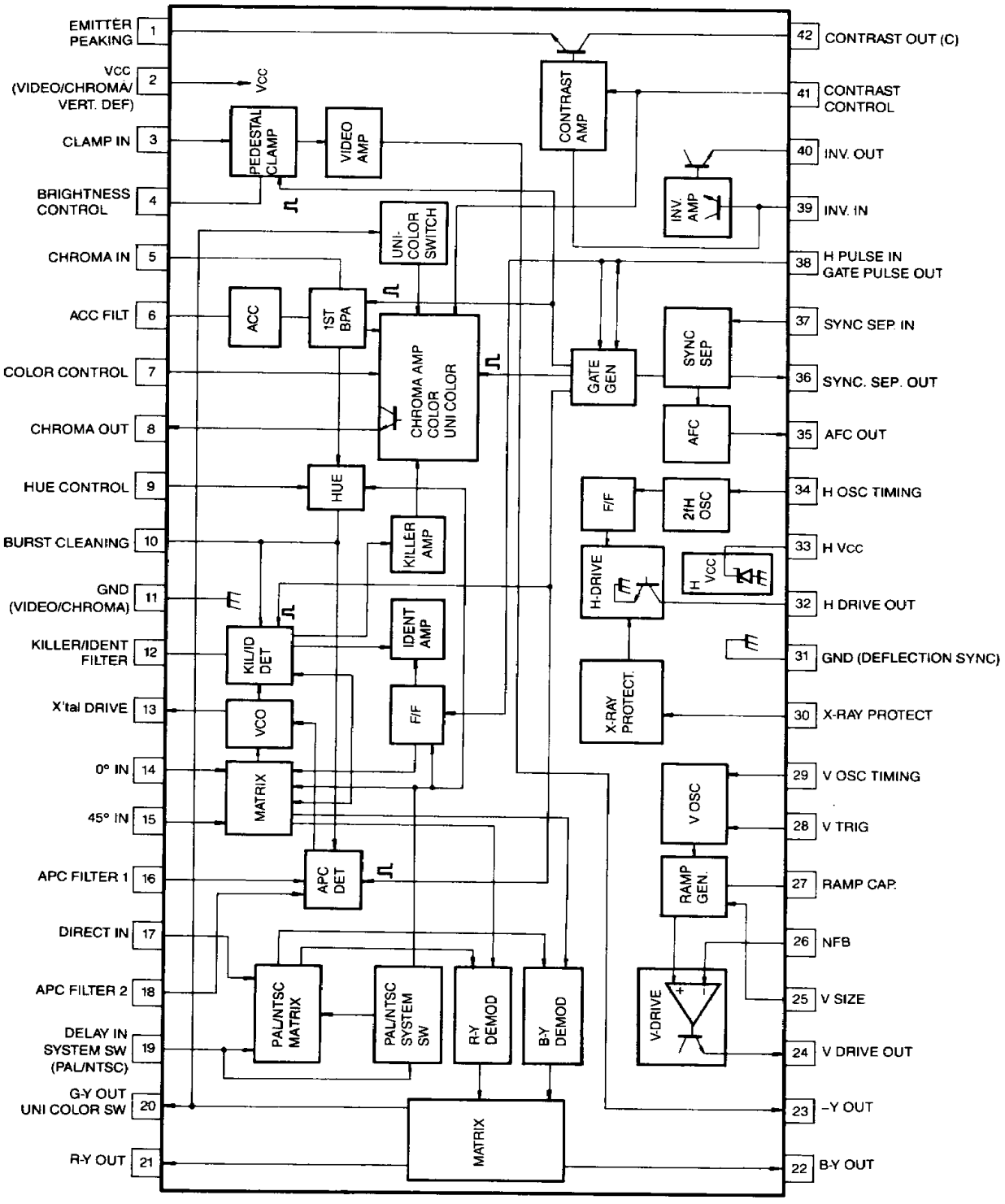
DEFLECTION SECTION

- Excellent Temperature Stability of Horizontal Oscillator.
- Exact 50% Duty Cycle Output Due to the 2-f_H Oscillator and Flip-Flop Circuit.
- Excellent Interface.

ORDERING INFORMATION

Device	Package	Operating Temperature
KA2154	42 DIP	−20 ~ +65°C

BLOCK DIAGRAM



MAXIMUM RATINGS (T_a = 25°C)

Characteristic	Symbol	Value	Unit
Supply Voltage	V_{CC} Max	15	V
Horiz. Supply Current	I_{CC} Max	40	mA
Max. Input Signal Level	$V_{IN\ 5,\ 14,\ 15,\ 17,\ 19,\ 28,\ 37,\ 39}$	5	V_{P-P}
Max. Control Terminal Voltage	$V_{4\ MAX}$, $V_{5\ MAX}$, $V_{7\ MAX}$, $V_{9\ MAX}$	V_{CC}	V
Term. 1 Max. Output Current	$I_{1\ MAX}$	4	mA
Term. 8 Max. Output Current	$I_{3\ MAX}$	10	mA
Term. 10 Max. Output Current	$I_{10\ MAX}$	4	mA
Term. 13 Max. Output Current	$I_{13\ MAX}$	4	mA
Min. Load Resistance	R_{LD}	1.8	KΩ
Term. 23 Max. Output Current	$I_{23\ MAX}$	4	mA
Vertical Stage Output Current	$I_{24\ MAX}$	20	mA
Term. 25 Max. Output Current	$I_{25\ MAX}$	4	mA
Term. 26 Max. Input Voltage	$V_{26\ MAX}$	V_{CC}	V
Term. 27 Max. Output Current	$I_{27\ MAX}$	50	mA
Term. 30 Max. Intput Current	$-I_{30\ MAX}$	1	mA
Horiz. Max. Sink Current	$-I_{32\ MAX}$	30	mA
Horiz. Ave. Sink Current	$-I_{32}$	15	mA
Term. 35 Max. Input Voltage	$V_{35\ MAX}$	V_{CCH}	V
Term. 36 Max. Voltage	$V_{36\ MAX}$	V_{CC}	V
Term. 38 Max. Intput Voltage	$V_{38\ MAX}$	5	V
Term. 40 Max. Output Current	$I_{40\ MAX}$	5	mA
Term. 42 Max. Sink Current	$-I_{42\ MAX}$	4	mA
Max. Power Dissipation (Note)	$P_{D\ MAX}$	2.2 (Note)	W
Operating Temperature	Topr	−20 ~ 65	°C
Storage Temperature	Tstg	−55 ~ 150	°C

Note: Derated above T_a = 25°C in the proportion of 17.6mW/°C.

