TA8659AN

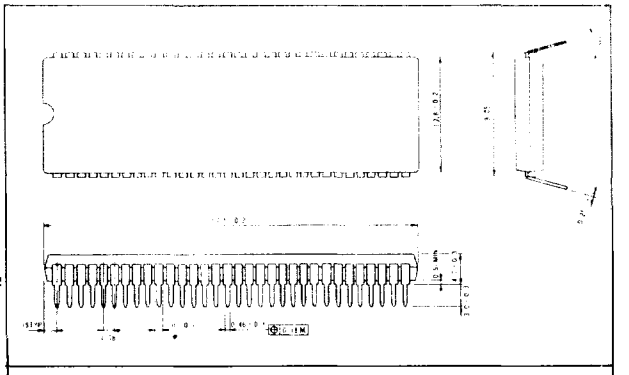
TENTATIVE

Unit: mm

MULTICOLOR VIDEO-CHROMA-DEFLECTION

The TA8659AN is an NTSC/PAL/SECAM video-chroma-deflection subsystem with a teletext interface circuit.

The TA8659N includes all of the functions required to realize a multicolor CTV in conjunction with a PIF/SIF IC, in a 64-lead, shrink-type, dual-in-line plastic package.



EIAJ	—
TOSHIBA	SDIP64-P-750

FEATURES

- Realizes full-automatic multicolor processing in conjunction with the TA8615N system switch, with minimal external components.
- Forced system selection.
- Automatic system change by subcarrier detection.
- The mode change output can be used for switching the external components or circuits.
- RGB interface with high switching speed, half-tone control, and independent contrast control.

FUNCTIONS

Video Section
- DC-controlled, 2nd-order differential picture sharpness.
- Contrast control with uni-color control.
- Brightness control.
- Internal vertical blanking.

Chroma Section
- ACC circuit.
- Color control/uni-color control.
- RGB primary color demodulator outputs.
- Adjustment-free APC circuit.
- Tint control.
- PAL/SECAM/NTSC automatic system detection.
- Forced system selection/Automatic subcarrier detection and switching.

Deflection Section
- Excellent sync separator performance.
- Adjustment-free H/V oscillator by countdown system.
- Stable vertical sync.
- Sawtooth-type horizontal AFC.
- Horizontal predriver.
- X-ray protecter.
- Vertical NFB amplifier.
- 50Hz/60Hz Automatic detection.

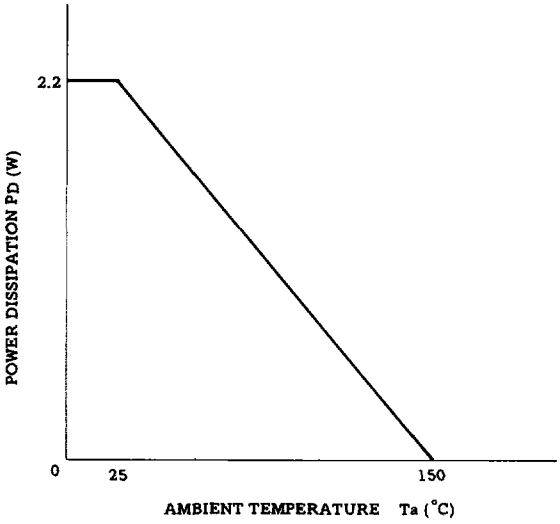
Teletext Interface Section
- RGB input.
- TV/TEXT switch.
- Text contrast control.
- Half-tone control.

TA8659AN

MAXIMUM RATINGS (Ta = 25°C)

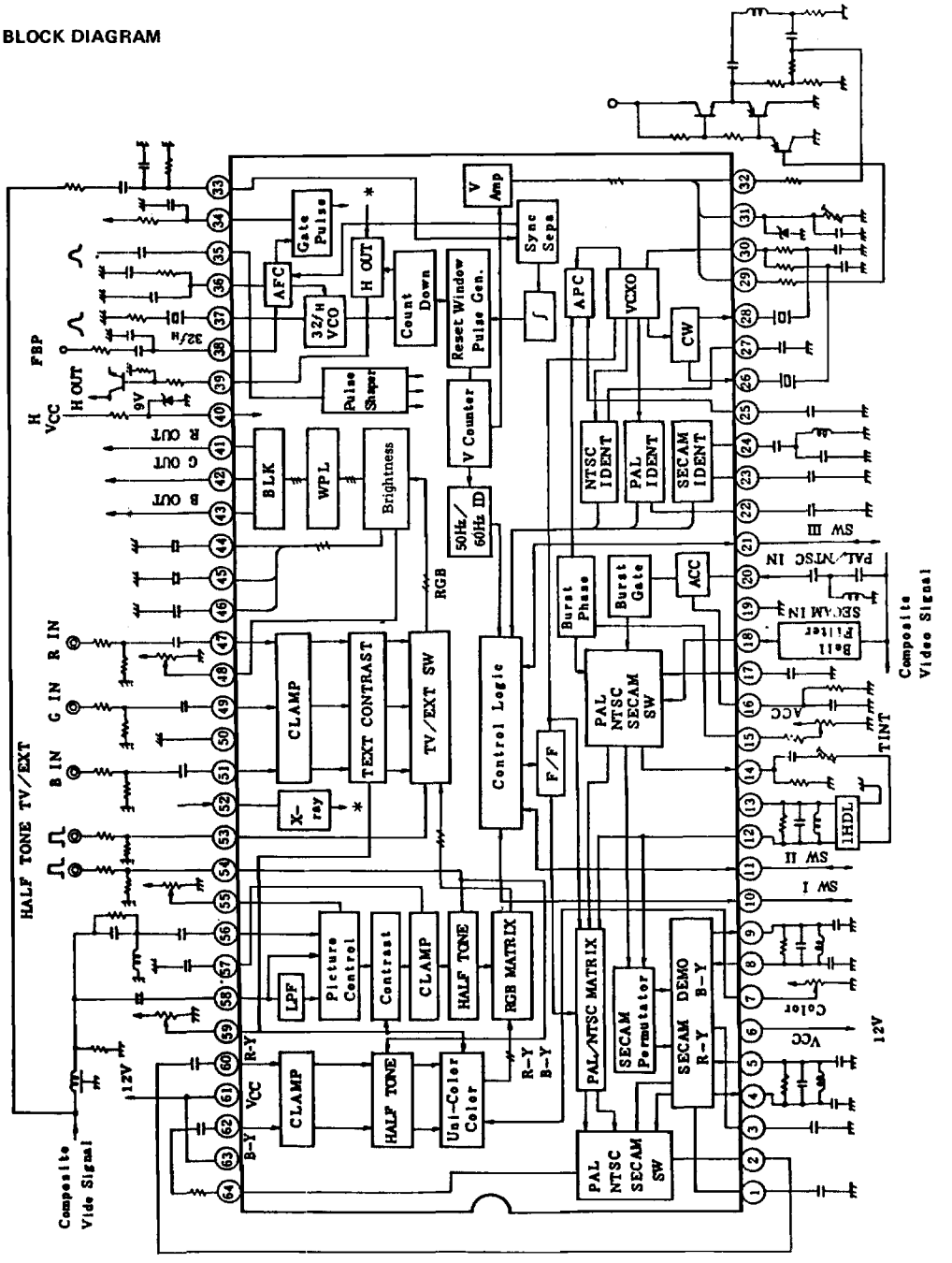
ITEM	SYMBOL	RATING	UNIT
Power Supply Voltage	V_{CC}	15.0	V
Input Terminal Voltage	V_{in}	GND -0.3 to V_{CC} +0.3	V
Input Signal Level	e_{in}	5.0	Vp-p
Power Dissipation	P_D	2.2	W
Operating Temperature	T_{opr}	-20 to 65	°C
Storage Temperature	T_{stg}	-55 to 150	°C

* Note: When using at Ta = 25°C or more, reduce 17.6 mW per 1°C.



TA8659AN

BLOCK DIAGRAM



TA8659AN

TERMINAL DESCRIPTION

#	FUNCTION	#	FUNCTION	#	FUNCTION
1	SECAM B-Y de-emphasis	23	SECAM ident	45	G clamp
2	R-Y OUT	24	SECAM reference	46	B clamp
3	SECAM R-Y de-emphasis	25	APC filter	47	Ext. R input
4	SECAM B-Y DET	26	4.43 X'tal	48	Brightness control
5		27	NTSC ident	49	Ext. G input
6	V_{CC}	28	3.58 X'tal	50	GND
7	Color control	29	Vertical drive	51	Ext. B input
8	SECAM R-Y DET	30	VCXO	52	X-ray
9		31	Vertical ramp	53	TV/EXT. SW
10	SWI	32	Vertical NFB input	54	Half tone
11	SWII	33	Sync separation input	55	Picture sharpness
12	Delay line input	34	Gate pulse filter	56	Diff. input
13	Bias	35	H.BLK input	57	Clamp
14	Delay line drive	36	AFC filter	58	Video input
15	Tint control	37	VCO	59	Contrast control
16	ACC filter	38	H.AFC pulse input	60	R-Y input
17	DC feedback	39	Horizontal output	61	V_{CC}
18	SECAM input	40	H.V_{CC}	62	B-Y input
19	GND	41	R output	63	V_{CC}
20	PAL/NTSC input	42	G output	64	B-Y output
21	SWIII	43	B output		
22	PAL ident	44	R clamp		

TA8659AN

LOGIC TABLE IN AUTOMATIC MODE

IDENT			X'TAL MODE	SWI	SWII	SWIII	MODE SELECT
PAL	SECAM	NTSC		#10	#11	#21	
#22	#23	#27					
H	L	H	4.43	H	H	M	PAL
L	H	L	4.43	H	M	M	SECAM
L	L	H	4.43	L	H	M	4.43 NTSC
L	L	H	3.58	L	L	M	3.58 NTSC
L	L	L	4.43/3.58	L	M/L	L	B/W
Output DC Level H → V_{CC} L = 6.0V			—	Output DC Level H = 6.0V ($1/2V_{CC}$) M = 2.0V ($1/6V_{CC}$) L = 0V (Connect to GND through 30 kΩ)			