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{CC} = 12V, T_a = 25°C)

Video Section (1)

Characteristic	Symbol	Test Pin	SW 36	SW 41	Test Conditions	Specification Min.	Specification Typ.	Specification Max.	Unit	Test CCT
Recommendable Supply Voltage	V_{CC1}					10.8	12	13.2	V	
12V Supply Current	I_{CC1}	2				60	82	106	mA	1
Video Gain	G_V	23 39	Off	On	V_C = 10V, V_X = 4.25V, V_Z = 4.0V υ_{39} = 500KHz, 1$V_{p\text{-}p}$(Multi Burst) $G_V = 20 \log (\upsilon_{23}/\upsilon_{39})$	3	6	7	dB	2
Contrast Gain Control Range	ΔG_V	23	Off	On	V_O = 10V ~ 2V, V_X = 4.25V, V_Z = 4.0V υ_{39}; 500KHz 1V_{PP} (Multi Burst) $\Delta G_V = 20 \log (\upsilon_{23\ MAX}/\upsilon_{23\ MIN})$	40	—	—	dB	2
Video Frequency Characteristics	ΔG_{VF}	23	Off	On	V_C = 10V, V_X = 4.25V, V_Z = 4.0V, υ_{39}; 500KHz, 4.0MHz 1$V_{P\text{-}P}$ (Multi Burst) $\Delta G_{VF} = 20 \log (V_{23\ 4MHz}/V_{23\ 5MHz})$	− 3.5	− 1.5	0.5	dB	2
DC Restoration Ratio	K	23	Off	On	V_C = 10V, V_Z = 4.0V V_X; Pedestal #39 = 3.25V υ_{39}; 2.5$V_{p\text{-}p}$ 10_{STEP} APL 10% ~ 90% $K = (1 - \frac{\Delta V_{23}\ pedestal}{V_{23}\ 100\%\ APL} \times 100)$	63	70	77	%	2
Max. Video Output	$\upsilon_{23\ MAX}$	23	Off	Off	V_X = 4.25V, υ_{39}; No Signal V_Z = 2V ~ 7V 10% to 90% of Variation	5.0	7.5	—	$V_{P\text{-}P}$	2
Video DC Output Therm Co-effici.	$\partial V_{23}/\partial T$	23	Off	Off	V_X = 4.25V, V_Z = 4.0V υ_{39}; No Signal T_a = −20°C ~ 65°C	− 2.5	0	2.5	mV/°C	2
Inverter Amp. Gain	G_R	40	Off	Off	V_X = 4.25V υ_{39}; 500KHz, 1$V_{P\text{-}P}$ $G_R = 20 \log (\upsilon_{40}/\upsilon_{39})$	2.2	3.5	4.6	dB	2
Inverter Amp. Differential	DG_R	40	Off	Off	V_X; 3.3 ~ 5.3V υ_{39}; 3.58 MHz 100m$V_{P\text{-}P}$ $DG_R = (\upsilon_{40\ MAX}/\upsilon_{40\ MIN} - 1) \times 100$	—	2.5	5	%	2
Inverter Amp. Differential Phase	DP_R	40	Off	Off	V_X; 3.3 ~ 5.3V υ_{39}; 3.58MHz, 100m$V_{P\text{-}P}$ $DP_R = \phi_{40\ MAX} - \phi_{40\ MIN}$	—	3	5	deg	2

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified; $V_{CC} = 12V$, $T_a = 25°C$)

Video Section (2)

Characteristic	Symbol	Test Pin	SW 36	SW 41	Test Conditions	Specification Min	Specification Typ	Specification Max	Unit	Test CCT
Inverter Amp. Frequency Characteristic	ΔG_{RF}	40	Off	Off	$V_X = 4.25V$ $\upsilon_{39} = 500KHz$, 4MHz $1V_{p\text{-}p}$ $\Delta G_{RF} = 20$ log $(\upsilon_{40\ 4MHz}/\upsilon_{40\ 500KHz})$	−3.5	−0.1	0.5	dB	2
Inverter Amp. 3.58MHz Linearity	υ_{39}	39 40	Off	Off	$V_X = 4.25V$ Measure #39 input level at #40 maximum output.	1.6	—	—	$V_{p\text{-}p}$	2
Contrast Control Open Voltage	V_{41}	41	—	—		6.7	7.2	7.7	V	1
Color Control Open Voltage	V_7	7	—	—		5.5	6.0	6.5	V	1
Tint Control Open Voltage	V_9	9	—	—		5.5	6.0	6.5	V	1
Pedstal AMP. Gain	G_P	3 23			$V_X = 4.25V$, $V_Z = 4V$ $\upsilon_{39} = 500KHz$ $1V_{p\text{-}p}$ (Multi Burst) $G_P = 20$ log $(\upsilon_{23}/\upsilon_3)$	9.5	12.0	13.5	dB	

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_C =10V, V_S =10V, SW_{36}; On, SW_{10}; Off, SW_{4A}; On, SW_{4B}; On)

Chroma (1) PAL

Characteristic	Symbol	Test Pin	SW 41	SW 7	SW 9	SW 12	SW 15	SW 20	Test Conditions	Specification Min.	Typ.	Max.	Unit	Test CCT
Max. Chroma Output Voltage	Q_{CMP}	8	On	On	Off	a	b	On	v_5: 120mV$_{P-P}$ (B:C=1:1)	0.5	0.75	1.05	V_{P-P}	3
Burst Output Voltage	Q_{bP}	10	On	On	Off	a	b	On	v_5: 120mV$_{P-P}$ (B:C=1:1)	0.45	0.70	0.95	V_{P-P}	3
ACC Characteristic (1)	Q_{aP}	8	On	On	Off	a	b	On	v_5: 15mV$_{P-P}$ (B:C = 1:1)	0.2	0.43	—	V_{P-P}	3
ACC Characteristic (2)	A_P	8	On	On	Off	a	b	On	v_5: 100mV$_{p-p}$, 300mV$_{p-p}$ (B:C = 1:1) $A_P = \frac{V_8\ (v_5 = 300mV_{P-P})}{V_8\ (v_5 = 100mV_{P-P})}$	—	1.0	1.3	Times	3
Chroma Input Dynamic Range	Q_{CIP}	8	On	On	Off	a	b	On	v_5 =100mV$_{P-P}$ → 800mV$_{P-P}$	500	600	—	mV$_{P-P}$	3
Uni Color Control Range (1) Uni Color Switch On	ΔQ_{CU1P}	8	On	On	Off	a	b	On	V_C =4 ~ 10V, V_S =10V v_5 =120mV$_{P-P}$ (B:C=1:1) $\Delta QCU_P = 20 \log \frac{v_8\ (V_C = 10V)}{v_8\ (V_C = 4V)}$	40	—	—	dB	3
Uni Color Control Range (2) (Switch Off)	ΔQ_{CU2P}	8	On	On	Off	a	b	Off	Same as above	—	0	—	dB	3
Uni Color Control Phase Shift	$\Delta\theta_{UP}$	8	On	On	Off	a	b	On	V_C =4V ~ 10V, V_S =10V v_5 =120mV$_{P-P}$ (B:C=1:1)	—	—	5	deg	3
Residual Color	Q_{CKP}	8	On	On	Off	a	b	On	V_C =10V, V_S =0V v_5 =120mV$_{P-P}$ (B:C=1:1)	—	—	3	mV$_{P-P}$	3

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified; $V_C = 10V$, $V_S = 10V$, SW_{36}; On, SW_{10}; Off, SW_{4A}; On, SW_{48}; On)