INPUT VOLTAGE IN FORCED (MANUAL) MODE

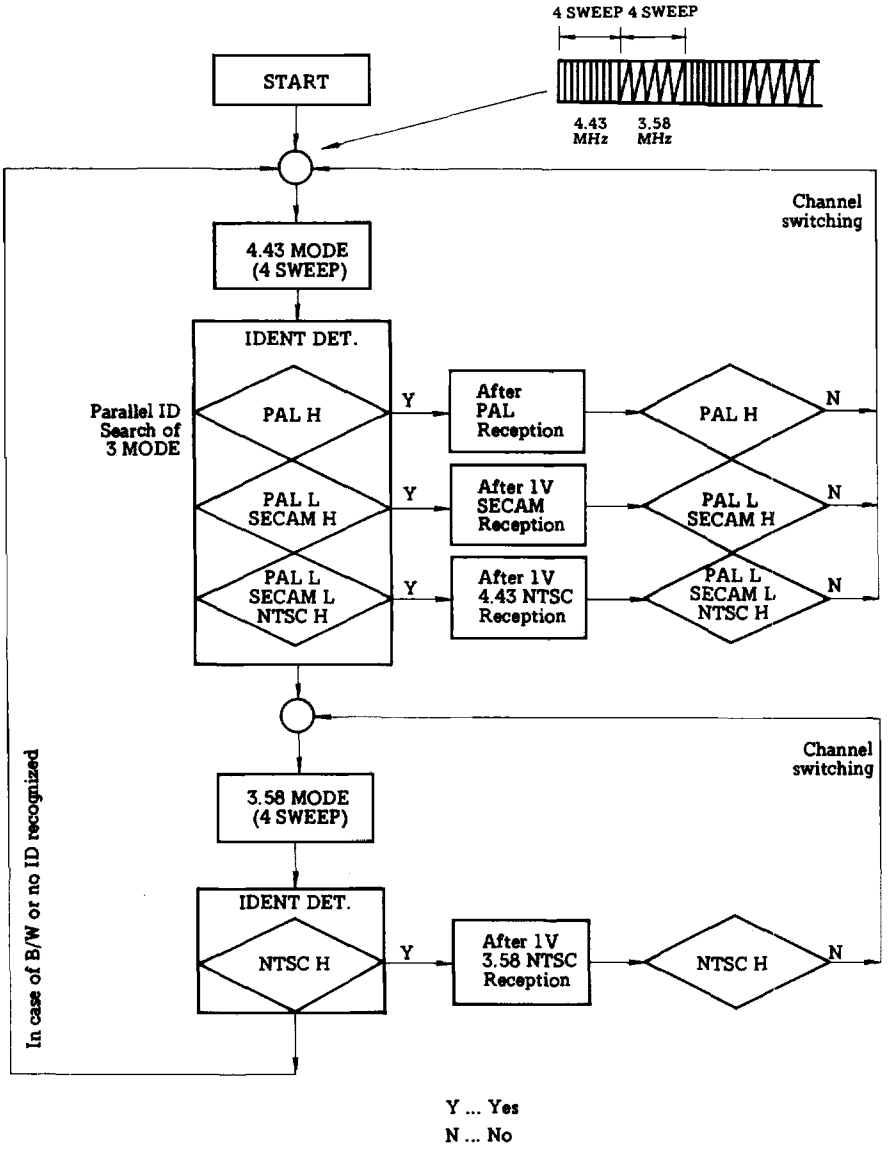
MODE	SWI	SWII	SWIII
	#10	#11	#21
PAL	H	H	H
SECAM	H	L	H
4.43 NTSC	L	H	H
3.58 NTSC	L	L	H

H: 6V

L: 0V

TA8659AN

FLOW CHART OF SYSTEM IDENTIFICATION



Y ... Yes
N ... No

TA8659AN

1. DC VOLTAGE AND CURRENT CHARACTERISTICS

(Ta = 25°C, V_{CC} = 12V, H.V_{CC} = 9V unless otherwise specified)

DC VOLTAGE CHARACTERISTICS

#	TERMINAL	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
1	SECAM B-Y De-emphasis	V_1	8.3	8.65	9.0	V	—
2	R-Y OUT	V_2	7.4	7.95	8.4		
3	SECAM R-Y De-emphasis	V_3	8.3	8.65	9.0		
4	SECAM B-Y DET	V_4	6.0	6.5	7.0		5.5V in SECAM MODE
5		V_5	6.0	6.5	7.0		
6	V_{CC}	V_6	—	V_{CC}	—		—
7	Color Control	V_7	—	—	—		
8	SECAM R-Y DET	V_8	6.0	6.5	7.0		5.5V in SECAM MODE
9		V_9	6.0	6.5	7.0		
10	SWI	V_{10}	5.4	6.0	6.6		PAL, SECAM MODE
11	SWII	V_{11}	5.4	6.0	6.6		PAL, 4.43 NTSC MODE
12	Delay Line Input	V_{12}	4.8	5.2	5.6		—
13	Bias	V_{13}	4.8	5.2	5.6		
14	Delay Line Drive	V_{14}	9.9	10.25	10.6		NTSC B/W MODE, 8.0V at P/S MODE
15	Tint Control	V_{15}	5.5	5.9	6.3		—
16	ACC Filter	V_{16}	—	11.3	—		B/W MODE, 10.7V at P/N MODE (100 mVp-p burst)
17	DC Feedback	V_{17}	3.2	3.55	3.9		—
18	SECAM Input	V_{18}	4.1	4.45	4.8		50Hz MODE, 7.5V at 60Hz MODE
19	GND	V_{19}	—	GND	—		—
20	PAL/NTSC Input	V_{20}	5.5	5.85	6.2		HID MODE. 4.8V at VID (15 kΩ GND)
21	SWIII	V_{21}	1.6	2.0	2.8		PAL, SECAM, NTSC MODE
22	PAL Ident	V_{22}	4.1	4.35	4.8		—
23	SECAM Ident	V_{23}	4.1	4.35	4.8		
24	SECAM Reference	V_{24}	5.4	5.8	6.2		
25	APC Filter	V_{25}	—	6.0	—		
26	4.43 X'tal	V_{26}	2.8	3.15	3.5		
27	NTSC Ident	V_{27}	4.1	4.45	4.8		
28	3.58 X'tal	V_{28}	2.8	3.15	3.5		
29	Vertical Drive	V_{29}	—	—	—		
30	VCXO	V_{30}	8.4	9.5	10.6		
31	Vertical Ramp	V_{31}	—	—	—		
32	Vertical NFB Input	V_{32}	—	—	—		

TA8659AN

#	TERMINAL	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
33	Sync Separation Input	V_{33}	5.4	6.0	6.6	V	—
34	Gate Pulse Filter	V_{34}	--	--	--		
35	H.BLK Input	V_{35}	3.8	4.1	4.4		
36	AFC Filter	V_{36}	7.0	7.5	8.0		
37	VCO	V_{37}	2.7	3.05	3.4		
38	H.AFC Pulse Input	V_{38}	6.3	6.7	7.1		
39	Horizontal Output	V_{39}	—	—	—		
40	H.V_{CC}	V_{40}	—	H.V_{CC}	—		
41	R Output	V_{41}	0.7	1.25	1.8		
42	G Output	V_{42}	0.7	1.25	1.8		
43	B Output	V_{43}	0.7	1.25	1.8		
44	R Clamp	V_{44}	2.5	3.2	3.6		#34: 3.0V #35: 2.5V (through 10k Ω)
45	G Clamp	V_{45}	2.5	3.2	3.6		
46	B Clamp	V_{46}	2.5	3.2	3.6		
47	Ext. R Input	V_{47}	4.7	6.0	7.3		
48	Brightness Control	V_{48}	—	—	—		
49	Ext. G Input	V_{49}	4.7	6.0	7.3		
50	GND	V_{50}	—	GND	—		
51	Ext. B Input	V_{51}	4.7	6.0	7.3		
52	X-ray	V_{52}	—	—	—		—
53	TV/EXT. SW	V_{53}	—	—	—		
54	Half Tone	V_{54}	—	—	—		
55	Picture Sharpness	V_{55}	5.0	5.4	5.8		
56	Diff. Input	V_{56}	2.9	3.25	3.6		
57	Clamp	V_{57}	—	5.9	—		
58	Video Input	V_{58}	4.4	4.8	5.2		
59	Contrast Control	V_{59}	—	—	—		
60	R-Y Input	V_{60}	5.8	6.2	6.6		#34: 3.0V #35: 2.5V (through 10k Ω)
61	V_{CC}	V_{61}	—	V_{CC}	—		
62	B-Y Input	V_{62}	5.8	6.2	6.6		
63	V_{CC}	V_{63}	—	V_{CC}	—		—
64	B-Y Output	V_{64}	7.4	7.95	8.4		

TA8659AN

CURRENT CHARACTERISTICS

#	TERMINAL	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
6	V_{CC} (CHROMA)	I_1	30	42	65	mA	—
63	V_{CC} (VIDEO)	I_2	25	38	55		
61	V_{CC} (VIDEO, DEF)	I_3	8	10	15		
40	H.V_{CC} (H.DEF)	I_4	6	10	15		
V_{CC} Total Current		I_{CC1}	63	90	135		$I_{CC1} = I_1 + I_2 + I_3$
H.V_{CC} Total Current		I_{CC2}	6	10	15		$I_{CC2} = I_4$

2. RECOMMENDED SUPPLY VOLTAGE

SUPPLY TERMINAL	SYMBOL	MIN.	TYP.	MAX.	UNIT
6, 61, 63	V_{CC}	10.8	12.0	12.5	V
40	H.V_{CC}	8.1	9.0	9.9	

3. AC CHARACTERISTICS

(Ta = 25°C, V_{CC} = 12V, H.V_{CC} = 9V unless otherwise specified)

VIDEO

CHARACTERISTICS	SYMBOL	LIMIT			UNIT	MEASUREMENT						NOTE
						SW & VR SETTING						
		MIN.	TYP.	MAX.		Uni-color Control	Sharpness Control	Color Control	Brightness Control	#56	#58	
Diff. Input (#56) Input Impedance	Z_{in56}	700	910	1150	Ω	MIN	OPEN	MIN	CENTER	MEASURE	AC GND	Note (1)
Video Input (#58) Input Impedance	Z_{in58}	14.0	20.0	24.0	kΩ					AC GND	MEASURE	Note (2)
Dynamic Range of Video Input	V_{ri}	2.9	3.4	—	V				ADJ		AC GND	Note (3)
Min. Output	V_{do1}	0.1	0.3	0.6								Note (4)
Max. Output	V_{do2}	7.7	8.1	8.5								Note (4) #54:OPEN
	V_{do3}	7.1	7.5	7.9								Note (4) #54:GND

CHARACTERISTICS	SYMBOL	LIMIT			UNIT	MEASUREMENT							
						SW & VR SETTING							NOTE
		MIN.	TYP.	MAX.		Uni-color Control	Sharpness Control	Color Control	Brightness Control	#56	#58	#54	
White Peak Limit Level	V_{PL}	7.3	7.5	7.7	V	MAX	OPEN	MAX	ADJ	AC GND	AC GND	GND	Note (5)
White Peak Slice Level	V_{PS}	7.9	8.1	8.3								OPEN	Note (6)
Dynamic Range of 2nd-order Differintial Video Input	V_{drp}	0.3	0.4	0.6	V	MIN	MAX	MIN		MEASURE			Note (7)
AC Gain (Y)	G_Y	5.9	7.7	8.9	times	MAX	MIN			AC GND	Input	—	Note (8)
Frequency Characteristics (Y)	F_Y	8.0	10.0	—	MHz		MAX						Note (9)

TA8659AN

CHARACTERISTICS	SYMBOL	LIMIT MIN.	LIMIT TYP.	LIMIT MAX.	UNIT	MEASUREMENT SW & VR SETTING: Uni-color Control	Sharpness Control	Color Control	Brightness Control	#56	#58	—	NOTE
Uni-color Control Adjust. Voltage Range (Y)	ΔV_{UY}	1.0	1.5	2.0	V	ADJ	OPEN	MIN	ADJ	AC GND	IN	—	Note (10)
Gain Variation Range by Uni-color Adjust. (Y)	ΔG_{UY}	20.0	21.0	22.0	dB								Note (11)
Uni-color Adjustment Control Range (Y)	V^{C}_{UY}	3.0	3.3	3.6	V								Note (12)
Uni-color Control Adjust. Voltage Range (U, V)	ΔV_{UC}	1.0	1.4	1.8	V			MAX			AC GND		Note (13)
Gain Variation Range by Uni-color Adjust. (U, V)	ΔG_{UC}	20.0	21.0	22.0	dB								Note (14)
Uni-color Adjustment Control Range (U, V)	V^{C}_{UC}	3.0	3.3	3.6	V								Note (15)
Gain of Picture Sharpness Control	G_{PS}	17.0	18.5	20.0	dB	MAX	MAX	MIN		INPUT			Note (16)
Picture Sharpness Control Range	$\Delta V_{\#55}$	1.8	2.4	3.0	V		ADJ			INPUT and AC GND	INPUT and AC GND		Note (17)