Chroma (2) PAL

Characteristic	Symbol	Test Pin	SW 41	SW 7	SW 9	SW 12	SW 15	SW 20	Test Conditions	Specification Min	Specification Typ	Specification Max	Unit	Test CCT
Color Control Phase Shift	$\Delta\theta_{ccp}$	8	On	On	Off	a	b	On	$V_C = 10V$, $V_S = 2 \sim 10V$ $v_5 = 120mV_{p-p}$ (B:C = 1:1) From maximum output of pin 8 to 20dB attenuation	—	3	7	deg	3
Burst-Chroma Phase Difference	$\Delta\theta_{bcp}$	8 10	On	On	Off	a	b	On		45	60	—	deg	3
Tint Control Range	$\Delta\theta_{bH1p}$	10	On	On	On	a	b	On		—	0	—	deg	3
Tint Control Phase Distribution	$\Delta\theta_{bH2p}$	10	On	On	On	a	b	On		—	0	—	deg	3
Killer Det. Sensitivity	ϱK_P	8 10	Off	On	Off	a	a	On		30	60	110	mV_{p-p}	3
Ident Dept. Sensitivity	ϱI_P	21 10	Off	On	Off	a	a	On		—	60	—	mV_{p-p}	3
APC Pull-in Range	f_{PP}	13	Off	Off	Off	a	a	On	$v_5 = 120mV_{p-p}$	±300	±500	—	Hz	3
Phase Det. Sensitivity	μ_P	16 18	Off	Off	Off	a	c	On	$v_5 = 120mV_{p-p}$	—	25	—	mV/deg	3
Control Sensitivity	β_P	13 16 18	Off	Off	Off	a	a	On	$v_5 = 120mV_{p-p}$	—	2.2	—	Hz/mV	3

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_C = 10V, V_S = 10V, SW_{36}; On, SW_{10}; Off, SW_{4A}; On, SW_{4B}; On)

Chroma (3) PAL

Characteristic	Symbol	Test Pin	SW 41	SW 7	SW 9	SW 12	SW 15	SW 20	Test Conditions	Specification Min.	Specification Typ.	Specification Max.	Unit	Test CCT
Color Differential Output Voltage	Q_{ORP} Q_{OGP} Q_{OBP}	21 20 22	On	On	Off	a	a	On	v_{17}, v_{19}: 100mV$_{P-P}$ 4.443618 MHz CW: 4.433618MHz	1.8 — 3.2	2.4 — 4.2	3.0 — 5.4	V_{P-P}	3
Max. Color Differential Output Voltage	Q_{ORMP} Q_{OGMP} Q_{OBMP}	21 20 22	On	On	Off	a	a	On	v_{17}, v_{17}, 500mV$_{P-P}$ 4.443618MHz CW: 4.433618 MHz	3.8 — 3.8	5.5 — 5.5	— — —	V_{P-P}	3
Relative Amplitude	R-Y/B-Y$_P$ G-Y/B-Y$_P$	21/22 20/22	On	On	Off	a	a	On	v_{17}: 200mV$_{P-P}$ 4,443618 MHz CW: 4.433618 MHz	0.46 0.24	0.56 0.34	0.66 0.44	—	3
Relative Phase	θR-Y$_P$ θG-Y$_P$	21/22 20/22	On	On	Off	a	a	On	Same as above	77 220	90 230	100 240	deg	3
Residual Carrier	Q_{RC} R$_P$ Q_{RC} G$_P$ Q_{RC} B$_P$	21 20 22	On	On	Off	a	a	On		—	—	300	mV$_{P-P}$	3
Demodulator Bandwidth	f_{BRP} f_{BGP} f_{BBP}	21 20 22	On	On	Off	a	a	On	v_{17}: 200mV$_{P-P}$ 10KHz ~ 5MHz	1.1	2.1	3.2	MHz	3
Demo. Output DC Voltage	E_{ORP} E_{OGP} E_{CBP}	21 20 22	Off	Off	Off	a	b	On		6.8	7.4	8.0	V	1
Demo. Output DC Voltage Difference	$E_{O\ (R-G)P}$ $E_{O\ (R-B)P}$ $E_{O\ (B-G)P}$	21 20 22	Off	Off	Off	a	b	On		−0.2	0	0.2	V	1
Demo. Output DC Voltage Therm. Co-effic	$\Delta E_{OR\theta P}$ $\Delta E_{OG\theta P}$ $\Delta E_{OB\theta P}$	21 20 22	Off	Off	Off	a	b	On	T_a = −20°C ~ +65°C	−3	0	2	mV/°C	1
Demo. Output Diffence Voltage Therm. Co-effic.	$\Delta E_{O(R-G)\theta P}$ $\Delta E_{O(R-B)\theta P}$ $\Delta E_{O(B-G)\theta P}$	21 20 22	Off	Off	Off	a	b	On	T_a = −20°C ~ +65°C	−2	−0.5	2	mV/°C	1
System SW Threshold	V_{THS}	19	Off	Off	Off	a	b	On	v_{17}: 200mV$_{P-P}$ 4.443618 MHz CW: 4.433618 MHz	2.4	3	3.6	V	3
DC Change by System SW	ΔE_{OR} ΔE_{OG} ΔE_{OB}	21 20 22	Off	Off	Off	a	b	On	v_{IN}: 220mV$_{P-P}$ 4.443618MHz	−100	0	100	mV	3

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_C =10V, V_S =10V, SW_{36}; On, SW_{10}; Off, SW_{4A}; On, SW_{4B}; On)

Chroma (4) NTSC

Characteristic	Symbol	Test Pin	SW 41	SW 7	SW 9	SW 12	SW 15	SW 20	Test Conditions	Specification Min.	Specification Typ.	Specification Max.	Unit	Test CCT
Max. Chroma Output Voltage	ϱCM_N	8	On	On	Off	a	b	On	υ_5: 120mV$_{P-P}$ (B:C=1:1)	0.5	0.75	1.05	V_{P-P}	4
Burst Output Voltage	ϱb_N	10	On	On	Off	a	b	On	υ_5: 120mV$_{P-P}$ (B:C=1:1)	0.45	0.70	0.95	V_{P-P}	4
ACC Characteristic (1)	ϱa_N	8	On	On	Off	a	b	On	υ_5: 15mV$_{P-P}$ (B:C=1:1)	0.2	0.43	—	V_{P-P}	4
ACC Characteristic (2)	A_N	8	On	On	Off	a	b	On	υ_5: 100mV$_{P-P}$, 300mV$_{P-P}$ (B:C=1:1) $A_P = \frac{\upsilon_8\ (\upsilon_5 = 300mV_{P-P})}{\upsilon_8\ (\upsilon_5 = 100mV_{P-P})}$	—	1.0	1.3		4
Chroma Input Dynamic Range	ϱCI_N	8	On	On	Off	a	b	On	υ_5 =100mV$_{P-P}$ → 800mV$_{P-P}$	500	600	—	mV_{P-P}	4
Uni Color Control Range (1) Uni Color SW On	$\Delta ecu1_N$	8	On	On	Off	a	b	On	V_C =4 ~ 10V, V_S =10V υ_5 =120mV$_{P-P}$ (B:C=1:1) $\Delta\varrho CU_P = 20 \log \frac{\upsilon_8\ (V_C = 10V)}{\upsilon_8\ (V_C = 4V)}$	40	—	—	dB	4
Uni Color Control Range (2) (SW. Off)	$\Delta\varrho CU2_N$	8	On	On	Off	a	b	Off	Same as above	—	0	—	dB	4
Uni Color Control Phase Shift	$\Delta\theta U_N$	8	On	On	Off	a	b	On	V_C =4V ~ 10V, V_C =10V υ_5 =120mV$_{P-P}$ (B:C=1:1)	—	—	5	deg	4
Residual Color	ϱCK_N	3	On	On	Off	a	b	On	V_C =0V, V_S =0V υ_5 =120mV$_{P-P}$ (B:C=1:1)	—	—	3	mV_{P-P}	4

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, $V_C = 10V$, $V_S = 10V$, SW_{36}; On, SW_{10}; Off, SW_{4A}; On, SN_{4B}; On)

Chroma (5) NTSC

Characteristic	Symbol	Test Pin	SW 41	SW 7	SW 9	SW 12	SW 15	SW 20	Test Conditions		Specification Min.	Specification Typ.	Specification Max.	Unit	Test CCT
Color Control Phase Shift	$\Delta\theta_{CC_N}$	8	On	On	Off	a	b	On	$V_C = 10V$, $V_S = 2 \sim 10V$ $v_5 = 120mV_{P-P}$ (B:C=1:1)		—	3	7	deg	4
Burst-Chroma Phase Difference	$\Delta\theta_{bC_N}$	8 10	On	On	Off	a	b	On			—	60	—	deg	4
Tint Control Range	$\Delta\theta_{bH1_4}$	10	On	On	On	a	b	On	$V_C = 10V$, $V_T = 2 \sim 10V$ $v_5 = 120mV_{P-P}$ (B:C = 1:1)	f=4.43MHz	75	95	110	deg	4
										f = 3.58MHz	100	120	140		
Tint Control Phase Distruction	$\Delta\theta_{bH2_N}$	10	On	On	On	a	b	On	$V_C = 10V$, $v_5 = 120mV_{P-P}$ (B:C = 1:1) V_7: Open	f=4.43MHz	34	47	62	deg	4
										f = 3.58MHz	45	60	80		
Killer Det Sensitivity	ϱ_{K_N}	8	Off	On	Off	a	a	On	$v_5 = 100mV_{P-P}$		15	30	75	mV_{P-P}	4
APC Pull-in Range	f_{P_N}	13	Off	Off	Off	a	a	On	$v_5 = 100mV_{P-P}$		±300	±500	—	Hz	4
Phase Det. Sensitivity	μ_N	16 18	Off	Off	Off	a	c	On	$v_5 = 100mV_{P-P}$		—	25	—	mV/deg	4
Control Sensitivity	β_N	13 16 18	Off	Off	Off	a	a	On	$v_5 = 100mV_{P-P}$		—	2.2	—	Hz/mV	4

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified; $V_C = 10V$, $V_S = 10V$, SW_{36}; On, SW_{10}; Off, SW_{4A}; On, SW_{48}; On)

Chroma (6) NTSC

Characteristic	Symbol	Test Pin	SW 41	SW 7	SW 9	SW 12	SW 15	SW 20	Test Conditions	Specification Min	Specification Typ	Specification Max	Unit	Test CCT
Color Difference Output Voltage	ϱOR_N ϱOG_N ϱOB_N	21 20 22	On	On	Off	a	a	On	v_{17}: $100mV_{p-p}$ 4.443618MHz CW: 4.433618MHz	3.0 1.0 3.0	4.1 1.6 4.1	5.3 2.2 5.3	V_{p-p}	4
Max. Color Differential Output Voltage	ϱCRM_N ϱCGM_N ϱCBM_N	21 20 22	On	On	Off	a	a	On	v_{17}: $500mV_{p-p}$ 4.443618MHz CW: 4.433618MHz	4.5 1.4 4.5	5.5 1.8 5.5	— — —	V_{p-p}	4
Relative Amplitude	R-Y/B-Y_N G-Y/B-Y_N	21/22 20/22	On	On	Off	a	a	On	v_{17}: $100mV_{p-p}$ 4.443618MHz CW: 4.433618MHz	0.88 0.28	1.00 0.38	1.11 0.48	—	4
Relative Phase	θR-Y_N θG-Y_N	21/22 20/22	On	On	Off	a	a	On	Same as above	— —	105 235	— —	deg	4
Residual Carrier	ϱrcR_N ϱrcG_N ϱrcB_N	21 20 22	On	On	Off	a	a	On		—	—	300	mV_{p-p}	4
Demodulator Bandwidth	f_{BRn} f_{BGN} f_{BBN}	21 20 22	On	On	Off	a	a	On	v_{17}: $100mV_{p-p}$ 10KHz~5MHz	1.1	2.1	3.2	MHz	4
Demo. Output DC Voltage	E_{ORN} E_{OGN} E_{OBN}	21 20 22	Off	Off	Off	a	b	On		6.8	7.4	8.0	V	1
Demo. Output DC Voltage Difference	$E_{o\ (R-G)N}$ $E_{o\ (G-B)N}$ $E_{o\ (B-G)N}$	21 20 22	Off	Off	Off	a	b	On		−0.3	0	0.3	V	1
Demo. Output DC Voltage Therm. Co. Effi.	$\Delta E_{OR\theta N}$ $\Delta E_{OG\theta N}$ $\Delta E_{OB\theta N}$	21 20 22	Off	Off	Off	a	b	On	$T_a = -20 \sim +65°C$	−3	0	2	mV/°C	1
Demo. Output Diff. Voltage Therm. Co. Effi.	$\Delta E_{O(R-G)\theta N}$ $\Delta E_{O(R-B)\theta N}$ $\Delta E_{O(B-G)\theta N}$	21 20 22	Off	Off	Off	a	b	On	$T_a = -20 \sim +65°C$	−2	0	2	mV/°C	1

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, SW_{24}, SW_{27}, SW_{28}, Off, SW_{29}; a)

Horizontal Section (1)

Characteristic	Symbol	Test Pin	SW 34	SW 35	SW 36	SW 37	SW 32	Test Conditions	Specification Min.	Specification Typ.	Specification Max.	Unit	Test CCT
Horizontal Regulated Voltage	V_{33}	33	—	—	—	—			7.4	8.2	9.0	V	1
Recommendable Supply Current	I_{33}	33							22	26	30	mA	5
Horizontal Free Running Frequency	f_H	34	Off	Off	Off	b	a	$V_H = 4V$	15.125	15.625	16.125	kHz	5
f_H Thermal Drift	Δf_{HT}	34	Off	Off	Off	b	a	$V_H = 4V$ $T_a = -20°C \sim +60°C$	−90	70	230	Hz	5
AFC Clamping Voltage	V_{CL}	35	—	—	—	—	a	SW_1: a SW_2: a	3.9	4.5	5.1	V	1
AFC Sink Current	I_{IN35}	35	—	—	—	—	a	SW_1: 1 SW_2: b	2.7	3.7	5.0	mA	1
AFC Source Current	I_{O35}	35	—	—	—	—	a	SW_1: a SW_2: b	2.7	4.0	5.0	mA	1
Horiz. Drive Residual Voltage	V_{OL32}	32	Off	Off	Off	b	a	$V_H = 4V$ Saturation Voltage of #32	—	—	0.3	V	5
Horiz. Output Pulse Duty	T_{O32}	32	Off	Off	Off	b	a	$V_H = 4V$ T_{O32} = Duty cycle of H period.	45	50	55	%	5
Horiz. Osc. Starting Voltage	$V33_{START}$	33	Off	Off	Off	b	a	V_B: Variable Measure #33 which provides Δ50% duty Output to #32	—	—	4.0	V	5
4V Supply Current	$I33_{START}$	33	Off	Off	Off	b	a	$V_B = 4V$ Measure I_{33}	4.6	6.7	8.8	mA	5
AFC Pull-in Range	ΔfH_{PULL}	32 37	On	On	Off	a ↓ b	a	V_H: Variable Observe #32 and #37 wave form. S_{37} a→b, Measure the frequency difference.	—	±900	—	Hz	5
AFC Hold Range	ΔfH_{HOLD}	32 37	On	On	Off	a ↓ b	a	Same as above	—	±1800	–	Hz	5