CHARACTERISTICS	SYMBOL	LIMIT			UNIT	MEASUREMENT							
						SW & VR SETTING							NOTE
		MIN.	TYP.	MAX.		Uni-color Control	Sharpness Control	Color Control	Brightness Control	#56	#58	—	
Half Tone (Y)	ΔV_{3T1}	-3.5	-3.0	-2.5	dB	MAX	OPEN	MIN	ADJ	AC GND	INPUT		Note (18)
	ΔV_{3T2}	-6.5	-6.0	-5.5									
Half Tone Switching Level (Y)	S_W^{-3dB}	2.7	3.0	3.3	V								Note (19)
	S_W^{-6dB}	4.8	5.1	5.4									
	S_W^{ACL}	0.7	1.0	1.2									
Half Tone (U, V)	V_{R-Y1} V_{B-Y1}	-3.5	-3.0	-2.5	dB			MAX			AC GND	—	Note (20)
	V_{R-Y2} V_{B-Y2}	-6.5	-6.0	-5.5									
Color Control Variable Range	$\Delta V_{\#7}$	1.0	1.4	1.8	V			ADJ					Note (21)
Color Control Center Voltage	$V_{\#7C}$	3.0	3.3	3.6	V								
AC Gain (R-Y)	G_{R-Y}	7.2	10.4	14.8	times			MAX					Note (22)
AC Gain (B-Y)	G_{B-Y}	13.0	18.5	26.2	times								Note (23)
Relative Amplitude (I) PAL/SECAM	$\frac{G-Y}{R-Y}$	-0.56	-0.51	-0.46	—								Note (24)
	$\frac{G-Y}{B-Y}$	-0.21	-0.19	-0.17									Note (25)

CHARACTERISTICS	SYMBOL	LIMIT			UNIT	MEASUREMENT							NOTE
						SW & VR SETTING							
		MIN.	TYP.	MAX.		Uni-color Control	Sharpness Control	Color Control	Brightness Control	#56	#58	—	
Relative Amplitude (II) NTSC	$\frac{G-Y}{R-Y}$	-0.35	-0.32	-0.29	—	MAX	OPEN	MAX	ADJ	AC GND	AC GND	—	Note (26)
	$\frac{G-Y}{B-Y}$	-0.24	-0.22	-0.20									Note (27)
Dynamic Range of R-Y Input	ΔV_{R-Y}	2.6	3.2	4.2	V	MIN							Note (28)
Dynamic Range of B-Y Input	ΔV_{B-Y}	1.5	1.8	2.4	V								Note (29)
Frequency Response of Color Differential Signal	F_D	3	5	—	MHz	MAX	MIN						Note (30)
Brightness Control Gain	G_{BR}	0.9	1.0	1.1	times		OPEN						Note (31)
Brightness Control Adjust. Voltage	$V_{\#48}$	2.9	3.2	3.5	V								Note (32)
V-BLK Pulse Output Level	V_{VR} V_{VG} V_{VB}	1.0	1.5	2.0	V								Note (33)
H-BLK Pulse Output Level	V_{HR} V_{HG} V_{HB}	1.0	1.5	2.0	V								Note (34)
DC Restoration Ratio	T_{DC}	95.0	98.0	100	%	ADJ		MIN			Input		Note (35)
Service SW ON Level	$V_{\#56S}$	0.5	0.7	1.0	V	MAX	ADJ	MAX					Note (36)

DATA

CHARACTERISTICS	SYMBOL	LIMIT			UNIT	MEASUREMENT							NOTE
						SW & VR SETTING							
		MIN.	TYP.	MAX.		TEXT Contrast Control	S47	V53	Color Control	Sharpness Control	V48	—	
DATA Contrast Control Voltage Range	ΔV_{TC}	1.1	1.6	2.2	V	ADJ	a ↓ b ↓ c	5V	MAX	Center	3V		
DATA Contrast Gain Variation Range	ΔG_{TC}	11.0	12.0	13.0	dB								Note (37)
DATA Contrast Control Center Voltage	V_{TC}^{C}	3.0	3.3	3.6	V								
Input Dynamic Range	V_{DI}	2.0	—	—	Vp-p	MIN						—	Note (38)
Input Clamp Level	V_{TIN}^{MIN}	4.0	6.0	8.0	V		d						Note (39)
	V_{TIN}^{MAX}	6.7	7.4	8.1	V	MAX							
Gain	G_T	16.0	17.0	18.0	dB		a ↓ b ↓ c						Note (40)
Rise Time	τ_R	—	25	—	nsec								Note (41)
Propagation Time (Rising Edge	t_{PR}	—	25	—									
Fall Time	τ_F	—	25	—									
Propagation Time (Falling Edge	t_{PF}	—	25	—									

CHARACTERISTICS	SYMBOL	LIMIT			UNIT	MEASUREMENT							NOTE
						SW & VR SETTING							
		MIN.	TYP.	MAX.		TEXT Contrast Control	S47	V53	Color Control	Sharpness Control	V48	—	
DATA Input ON Level	V_{TSW}^{ON}	1.0	—	—	V	MAX	a	ADJ	MAX	Center	3V		Note (42)
DATA Input OFF Level	V_{TSW}^{OFF}	—	—	0.5									
Video → DATA Switching Time	t_{SVD}	—	40	—	nsec		a↓b↓c						Note (43)
DATA → Video Switching Time	t_{SDV}	—	40	—									
Crosstalk DATA → Video	CT_T	-43	-50	—	dB			5V → 0V			5V		Note (44)
Crosstalk Video → DATA	CT_Y	-43	-50	—			d	0V → 5V					Note (45)
Band Width of DATA	F_T	14	19	—	MHz		a → b → c	5V					Note (46)
Clamp Voltage	V_{44} V_{45} V_{46}	2.3	3.3	4.3	V		d	5V			3V		Note (47)
Blanking Input Threshold Voltage	V_{BLK}^{ON}	1.5	2.0	2.5	V			0V					Note (48)
Blanking Pulse Delay Time	t_{dBP}^{ON}	—	0.35	0.5	μsec			0V					Note (49)
	t_{dBP}^{OFF}	0.76	0.86	0.96									

CHROMA

CHARACTERISTICS	SYMBOL	LIMIT			UNIT	MEASUREMENT									NOTE
						SW & VR SETTING									
		MIN.	TYP.	MAX.		2&64	13	15	18	20	22	23	27	35	
Chroma Amplitude	V_{13PC}	0.10	0.15	0.22	Vp-p	—	OFF	—	C	B	A	B	A	A	Note (50)
	$V_{13nc3.58}$	0.11	0.17	0.25							B				
ACC Characteristic	e_{apc}	0.03	0.06	—							A				Note (51)
	A	0.90	1.00	1.30	—										
Delay Line Amp. Gain	V_{14PC}	0.96	1.20	1.92	Vp-p										Note (52)
	G_{DL}	15.0	18.0	21.0	dB		ON & OFF								
Tint Control Voltage	$V_{15}^{3.58n}$	5.50	6.00	6.50	V	ON	ON	ADJ	A	A	B or OFF	B or OFF	A or OFF	B	Note (53)
Tint Control Voltage Range	$\Delta V_{15}^{3.58n}$	1.50	2.20	2.90											
Tint Control Range	$\frac{\Delta\theta_{15}^{3.58n}}{\Delta\theta_{15}^{4.43n}}$	$\frac{77}{65}$	$\frac{101}{90}$	$\frac{131}{121}$	—										
Tint Control Symmetricity	$\frac{\Delta\theta_{1}^{3.58n}}{\Delta\theta_{1}^{4.43N}}$	$\frac{35}{30}$	$\frac{51.8}{41.9}$	—	—										
	$\frac{\Delta\theta_{2}^{3.58n}}{\Delta\theta_{2}^{4.43N}}$	$\frac{35}{30}$	$\frac{49.4}{47.3}$	—											
4.43 APC Pull-in & Hold Range	f_{4PH} f_{4PL} f_{4HH} f_{4HL}	0.40	0.60	1.00	kHz			OFF	C	B	B	B	OFF	A	Note (54)

CHARACTERISTICS	SYMBOL	LIMIT			UNIT	MEASUREMENT									NOTE
						SW & VR SETTING									
		MIN.	TYP.	MAX.		2&64	13	15	18	20	22	23	27	35	
3.58 APC Pull-in & Hold Range	f_{3PH} f_{3PL} f_{3HH} f_{3HL}	0.40	0.60	1.00	kHz	ON	ON	OFF	C	B	B	B	OFF	A	Note (55)
Frequency Control Sensitivity	$ß_{4.4}$	3.00	4.20	5.40	Hz/mV					C	A		A		Note (56)
	$ß_{3.5}$	3.00	4.20	5.40							B				
APC Pull-in Voltage	V_{25-4}	5.90	6.00	6.10	V					B	OFF		OFF		Note (57)
	V_{25-3}	5.90	6.00	6.10											
APC Pull-in Sweep Amplitude	SV1	6.35	6.50	6.70	V					C	B		B		Note (58)
	SV2	5.20	5.45	5.60											
	SV3	0.70	1.00	1.30											
APC Pull-in Sweep Period	t_1	7	16	25	msec										
	t_2	60	80	100											
	t_3	67	96	125											
Color Difference Output	V_{2PR}	0.29	0.40	0.62	Vp-p			ON ADJ	A	A	A or OFF	B or OFF	A or OFF	B	Note (59)
	V_{64PB}														
	$\frac{V_{2nR}}{V_{2NR}}$	$\frac{0.46}{0.42}$	$\frac{0.68}{0.61}$	$\frac{1.00}{0.90}$	—										
	$\frac{V_{64nB}}{V_{64NB}}$	$\frac{0.33}{0.27}$	$\frac{0.44}{0.39}$	$\frac{0.65}{0.57}$											

CHARACTERISTICTS	SYMBOL	LIMIT			UNIT	MEASUREMENT									
						SW & VR SETTING									NOTE
		MIN.	TYP.	MAX.		2&64	13	15	18	20	22	23	27	35	
Relative Amplitude	$\frac{V_{2PR}}{V_{64PB}}$	0.85	1.00	1.15	—	ON	ON	ON ADJ	A	A	A or OFF	B or OFF	A or OFF	B	Note (59)
	$\frac{V_{2nR}}{V_{64nB}}$ $\frac{V_{2NR}}{V_{64NB}}$	1.32	1.53	1.77											
Relative Phase	θ_{2PR}	85	90	95	deg										Note (60)
	θ_{2nR} θ_{2NR}	102	109	116											
Characteristics of SECAM Limiter	e_{18}	20	30	44	mVp-p		OFF	OFF	B	C	B	A	B	A	Note (61)
	e_{13}	310	460	670											
	Δe_{13}	-50	0	50											
SECAM Color Difference Output	V_{2SR}	0.68	1.00	1.47	Vp-p		ON		A	A	B or OFF	A or OFF	B or OFF	B	Note (62)
	V_{64SB}	0.48	0.71	1.04											
SECAM Relative Amplitude	$\frac{V_{2S}}{V_{64S}}$	1.00	1.15	1.33	—		OFF & ON		B	C	B	OFF or A	B	A & OFF	Note (63)
Band Width of SECAM Demodulated Signal	2B 64B	0.80	1.15	—	MHz										Note (64)