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, SW_{24}, SW_{27}, SW_{28}, Off, SW_{29}; a)

Horizontal Section (2)

Characteristic	Symbol	Test Pin	SW 34	SW 35	SW 36	SW 37	SW 32	Test Conditions	Specification Min.	Specification Typ.	Specification Max.	Unit	Test CCT
AFC Voltage Sensitivity	β_H	32	Off	Off	Off	b	a	Set V_H so that f_H will be 15.75 KHz. Then, change V_A 4V ~ 5V, Measure f_H difference.	—	1900	—	Hz/V	5
X-ray protector Voltage Sensitivity	V_{IN30}	30	Off	Off	Off	b	a	Apply variable DC voltage to #30 (V_{30}). Measure V_{30} and I_{30} when #32 output disappears.	0.75	0.93	1.1	V	5
X-ray protector Current Sensitivity	I_{IN30}	30	Off	Off	Off	b	a		0.05	0.18	1.0	μA	5
H. Drive Output Excess Voltage Protector Current Sens.	I_{IN32}	32	Off	Off	Off	b	b	Apply variable DC voltage to #32 Measure V_{32} and I_{32} just before V_{32} goes down.	0.05	0.18	1.0	μA	5
Excess Voltage Protector Voltage Sens.	V_{IN32}	32	Off	Off	Off	b	b		7.1	8.6	9.5	V	5

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, SW_{24}, SW_{27}, SW_{28}, Off, SW_{29}; a)

Vertical Section

Characteristic	Symbol	Test Pin	SW 24	SW 26	SW 28	SW 29	Test Conditions	Specification Min.	Specification Typ.	Specification Max.	Unit	Test CCT
Vertical Frequency	f_V	27	Off	Off	Off	c		47	50	54.1	Hz	5
Retrace Time	T_r	27	Off	Off	Off	c	H period of #27 output pulse	450	690	850	μsec	5
f_V Pull-in Range	$\Delta f_{V\,PULL}$	27	Off	Off	On* Off	b	Set f_V to 50Hz at SW_{28} Off; $f_{OSC\,28}$ Measure f_V at SW_{28} On; $f_{OSC'\,28}$ $\Delta f_{V\,PULL} = f_{OSC28} - f_{OSC'28}$	9.0	10.0	11.0	Hz	5
Term. 27 Max. Output Voltage	VO_{27}	27	—	—	—	—	SW_{29}; On SW_4; Off	7.7	8.5	9.2	V	1
Term. 27 Max. Output Current	IO_{27}	27	—	—	—	—	SW_{29}; On SW_4; On	15	27	50	mA	1
Max. Common Mode Input Voltage	VIH_{26}	26	On	On	Off	a	V_{27} = 6→12V	11.9	—	—	V	5
Min. Common Mode Input Voltage	VIL_{26}	26	On	On	Off	a	V_{27} = 6→0V	—	2.8	3.7	V	5
Term. 27 Input Current	II_{27}	27	On	On	Off	a	V_{27} = 6V	0.25	1.0	4.5	μA	5
Term. 26 Input Current	II_{26}	26	On	On	Off	a	V_{27} = 6V	0.18	1.0	6.3	μA	5
Max. Drive Output Voltage	VOH_{24}	24	Off	On	Off	d		7.3	8.0	8.7	V	5
Min. Drive Output Voltage	VOL_{24}	24	Off	Off	Off	d		—	—	0.3	V	5
Term. 25 Bias Voltage	V_{25}	25	—	—	—	—	I_{25} = −0.2mA	3.7	3.9	4.1	V	5
f_V Thermal Drift	Δf_{VT}	27	Off	Off	Off	c	T_a = −20°C ~ +60°C	−1.0	—	2.0	Hz	5

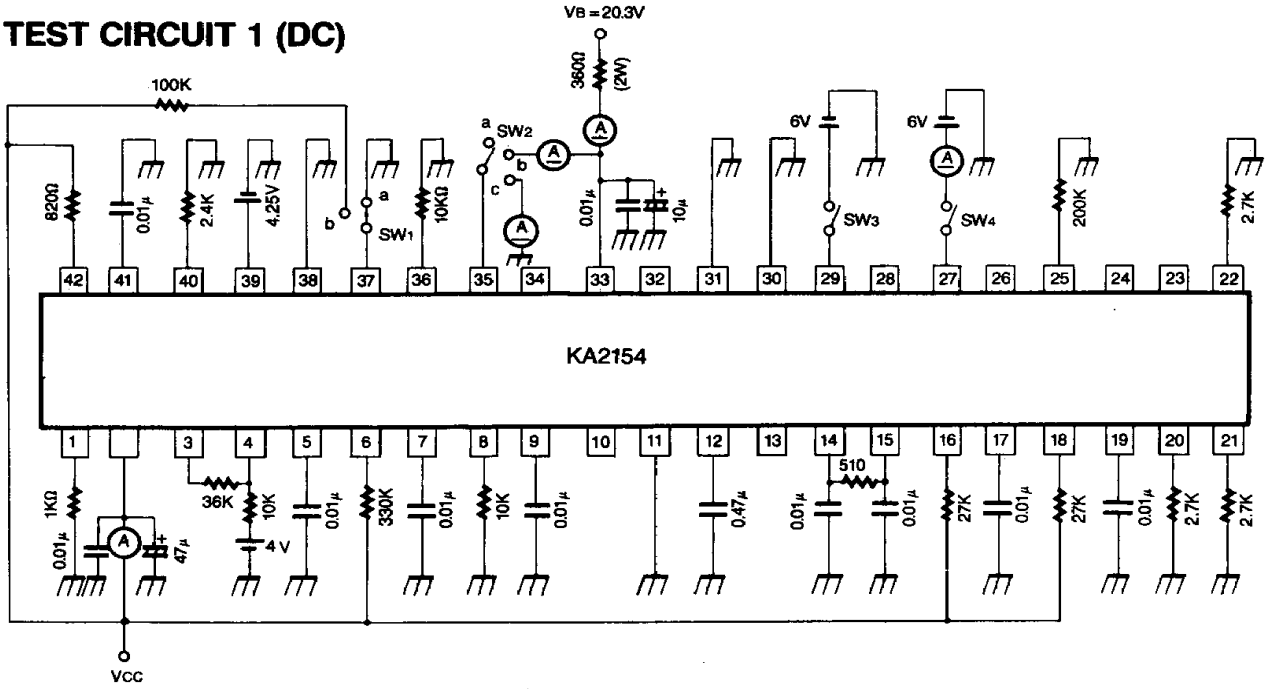
ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, SW_{24}, SW_{27}, SW_{28}, Off, SW_{29}; a)

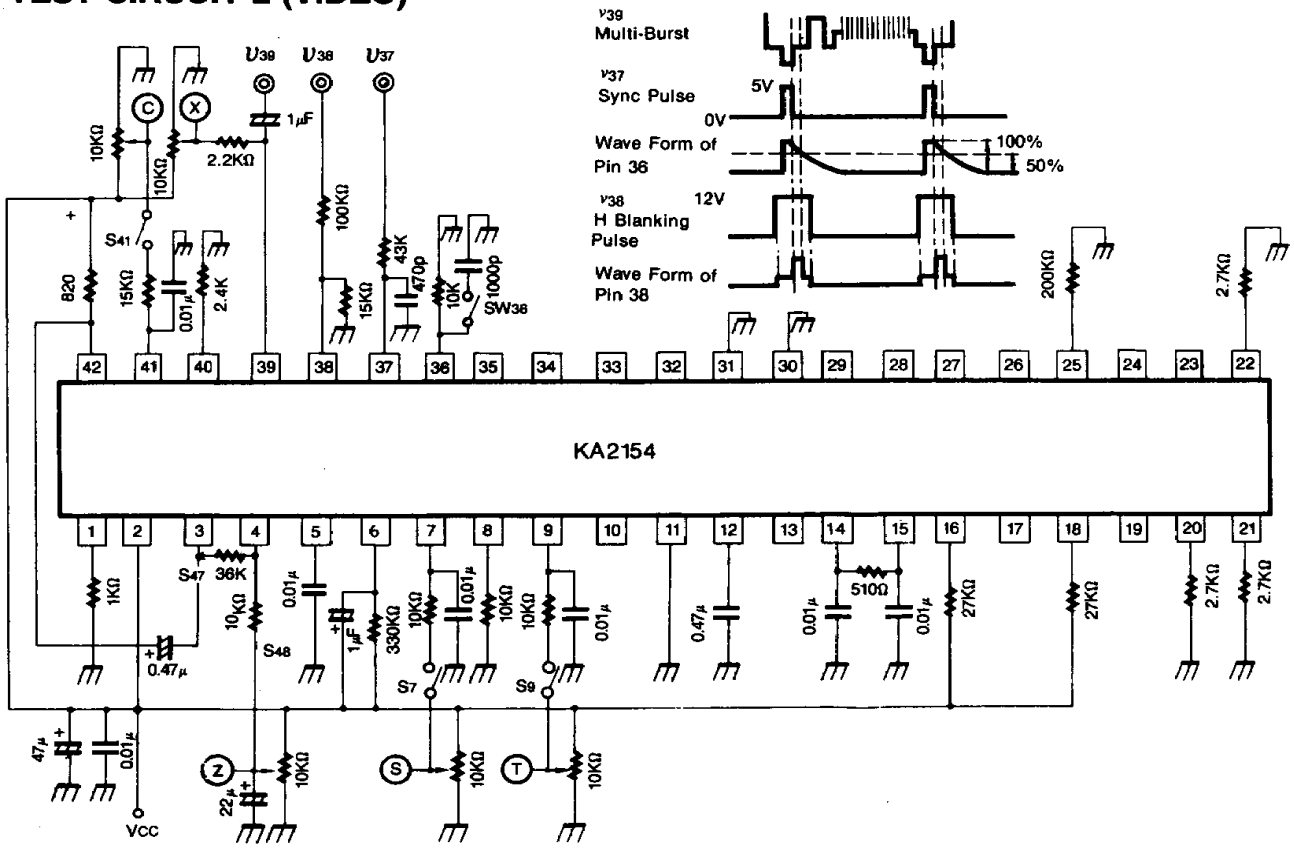
SYNC. Separator

Characteristic	Symbol	Test Pin	SW 34	SW 35	SW 36	SW 37	Test Conditions	Specification Min.	Specification Typ.	Specification Max.	Unit	Test CCT
Sync. Separator Current Sensitivity	I_{IN37}	36 37	Off	Off	Off	c	Measure #37 input current when V_{36} goes L level to H.	18	35	113	μA	5
Sync. Output H Level	V_{OH36}	36	Off	Off	Off	c	V_S=2V Measure V_{36}	7.0	8.2	9.4	V	5
Sync. Outpout L Level	V_{OL36}	36	Off	Off	Off	b	Measure V_{36}	0	0.2	1.0	V	5
Gate Pulse H Level	V_{OH38}	38	Off	Off	Off	b	V_D=12V, V_{36}=5V Measure V_{38}	4.5	5.3	6.1	V	5
Gate Pulse L Level	V_{OL38}	38	Off	Off	Off	b	V_O=12V Measure V_{38}	—	1.6	—	V	5
H Pulse Threshold	V_{38ON}	38	Off	Off	Off	b	V_D: Variable 0→2V Measure V_D when V_{38} goes H to L.	0.7	1	1.5	V	5

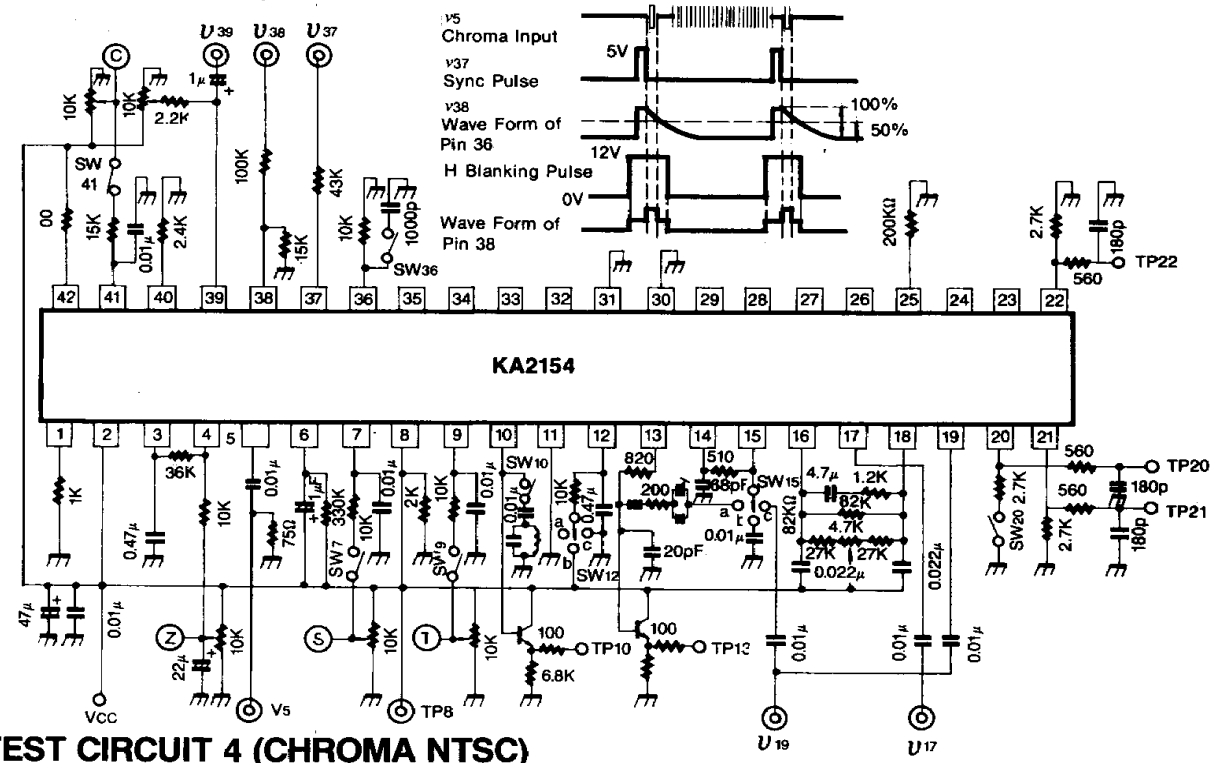
TEST CIRCUIT 1 (DC)