CHARACTERISTICTS	SYMBOL	LIMIT			UNIT	MEASUREMENT									NOTE
						SW & VR SETTING									
		MIN.	TYP.	MAX.		2&64	13	15	18	20	22	23	27	35	
SECAM Crosstalk	V_{2SRC}	0.68	1.00	1.47	Vp-p	ON	ON	OFF	A	A	B or OFF	A or OFF	B or OFF	B	Note (65)
	V_{2E}	—	—	46	mVp-p										
	RC	30	—	—	dB										
	V_{64SBC}	0.48	0.71	1.04	Vp-p										
	V_{64E}	—	—	33	mVp-p										
	BC	30	—	—	dB										
50/60 Detection	V_{18-50}	4.20	4.50	4.80	V				C	A	A or OFF	B or OFF	A or OFF	B	Note (66)
	V_{18-60}	7.00	7.30	7.60											
IDENT Input Level	$P_{IN\ B/W}$	0.60	1.00	1.70	mVp-p			—			OFF	B	OFF	A	Note (67)
	$N_{IN\ B/W}$	0.40	0.70	1.30				OFF			B				
	$S_{IN\ B/W}$	0.60	1.00	1.70					B	C		OFF	B		Note (68)
	$P_{IN\ COLOR}$	0.60	2.50	4.30				—	C	A	OFF	B	OFF		Note (69)
	$N_{IN\ COLOR}$	0.40	1.80	3.10				OFF			B				
	$S_{IN\ COLOR}$	0.60	1.00	1.70					B	C		OFF	B		Note (70)
IDENT Voltage	PC	—	6.40	—	V			—	C	A	OFF & ADJ	B	OFF A & ADJ		Note (71)
	PS	—	6.40	—											
	NC	—	6.40	—				OFF			B		OFF & ADJ		Note (72)
	NS	—	6.40	—											
	SC	—	6.40	—					B	C		OFF & ON ADJ	B		Note (73)

TA8659AN

CHARACTERISTICS	SYMBOL	LIMIT MIN.	LIMIT TYP.	LIMIT MAX.	UNIT	SW10	SW11	SW20	Receiving System
Output Voltage of SWI (#10)	V_{SI}	5.4	6.0	6.6	V	a	a	a	PAL, SECAM
		0	0	0.4					NTSC, B/W
Output Voltage of SWII (#11)	V_{SII}	5.4	6.0	6.6					PAL, 4.43 NTSC
		1.6	2.0	2.8					SECAM, B/W I
		0	0	0.4					3.58 NTSC, B/W II
Output Voltage of SWIII (#21)	V_{SIII}	1.6	2.0	2.8					PAL, SECAM, NTSC
		0	0	0.4					B/W

DEFLECTION

CHARACTERISTICS	SYMBOL	LIMIT			UNIT	NOTE
		MIN.	TYP.	MAX.		
Sync Separation Input Current Sensitivity	I_{IN33}	35	50	65	μA	Note (74)
H.AFC Phase Detection Current	I_{DET}	0.45	0.55	0.70	mA	Note (75)
Phase Detection Masked Period	T_{CO60}	—	258.25-5.75	—	H	Note (76)
	T_{CO50}	—	308.25-5.75	—		
32 f_H VCO Oscillation Stage Voltage	V_{ON37}	3.0	4.0	4.5	V	Note (77)
Horizontal Output Start Voltage	V_{ON39}	4.6	5.0	5.4		Note (78)
Horizontal Free-running Frequency	f_o	15.475	15.625	15.775	kHz	Note (79)
Horizontal Frequency Oscillation Range	f_{max}	16.40	16.45	16.60		Note (80)
	f_{min}	14.70	15.00	15.25		Note (81)
Horizontal Frequency Control Sensitivity	$ß_H$	1.8	2.1	2.4	kHz/V	Note (82)
Horizontal Output Duty Ratio	T_{O39}	40	42	44	%	Note (83)
X-ray Protection Threshold Voltage	V_{I52}	1.1	1.3	1.5	V	Note (84)
X-ray Protection Hold Voltage	V_{H52}	—	—	2.5		Note (85)
X-ray Protector Current Sensitivity	I_{I52}	—	—	2.5	μA	Note (86)
Horizontal Output Voltage	V_{H39}	4.8	5.1	5.4	V	Note (87)
	V_{L39}	—	0	0.1		
Vertical Output Pulse Width	T_{O31}	—	10	—	H	Note (88)
Vertical Amplifier Gain	G_V	17	20	23	dB	Note (89)

CHARACTERISTICS	SYMBOL	LIMIT			UNIT	NOTE
		MIN.	TYP.	MAX.		
Vertical Output Dynamic Range	V_{H29}	3.0	3.5	4.0	V	Note (90)
	V_{L29}	—	0	0.1		Note (91)
Max. Output Current of Vertical Ramp Generator	I_{max31}	12	15	—	mA	Note (92)
Pull-in Range of Vertical Oscillator	V_{pull}	—	248.5-353	—	H	Note (93)
60 Hz Detector Identification Range	V_{pull60}	—	248.5-288	—		Note (94)
Vertical Blanking Pulse Width	T_{B60}	—	16	—	H	Note (95)
	T_{B50}	—	21	—		Note (96)
Phase of Gate Pulse NTSC/PAL	T_{PNI}	—	0.6	—	μs	Note (97)
	T_{PNII}	—	3.1	—		
Phase of Gate Pulse SECAM	T_{SI}	—	2.0	—		Note (98)
	T_{SII}	—	4.8	—		

NOTE (1)

(1) Read DC voltage of #56 (V#56A).

(2) Read DC voltage of #56 connecting 10 k to GND (V#56B).

(3) $Zin\#58 = 1 \times 10^4 \times \left(\frac{V\#56A}{V\#56B} - 1\right)$

NOTE (2)

(1) Read DC voltage of #58 (V#58A).

(2) Read DC voltage of #58 connecting 20 k to GND (V#58B).

(3) $Zin\#58 = 2 \times 10^4 \times \left(\frac{V\#58A}{V\#58B} - 1\right)$

NOTE (3)

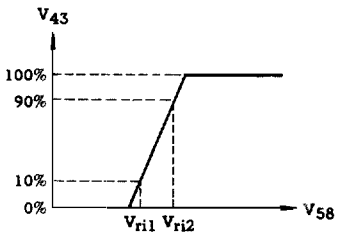
(1) Adjust Brightness Control V.R. to obtain 3.0V at #43 during trace period.

(2) Read voltage of #46, and apply the voltage to #46.

(3) Read voltage of #57, and apply the voltage to #57.

(4) Vary DC voltage of #58, and read the changes at #43.

(5) Measure input voltage at #58, which gives 10% (V_{ril}) and 90% (V_{ri2}) of #43.



$V_{ri} = V_{ri2} - V_{ril}$

NOTE (4)

(1) Adjust Brightness Control V.R. to obtain 3.0V at #43 during trace period.

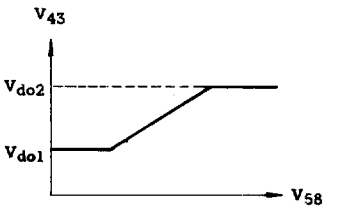
(2) Read voltage of #46, and apply the voltage to #46.

(3) Read voltage of #57, and apply the voltage to #57.

(4) Vary DC voltage of #58 to change output at #43.

(5) Read min. voltage (V_{dol}) and max. voltage (V_{do2}) at #43.

(6) Measure same voltage of RED and GREEN output the same as BLUE.



NOTE (5)

(1) Adjust Brightness Control V.R. to obtain 3.0V at #43 during trace period.

(2) Apply Signal-2 and increase amplitude gradually from 0.

(3) Read the amplitude of #43 when #59 voltage starts to change.

NOTE (6)

(1) Adjust Brightness Control V.R. to obtain 3.0V at #43 during trace period.

(2) Connect #54 to GND.

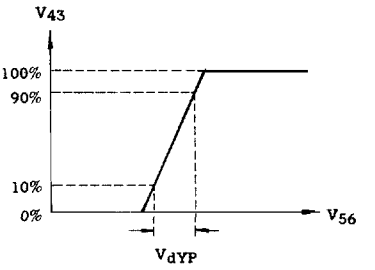
(3) Same as (2) above.

(4) Read voltage of #43 clipped.

TA8659AN

NOTE (7)

(1) Adjust Brightness Control V.R. to obtain 3.0V at #43 during trace period.
(2) Read voltage of #46, and apply the voltage to #46.
(3) Read voltage of #57, and apply the voltage to #57.
(4) Vary DC voltage of #56 to read the dynamic range at #43.
(5) Read DC voltage of #56 which gives the output voltage of 10% and 90% at #43 respectively.



NOTE (8)

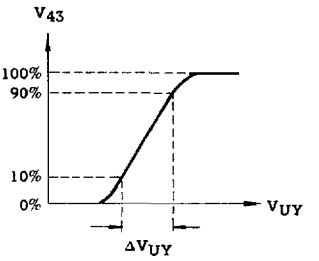
(1) Adjust Brightness Control V.R. to obtain 3V at #43 during trace period.
(2) Apply 0.3 Vp-p Input Signal-2 to #58.
(3) Read the output signal at #43.
(4) Gv = V43 x 2

NOTE (9)

(1) Adjust Brightness V.R. to obtain 3V at #43 during trace period.
(2) Apply 0.3 Vp-p/100 kHz and 0.3 Vp-p/8 MHz Signal-1 to #58.
(3) Read the output signal at #43.
(4) Read the frequency of -3 dB point.

NOTE (10)

(1) Adjust Brightness V.R. to obtain 3V at #43 during trace period.
(2) Apply 0.3 Vp-p to #58.
(3) By changing Uni-Color V.R., read the dynamic range at #43.
Read dynamic range of Uni-Color Control, which gives 100% and 90% at #43.



NOTE (11)

(1) Adjust Brightness V.R. to obtain 3V at #43 during trace period.
(2) Apply 0.3V Signal-2 to #58.
(3) Read the output signal of MIN. ($V_{43\ MIN}$) and MAX. ($V_{43\ MAX}$) at #43.
(4) $\Delta G_{UY} = 20 \log(V_{43\ MAX}/V_{43\ MIN})$ dB

NOTE (12)

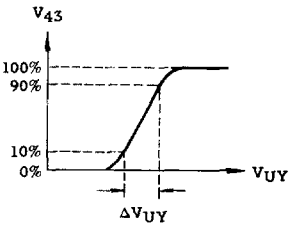
(1) Same as above.
(2) Same as above.
(3) Same as above.
(4) Read voltage at #59, which gives output of $(V_{43\ MAX} + V_{43\ MIN})/2$ at #43.

NOTE (13)

(1) Adjust Brightness V.R. to obtain 3V at #43 during trace period.

(2) Apply Signal-2 (0.1 Vp-p) to #62.

(3) Calculate the difference voltage of #59 and 90% of #43 output signal.



NOTE (14)

(1) Same as NOTE (13)-(1).

(2) Same as NOTE (13)-(2).

(3) Read the #43 output signal when Uni-Color V.R. is set to MAX ($V_{43\ MAX}$) and MIN ($V_{43\ MIN}$).

(4) $\Delta G_{UC} = 20 \log(V_{43\ MAX} + V_{43\ MIN})$

NOTE (15)

(1) Same as NOTE (13)-(1).

(2) Same as NOTE (13)-(2).

(3) Same as NOTE (14)-(3).

(4) Read #59 voltage, which gives $(V_{43\ MAX} + V_{43\ MIN})/2$ to #43.

NOTE (16)

(1) Adjust Brightness V.R. to obtain 3V at #43 during trace period.

(2) Apply Signal-3 30 mV to #56 through 10 μF capacitor.

(3) Measure #43 signal output.

(4) Calculate Gain g.

(5) $\Delta Gps = 20 \log(g/Gy)$ dB

NOTE (17)

(1) Adjust Brightness V.R. to obtain 3V at #43 during trace period.

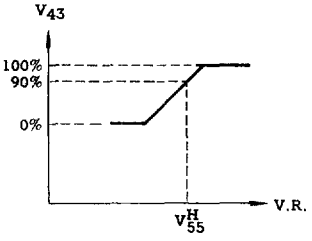
(2) Apply Signal-1 (30 mV signal during trace period and 10 kHz) to #56 and #58 AC grounded.

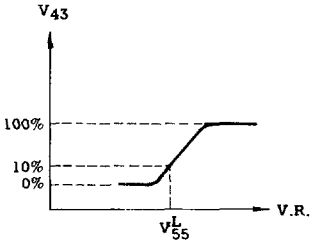
(3) Read #55 control voltage, which gives 90% level of #43 output voltage dynamic range. (V^{H}_{55})

(4) Apply Signal-1 (0.3V, 2.4 MHz) to #58 and #56 AC grounded.

(5) Same as (3). Read #55 control voltage, which gives 10% level of #43 output dynamic range. (V^{L}_{55})

(6) $\Delta V_{55} = V^{H}_{55} - V^{L}_{55}$





TA8659AN

NOTE (18)

(1) Adjust Brightness V.R. to obtain 3V at #43 during trace period.

(2) Apply Signal-2 (0.3 Vp-p) to #58.

(3) Read #43 output voltage when applying 0V to #54. (V_{43}^{1})

(4) Read #43 output voltage when applying 1V to #54. (V_{43}^{2})

(5) Read #43 output voltage when applying 3V to #54. (V_{43}^{3})

(6) $\Delta V_{3T1} = 20 \log(V_{43}^{2}/V_{43}^{1})$ dB

(7) $\Delta V_{3T2} = 20 \log(V_{43}^{3}/V_{43}^{1})$ dB

NOTE (19)

(1) Adjust Brightness V.R. to obtain 3V at #43 during trace period.

(2) Apply Signal-2 (0.3 Vp-p) to #58.

(3) Vary the #54 control voltage, and read #54 voltage, which gives #43 output voltage down by 3dB. ($S_W^{-3\ dB}$)

(4) Vary the #54 control voltage, and read #54 voltage, which gives #43 output voltage down by 6dB. ($S_W^{-6\ dB}$)

NOTE (20)

(1) Set the Brightness Control V.R. to obtain 3.0V at #41 during trace period.

(2) Apply Signal-2 (0.2 Vp-p) to #60.

(3) Read the #41 output (V_{41}^{1}) when applying 0V to #54.

(4) Read the #41 output (V_{41}^{2}) when applying 1V to #54.

(5) Read the #41 output (V_{41}^{3}) when applying 3V to #54.

(6) $\Delta V_{R-Y1} = 20 \log (V_{41}^{2}/V_{41}^{1})$ dB

(7) $\Delta V_{R-Y2} = 20 \log (V_{41}^{3}/V_{41}^{1})$ dB

(8) Apply signal 0.1 Vp-p to #62.

(9) Same as (3). Read #43 output (V_{43}^{1}).

(10) Same as (4). Read #43 output (V_{43}^{2}).

(11) Same as (5). Read #43 output (V_{43}^{3}).

(12) $\Delta V_{B-Y1} = 20 \log (V_{43}^{2}/V_{43}^{1})$ dB

(13) $\Delta V_{B-Y2} = 20 \log (V_{43}^{3}/V_{43}^{1})$ dB

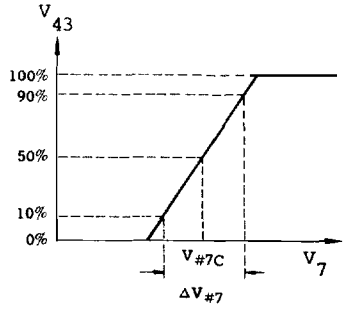
TA8659AN

NOTE (21)

(1) Adjust Brightness V.R. to obtain 3V at #43 during trace period.

(2) Apply Signal-2 (0.1 Vp-p) to #62.

(3) By changing Color V.R. and making MAX output (100%) and MIN output (0%), read the color control variable range ($\Delta V_{\#7}$), which is the difference of color control voltage between 10% and 90% of its output.



NOTE (22)

(1) Adjust Brightness V.R. to obtain 3V at #43 during trace period.

(2) Apply Signal-2 (0.2 Vp-p) to #60.

(3) Read the #41 output signal (V_{41}).

(4) $G_{R-Y} = 20 \log(V_{41}/0.2)$ dB

NOTE (23)

(1) Adjust Brightness V.R. to obtain 3V at #43 during trace period.

(2) Apply Signal-2 (0.1 Vp-p) to #62.

(3) Read the #43 output signal (V_{43}).

(4) $G_{B-Y} = 20 \log(V_{43}/0.1)$ dB

NOTE (24)

(1) Adjust Brightness V.R. to obtain 3V at #43 during trace period.

(2) Apply Signal-3 (0.2 Vp-p) to #60.

(3) Read the output signal at #42 (V_{42}).

(4) $G\text{-}Y = V_{42}/0.2$

(5) $G\text{-}Y/R\text{-}Y = -G_{G-Y}/G_{R-Y}$

NOTE (25)

(1) Adjust Brightness V.R. to obtain 3V at #43 during trace period.

(2) Apply Signal-3 (0.1 Vp-p) to #62.

(3) Read the output signal at #42 (V_{42}).

(4) $G_{G-Y} = V_{42}/0.1$

(5) $G\text{-}Y/B\text{-}Y = -G_{G-Y}/G_{B-Y}$

NOTE (26)

(1) Adjust Brightness V.R. to obtain 3V at #43 during trace period.

(2) Apply Signal-3 (0.2 Vp-p) to #60.

(3) Connect 10 kΩ between #22 and GND.

(4) Read the output signal at #42 (V_{42}).

(5) $G_{G-Y} = V_{42}/0.2$

(6) $G\text{-}Y/R\text{-}Y = -G_{G-Y}/G_{R-Y}$

TA8659AN

NOTE (27)

(1) Adjust Brightness V.R. to obtain 3V at #43 during trace period.

(2) Apply Signal-3 (0.1 Vp-p) to #62.

(3) Connect 10 kΩ between #22 (P-Ident) and GND.

(4) Read the output signal at #42 (V_{42}).

(5) $G_{G-Y} = V_{42}/0.1$

(6) $G-Y/B-Y = -G_{G-Y}/G_{B-Y}$

NOTE (28)

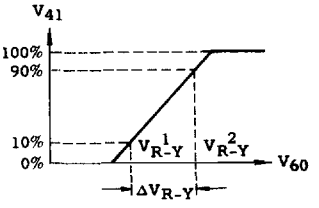
(1) Set Brightness Control V.R. to give 4.0V to #41 during trace period.

(2) Read #44 DC voltage, and apply it to #44.

(3) Vary #60 DC voltage.

(4) Read #60 DC voltages, which supply DC voltages of 90% (V_{R-Y}^{2}) and 10% (V_{R-Y}^{1}) to #41 of its dynamic range.

(5) $\Delta V_{R-Y} = V_{R-Y}^{1} - V_{R-Y}^{2}$



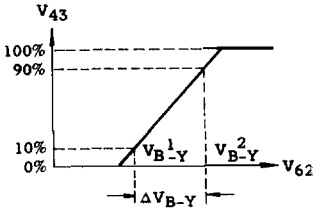
NOTE (29)

(1) Set Brightness Control V.R. to obtain 4.0V at #43 during trace period.

(2) Read #46 DC voltage, and apply it to #46.

(3) Vary #62 DC voltage.

(4) Read #62 DC voltages, which supply DC voltages of 90% (V_{B-Y}^{2}) and 10% (V_{B-Y}^{1}) to #43 of its dynamic range.



NOTE (30)

(1) Set Brightness Control V.R. to obtain 3.0V at #43 during trace period.

(2) Apply Signal-1 (0.1V, 100 kHz/5 MHz) to #62.

(3) Measure the output signal at #43 (V_{43}).

(4) Apply same signal as (2) to #60.

(5) Measure the output at #41 (V_{41}) and #42 (V_{42}).

(6) Read the frequency of -3 dB point.

NOTE (31)

(1) Same as NOTE (30)-(1).

(2) Read #43 voltage when brightness control voltage is increased by 1.0V during trace period ($V_{\#43}$).

(3) $G_{BR} = 20 \log((V_{\#43} - 3.0)/1.0)$ dB

NOTE (32)

(1) Same as NOTE (30)-(1).

(2) Read #48 voltage ($V_{\#48}$).

NOTE (33)

(1) Read #41 V-blanking pulse voltage (V_{VR}).

(2) Read #42 V-blanking pulse voltage (V_{VG}).

(3) Read #43 V-blanking pulse voltage (V_{VB}).

NOTE (34)

(1) Read #41 H-blanking pulse voltage (V_{HR}).

(2) Read #42 H-blanking pulse voltage (V_{HG}).

(3) Read #43 H-blanking pulse voltage (V_{HB}).

NOTE (35)

(1) Set Brightness Control V.R. to obtain 3.0V at #43 during trace period.

(2) Apply 3-step signal (a) to #58.

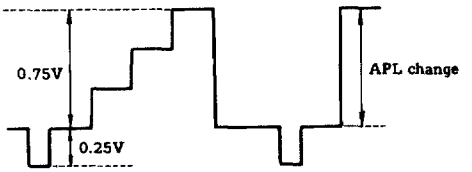
(3) Adjust Uni-color V.R. so that amplitude of output signal (#43) is 1.25V.

(4) Vary the APL of input signal from 10% to 90%.

(5) Measure the variation of pedestal level (ΔV_p) with APL change.

(6) $T_{DC} = (1 - \Delta V_p) \times 100$ (%)

(a)



Input signal of #58

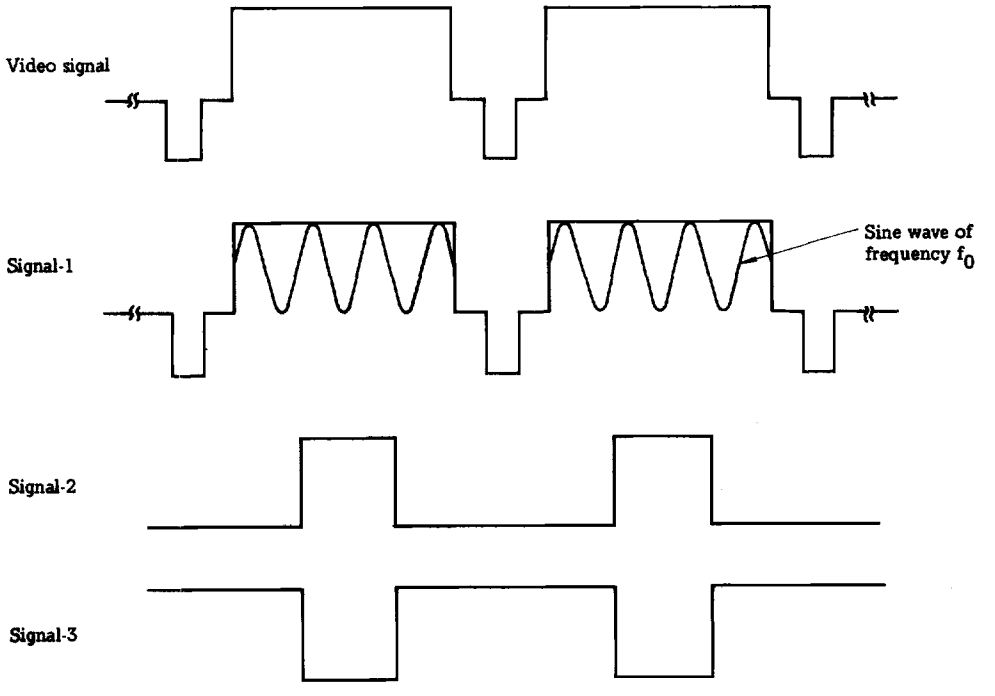
NOTE (36)

(1) Adjust Brightness Control V.R. to obtain 3.0V at #43 during trace period.

(2) By decreasing #55 voltage, read the #55 voltage that causes #59 to start changing.