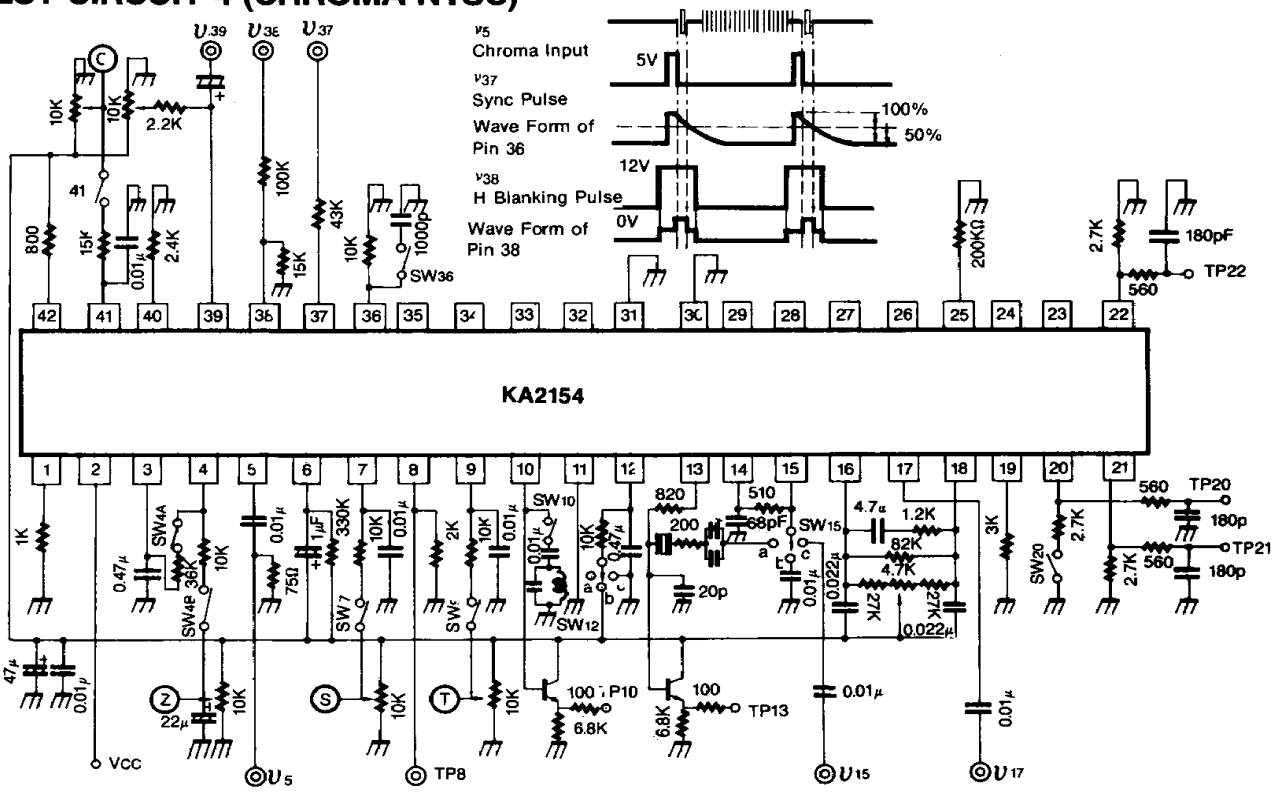
TEST CIRCUIT 2 (VIDEO)



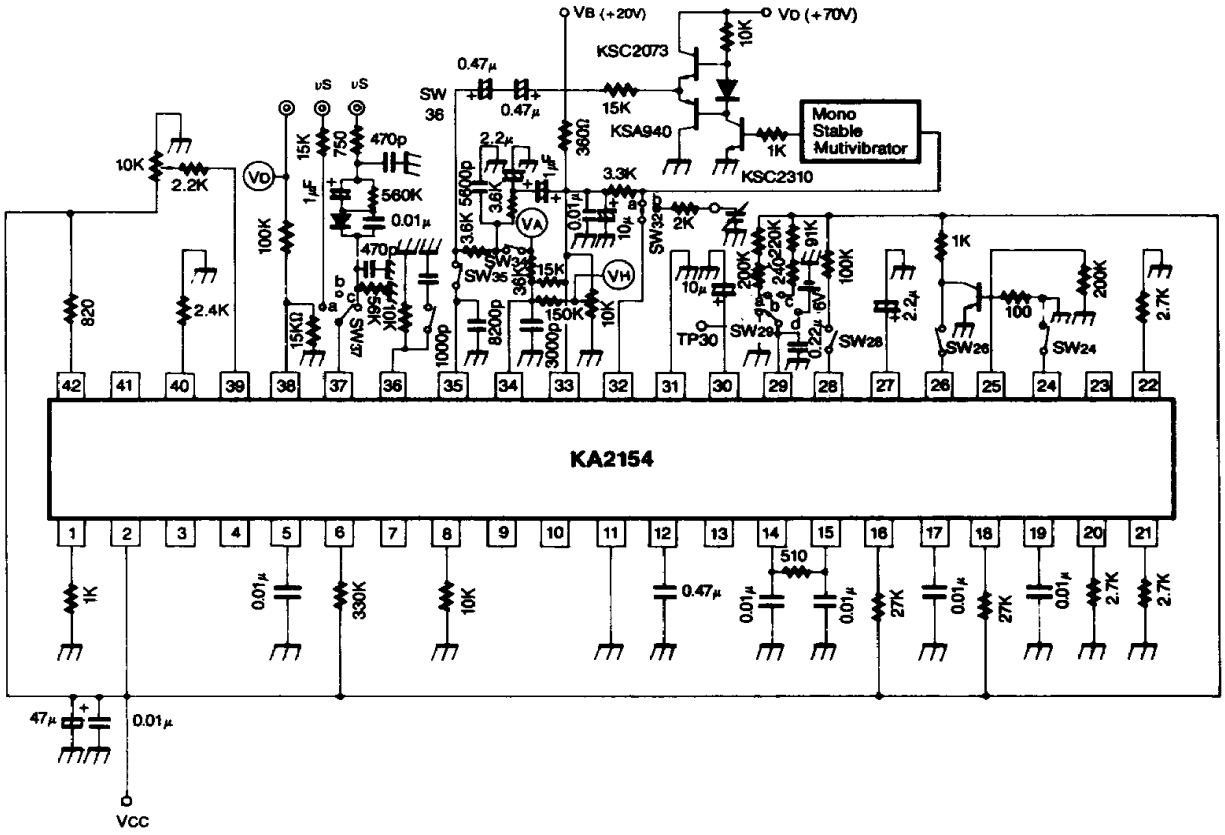
TEST CIRCUIT 3 (CHROMA PAL)