TA8659AN

INPUT SIGNAL WAVEFORM OF VIDEO SECTION



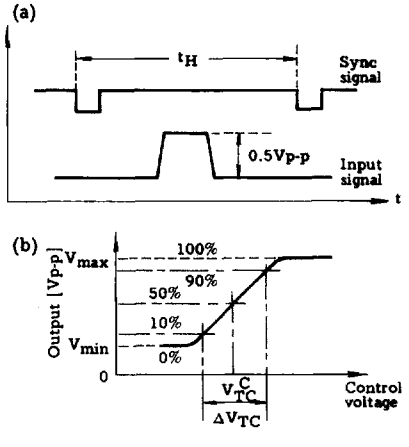
NOTE (37)

(1) Apply Fig. (a) signal to #47, and measure the output signal at #41.

(2) Read the DATA output signal level V_{max}, when DATA contrast is maximum, and the V_{min}, when DATA contrast is minimum. Then calculate the DATA contrast gain variation range.

$$\Delta G_{TC} = 20 \log(V_{max}/V_{min})$$

(3) Calculate the DATA contrast control voltage range ΔV_{TC} and DATA contrast control center voltage V_{TC}^{C} as Fig. (b).



NOTE (38)

(1) Apply signal of Fig. (a) to #47, #49 and #51.

(2) Increase the intput signal, and read the input signal level when the output signal saturates to increase.

(3) V_{DI} is the input signal level which gives 90% of output signal.

TA8659AN

NOTE (39)

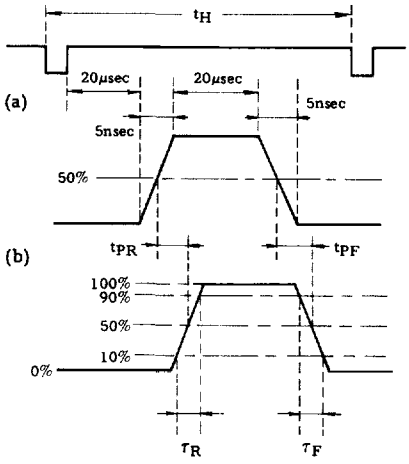
(1) Read DC voltage of #47, #49, and #51.

NOTE (40)

(1) Apply signal of Fig. (a) to #47, #49, and #51.

(2) Read the output V_0 at #41, #42, and #43.

(3) $G_T = 20 \log(V_0/0.5)$ dB



NOTE (41)

(1) Apply DATA input signal of 0.5 Vp-p to #47, #49, and #51.

(2) Measure the τ_R, t_{PR}, τ_F and t_{PF} at #41, #42, and #43 as defined in Fig. (b).

NOTE (42)

(1) Apply signal of Fig. (a) (ΔG_{TC}) to #47.

(2) Read the output signal (V_0) at #41 when applying 5V to #53.

(3) Increase V_{53} from 0V, and read the V_{53} (V_{TSW}^{ON}), which gives #41 same voltage as V_0.

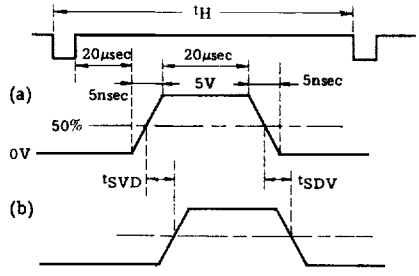
(4) Then decrease V_{53}, and read the V_{53} (V_{TSW}^{OFF}), which gives #41 as 0V.

NOTE (43)

(1) Read #47 voltage, and apply to #47 the voltage +0.5V.

(2) Apply input signal of Fig. (a) to #53, and measure t_{SVD} and t_{SDV} in Fig. (b) at #41.

(3) Measure the same as item (2) above, with #49, #42 and #51, #43.



NOTE (44)

(1) Same as NOTE (43)-(1).

(2) Read #41 output signal (V_{41}) when applying 5V to #53.

(3) Read max. output (V_0) among #41, #42, and #43.

(4) $CT_T = 20 \log(V_0/V_{\#41})$

(5) Repeat same procedure by changing input to #49 (output #42) and #51 (output #43).

NOTE (45)

(1) Apply sine wave of 1 MHz, 0.5 Vp-p to #58. (Y)

(2) Read output (Vor) at #41, #42, and #43.

(3) Measure the maximum output (Voc) level among #41, #42, and #43.

(4) $CT_Y = 20 \log(Voc/Vor)$

TA8659AN

NOTE (46)

(1) Apply sine-wave signal (0.5 Vp-p, 500 kHz) to #47.

(2) Measure the output level at #41 (V_{41} at 500 kHz).

(3) Vary the input frequency from 500 kHz to 30 MHz.

(4) Measure the frequency when the output level is -3 dB of V_{41} at 500 kHz.

(5) Measure the -3 dB frequencies at #42 and #43 in same manner.

NOTE (47)

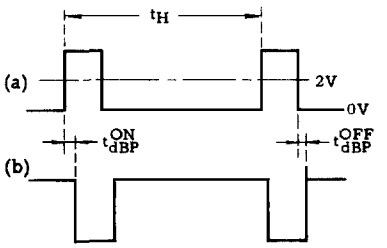
(1) Measure the DC voltage of #44, #45, and #46.

NOTE (48)

(1) Increase height of the BLK pulse at #35 from 0V to 5V, and measure threshold voltage of the BLK pulse when blanking outputs appear at the output terminals #41, #42, and #43.

NOTE (49)

(1) Apply signal of Fig. (a) to #35, and measure t_{dBP}^{ON} and t_{dBP}^{OFF} of the output signal at #41, #42, and #43.



NOTE (50)

(1) Apply 100 mVp-p burst/chroma signal to #20 (Chroma:Burst = 1:1).

(2) Color Mode

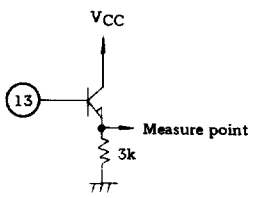
(3) In case of PAL mode, connect #41 to V_{CC}.

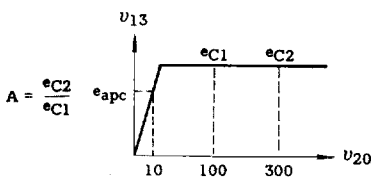
NOTE (51)

(1) Apply 10 mVp-p, 100 mVp-p, and 300 mVp-p burst/chroma signal to #20 (Chroma:Burst = 1:1).

(2) Measure the output level at #13 for each input.

(3) PAL Color Mode





TA8659AN

NOTE (52)

(1) Apply 100 mVp-p burst/chroma signal to #20 (Chroma:Burst = 1:1). Measure the output level of #14 (V_{14PC}).

(2) PAL Color Mode

(3) Measure the output of #14 when the capacitor of #13 (1 μF) is removed and the line between #12, #13 is opened.

$$G_{DL} = 20 \log(V_{14PC}/V_{13PC})$$

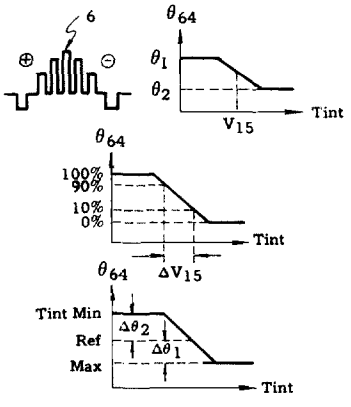
(4) In the measurement of V_{14PC}, connect #13 to V_{CC}.

NOTE (53)

(1) Apply "10" color bar signal (3.58/4.43).

(2) Adjust Tint Control V.R. so that the 6th color bar output of (B-Y) is the maximum.

(3) Plot the phase change (θ) vs the tint control voltage V_{15}.



$$V_{15} = \frac{1}{2}(\theta_1 + \theta_2)$$

$$\Delta\theta_1 = |\text{Ref-Tint Max}|$$

$$\Delta\theta_2 = |\text{Tint Min-Ref}|$$

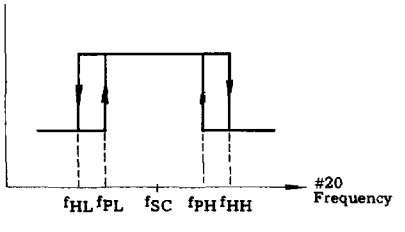
NOTE (54)

(1) Apply 4.43 MHz 0.1 Vp-p CW to #20.

(2) Increase CW frequency, monitoring the wave shape of terminal 25 with a synchroscope.

(3) Measure CW frequency of f_{HH} when terminal 25 wave shape changes from DC to sweeping.

(4) Then decrease CW frequency of f_{PH} when terminal 25 wave shape changes from sweeping to DC.



(5) Continue to decrease CW frequency and measure the frequency of f_{HL} when the terminal 25 wave shape again changes from DC to sweeping.

(6) Then increase CW frequency and measure frequency of f_{PL} when the terminal 25 wave shape changes from sweeping to DC.

NOTE (55)

(1) Apply 3.58 MHz 0.1 Vp-p CW to #25.

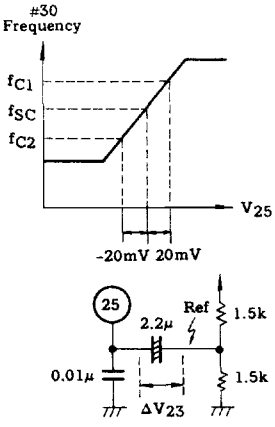
Measure f_{HH}, f_{PH}, f_{HL} and f_{PL} with same manner above.

TA8659AN

NOTE (56)

(1) Apply DC voltage to #25.
Adjust DC voltage so that #30 frequency is equal to f_{SC} (4.43 or 3.58 MHz subcarrier frequency). Then change DC voltage by ±20 mV, and measure the #30 frequency f_{C1} and f_{C2}.

$$\beta_{4.4}\ (\beta_{3.5}) = \frac{f_{C1} - f_{C2}}{40}$$



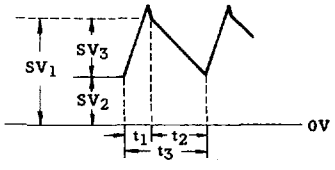
NOTE (57)

(1) Apply burst signal (100 mVp-p, 4.43/3.58) to #20.

NOTE (58)

(1) B/W Mode

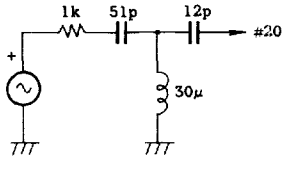
(2) Measure #25 terminal waveform.



NOTE (59)

(1) Apply "10" color bar signal.

(2) In case of NTSC, change chroma band pass filter as follows:
n ... 3.58 NTSC N ... 4.43 NTSC



NOTE (60)

(1) Calculate the ratio of (R-Y) and (B-Y) output signal.
The test condition is same as NOTE (59).

(2) Adjust Tint Control V.R. so that the 6th color bar output of (B-Y) is maximum.

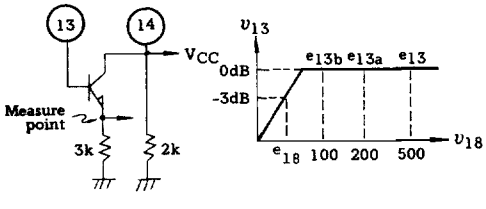
(3) Measure phase difference between (R-Y) output and (B-Y) output.

NOTE (61)

(1) Connct #14 to V_{CC}.

(2) Apply 4.4 MHz CW to #18.
Vary the input level, then measure the output level at #13 through emitter follower.

(3) SECAM Mode
e_{18}; Input level for -3 dB down from e_{13}.



NOTE (62)

(1) Apply 75% SECAM standard color bar signal.

NOTE (63)

(1) Apply FM 100 kHz deviation, fm 1 kHz 100 dBμ signal to #18.

(2) f_{OR} = 4.406 MHz, f_{OB} = 4.25 MHz.

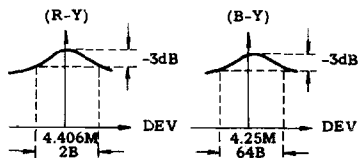
(3) H.Pulse is not applied to #35.

(4) SECAM Mode

*Before measurement, offset of outputs should be removed by adjusting demodulator coils.

NOTE (64)

(1) Apply FM 100 kHz deviation, fm 1 kHz, 100 dBμ signal to #18.
Vary the frequencies of f_{OB} and f_{OR}. Measure -3 dB band width at color difference signal outputs.



(2) - (4) Same as NOTE (63).

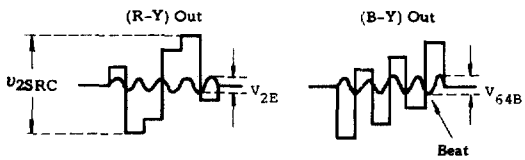
NOTE (65)

(1) Apply 75% SECAM standard color bar signal to #18.

(2) Measure V_{2E}, the amplitude of the beat frequency (f_{OR}-f_{OB}).

(3) Measure V_{2SRC}, demodulated color signal amplitude.

$RC = 20 \log(V_{2E}/V_{2SRC})$



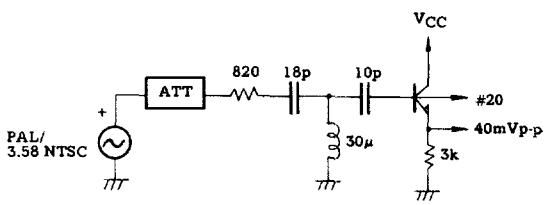
NOTE (66)

(1) Measure DC voltage at #18. V_{18-50} (PAL receiving)
V_{18-60} (NTSC receiving)

NOTE (67)

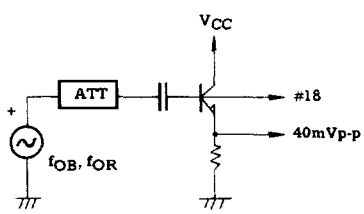
(1) Apply 40 mVp-p (0 dB) burst signal to #20 through an attenuator, chroma take-off coil and emitter follower.

(2) Decrease the input level and measure amplitude when the killer operates.



NOTE (68)

(1) Apply f_{OB}, f_{OR} of 40 mVp-p signals to #18.
Measure amplitude when the color killer operates.



NOTE (69)

(1) Test condition is same as $P_{INB/W}$, $N_{INB/W}$.

(2) Attenuate the input burst level up to killer operating level. Then increase the input burst level and measure amplitude when the color appears.

NOTE (70)

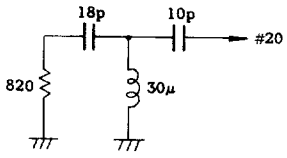
(1) Test condition is same as $S_{INB/W}$.

(2) Same as NOTE (69)-(2).

NOTE (71)

(1) Change the chroma take-off coil as follows:

(2) (a) Connect #27 to V_{CC} through 10 kΩ.
Apply DC voltage to #22.
Vary DC voltage from 7V to 5V while monitoring terminal 25 with a synchroscope, and measure voltage (PC) when the killer functions.



(b) Apply DC voltage to #22 and #27 simultaneously.
Vary DC voltage from 7V to 5V while monitoring terminal 25 with a synchroscope, and measure DC voltage (PS) when #25 starts sweeping.

NOTE (72)

(1) Same as NOTE (71)-(1).

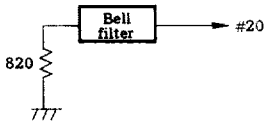
(2) (a) Apply DC voltage to #27.
Vary DC voltage from 7V to 5V while monitoring terminal 25 with a synchroscope, and measure voltage (NC) when the killer functions.

(b) Apply DC voltatge to #27 simultaneously.
Vary DC voltage from 7V to 5V while monitoring terminal 25 with a synchroscope, and measure DC voltage (NS) when #25 starts sweeping.

NOTE (73)

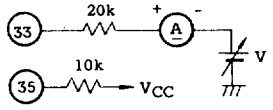
(1) Change the Bell filter as follows:

(2) Connect #23
Vary DC voltage from 7V to 5V while monitoring terminal 25 with a synchroscope, and measure voltage (SC) when the killer functions.



NOTE (74)

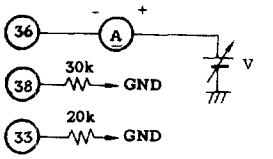
(1) Adjust an external DC voltage (V).
Read the current (A) when the terminal voltage of #35 changes from Low to High.



TA8659AN

NOTE (75)

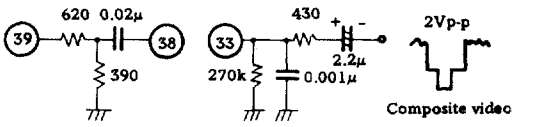
(1) Connect #38 to GND through 30 kΩ.
Adjust an external DC voltage (V) so that no current flows.
Measure the current by connecting #33 to GND through 20 kΩ.



NOTE (76)

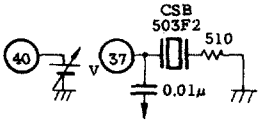
(1) Apply composite video signal to #33 through sync sepa. filter.
Monitor #36 waveform and measure the V-mask period.

T_{C60} ... (60Hz) T_{C50} ... (50Hz)



NOTE (77)

(1) Apply an external DC voltage (V) to #40.
(2) Monitor #37 waveform through 0.01 μF capacitor.
(3) Increase DC voltage (V) from 0 to 9V.
(4) Measure DC voltage of #40 when the oscillation signal of #37 appears. V_{CC} (12V) is not applied.

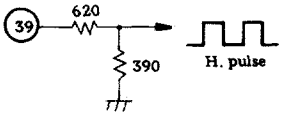


NOTE (78)

(1) - (3) Same as NOTE (77)-(1).
(4) Measure DC voltage of #40 when the H. pulse appears.

NOTE (79)

(1) Measure frequency at #39.



NOTE (80)

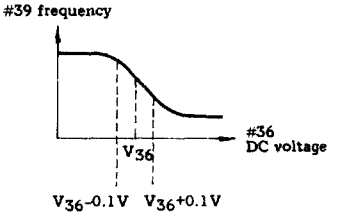
(1) Connect #36 to GND through 30 kΩ.
(2) Measure the frequency at #39.

NOTE (81)

(1) Connect #36 to H.V_{CC} through 10 kΩ.
(2) Measure the frequency at #39.

NOTE (82)

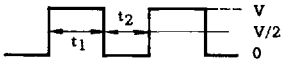
(1) Measure the open terminal voltage at #36 (V_{36}).
(2) Apply an external DC voltage of $V_{36} \pm 0.1V$, and measure #39 frequency variation.



TA8659AN

NOTE (83)

(1) Measure t_1 and t_2 by monitoring #39 waveform with a synchroscope.



$$T_{039} = \frac{t_1}{t_1 + t_2} \times 100$$

NOTE (84)

(1) Apply an external DC voltage (V) to #52 through 100 kΩ.

(2) Increase the DC voltage.

(3) Measure DC voltage of #52 when the output pulse of #39 disappears.

NOTE (85)

(1) $H.V_{CC}$ = 9V

(2) Apply an external DC voltage to #52 through 100 kΩ so that H. pulse at #39 disappears.

(3) Then set $H.V_{CC}$ = 2.5V.

(4) Confirm that the H. pulse at #39 still disappears when $H.V_{CC}$ is reset to 9V.

NOTE (86)

(1) Apply an external DC voltage (V) to #52.

(2) Increase DC voltage.

(3) Measure the current when #39 is Low.

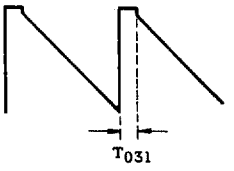
NOTE (87)

(1) Measure the high level of #39 waveform (V_{H39}).

(2) Measure the low level of #39 waveform (V_{L39}).

NOTE (88)

(1) Measure the high-state period of #31 waveform.

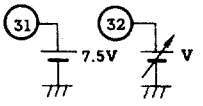


NOTE (89)

(1) Apply an external DC voltage (V) to #32.

(2) Vary external DC voltage from 7.4V to 7.6V.

(3) Measure the voltage change at #29.



NOTE (90)

(1) Test condition is same as NOTE (89).

(2) Measure DC voltage at #29 when the external DC voltage of #32 is set to 6.5V.

NOTE (91)

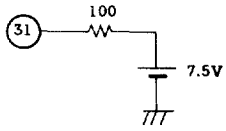
(1) Same as NOTE (90)-(1).

(2) Measure DC voltage at #29 when the external DC voltage of #32 is set to 8.5V.

NOTE (92)

(1) Monitor the waveform of #31.

(2) Measure current of the ramp period.



NOTE (93)

(1) Vary the vertical sync period of the input composite signal. Test condition is the same as NOTE (76).

(2) Measure the vertical period when the vertical output pulse at #31 synchronizes with the input V sync period.

NOTE (94)

(1) Test condition is the same as NOTE (93).

(2) Measure the vertical period when DC voltage at #18 is approximately 7.3V.

NOTE (95)

(1) Measure the vertical blanking width at RGB output.

(2) Vertical frequency of input signal is 60 Hz.

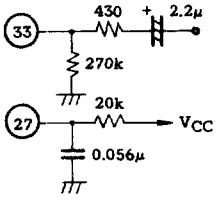
NOTE (96)

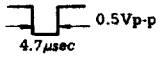
(1) Same as NOTE (95)-(1).

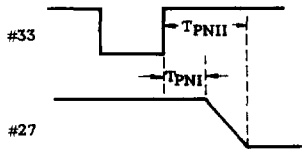
(2) Vertical frequency of input signal is 50 Hz.

NOTE (97)

(1) Measure the T_{PNI} and T_{PNII} at #27 with a synchroscope.

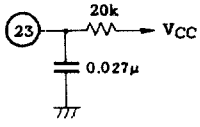


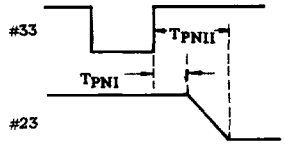




NOTE (98)

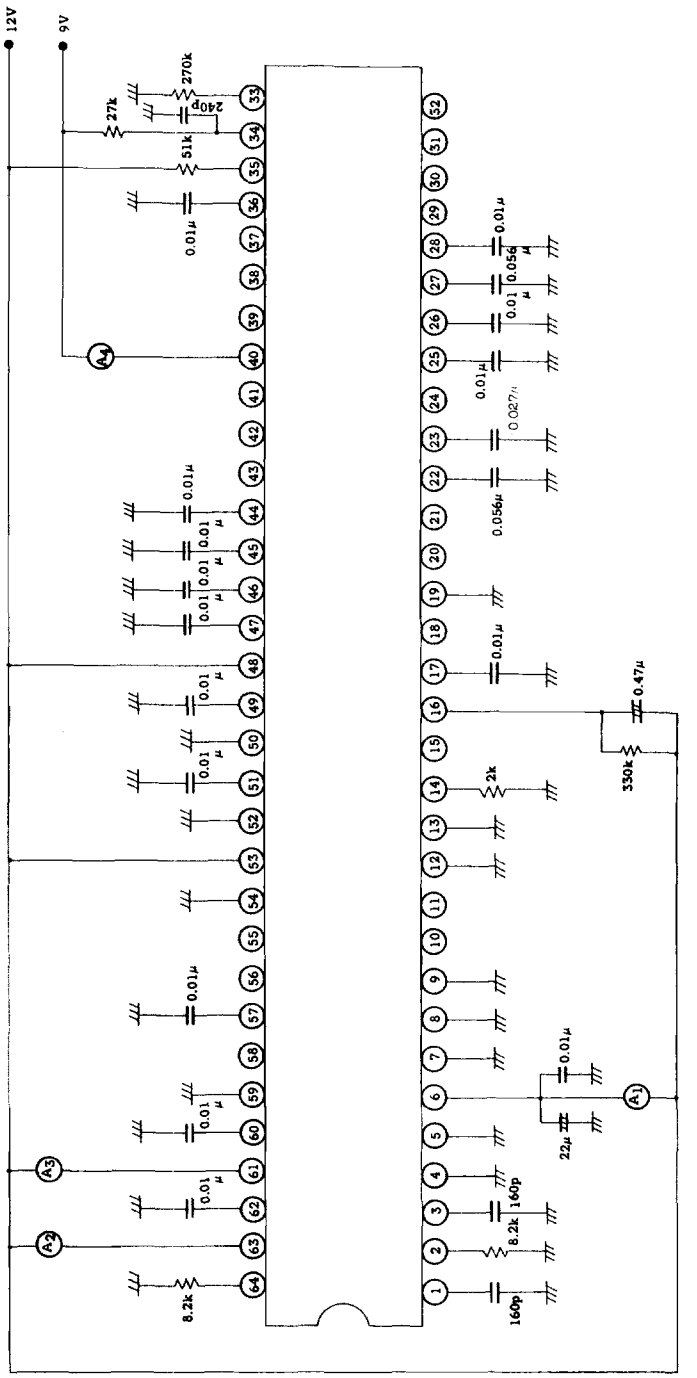
(1) Same as NOTE (97).