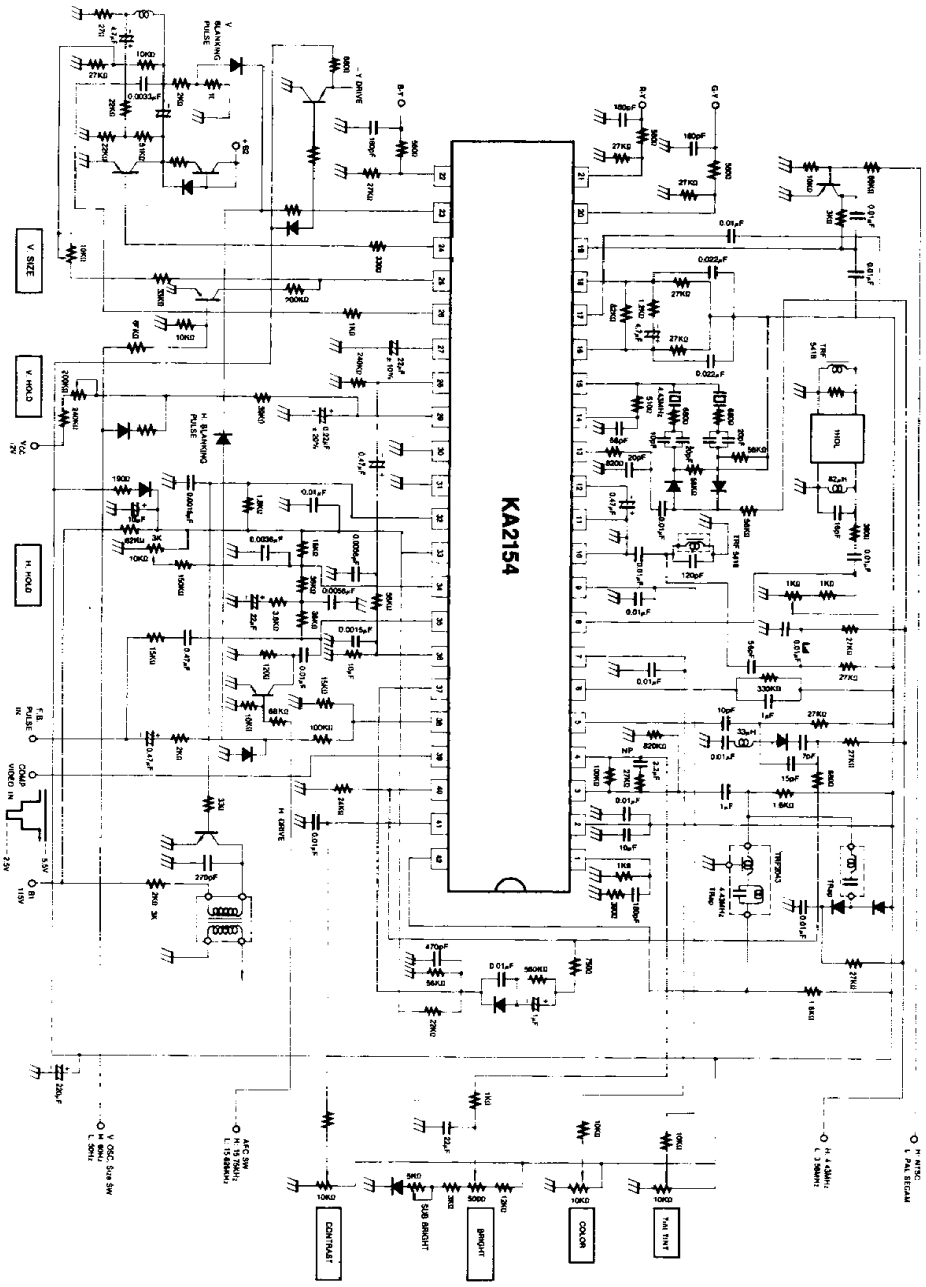
TEST CIRCUIT 4 (CHROMA NTSC)



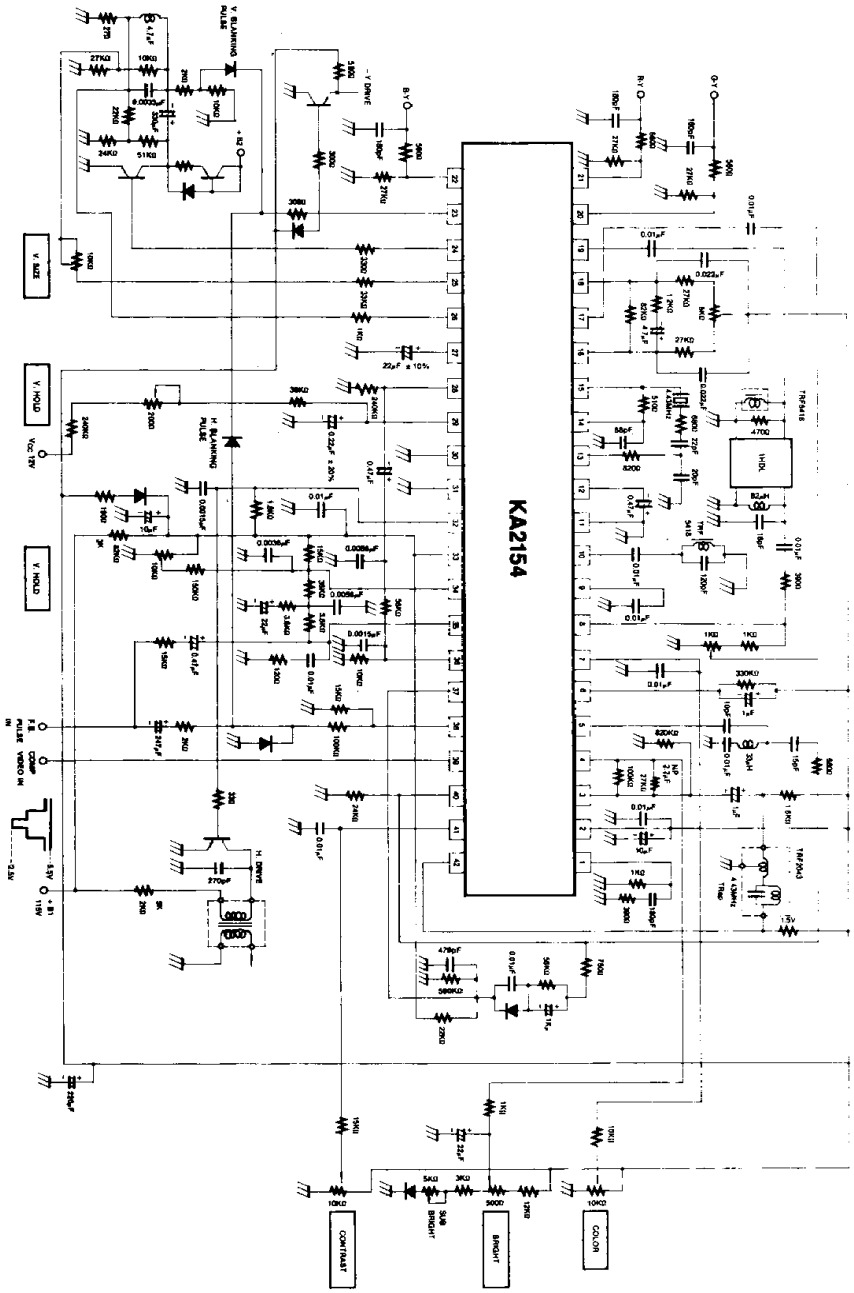
TEST CIRCUIT 5 (Deflection)



KA2154 PAL (SECAM)/NTSC TYPICAL APPLICATION CIRCUIT



KA2154 PAL TYPICAL APPLICATION CIRCUIT



KA2154 NTSC TYPICAL APPLICATION CIRCUIT