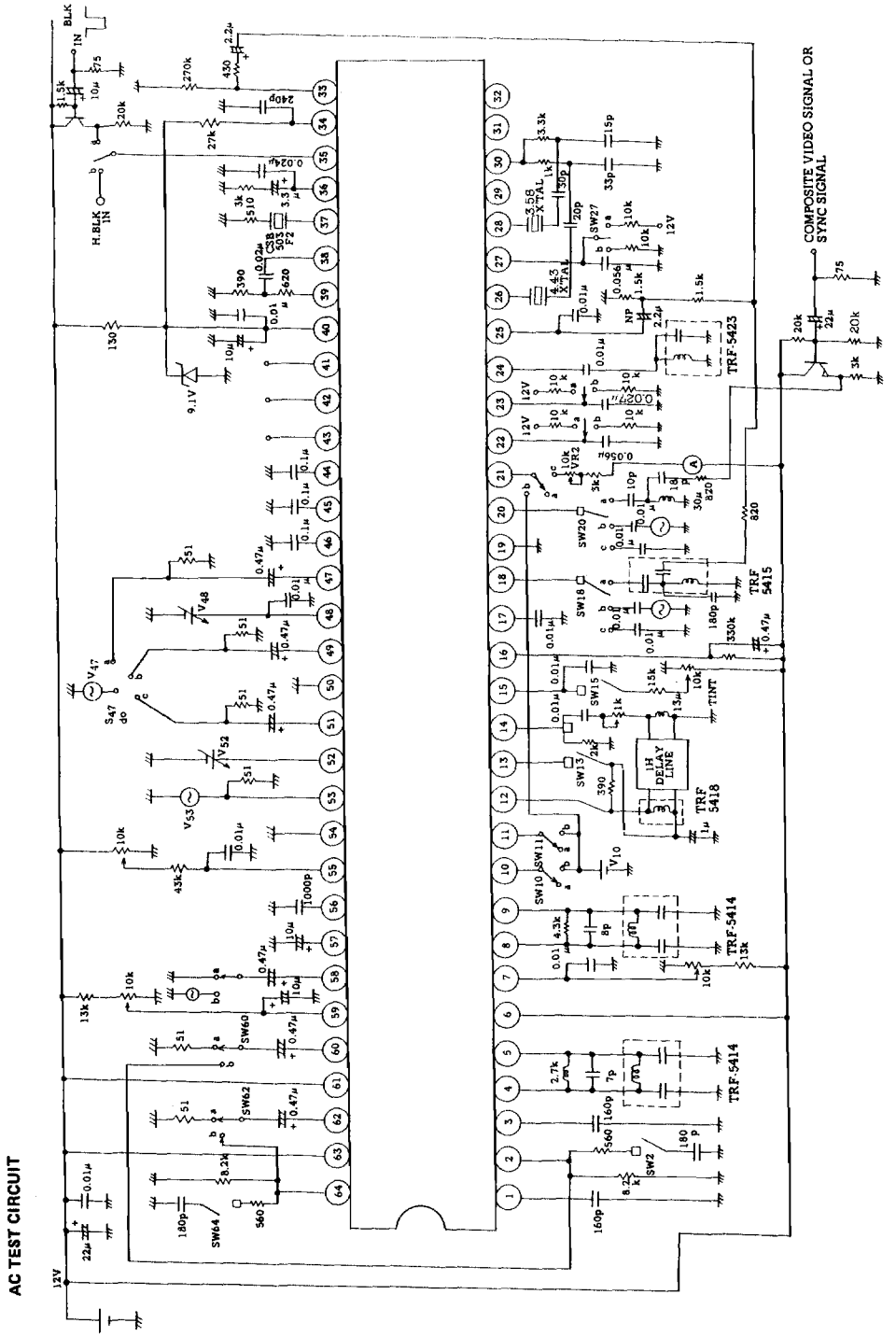


TA8659AN

DC TEST CIRCUIT



TA8659AN



AC TEST CIRCUIT

TA8659AN

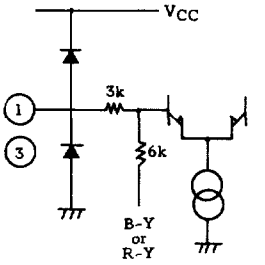
INTERFACE CIRCUIT OF EACH TERMINAL

#1, #3 SECAM de-emphasis

Connect a capacitor to GND for SECAM de-emphasis.

#1 : B-Y

#3 : R-Y

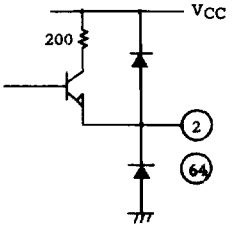


#2, #64 Color differential signal outputs

#2 : R-Y

#64: B-Y

Load resistor of 8.2 kΩ is connected to GND.

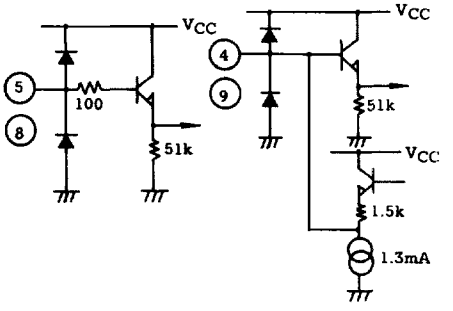


#4, #5 SECAM B-Y detector

A 4.250 MHz tuned tank circuit for SECAM B-Y detector is connected.

#8, #9 SECAM R-Y detector

A 4.406 MHz tuned tank circuit for SECAM R-Y detector is connected.



#6 V_{CC} for chroma stage

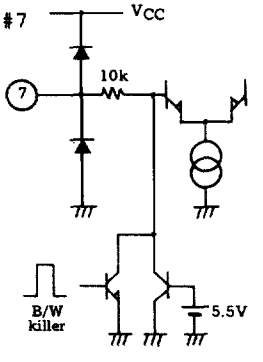
The typical supply voltage is 12.0V.

By-pass capacitance is connected to terminal 19.

#7 Color control

Color saturation increases when the terminal voltage of #7 increases.

When the color killer circuit operates, the terminal voltage of #7 turns to low.



TA8659AN

#10, #11, #21 System logic I/O

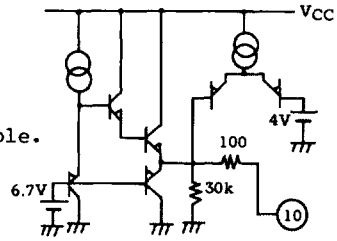
This terminal is an output of system identification logic circuit and also is an input of Manual Select Mode.

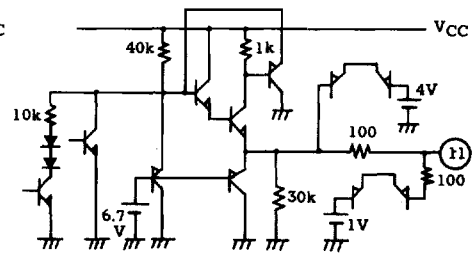
#10: SW I

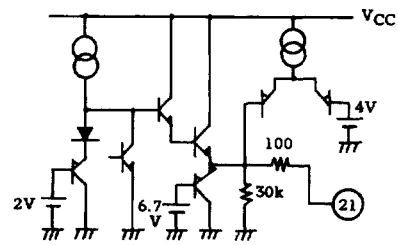
#11: SW II

#21: SW III

See Logic Table.





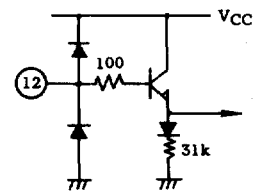


#12 Delayed chroma signal input

1H delayed chroma signal input for PAL/SECAM.

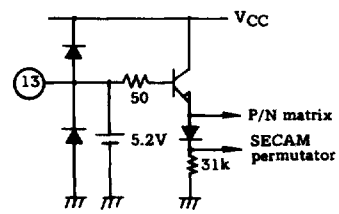
The signal phase shift between terminal #14 and terminal #12 should be less than 5 deg.

The signal loss of the 1H delay line should be 16 dB.



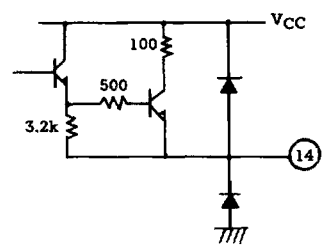
#13 By-pass

An external capacitor for a bias circuit is connected.



#14 Delay line driver output

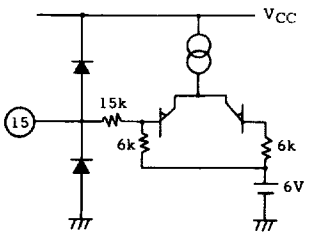
The PAL/SECAM chroma signal output for a 1H delay line. Connect a load resistor of 2 kΩ to GND.



TA8659AN

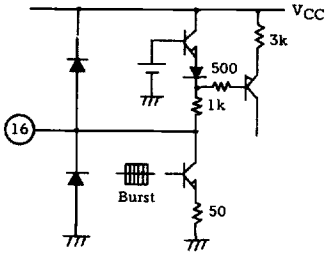
#15 Tint control (NTSC Mode)

A phase of burst signal is controlled by this terminal in the NTSC mode.



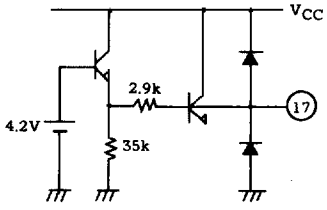
#16 ACC filter

An external capacitor for ACC filter is connected.



#17 By-pass filter

An external by-pass capacitor for a bias circuit is connected.



#18 SECAM signal input

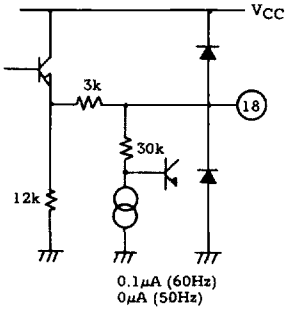
SECAM chroma signal is led to this terminal through a Bell filter circuit.

Terminal DC voltage is changed by the 50/60 identification logic output.

7.4V for 60 Hz

4.4V for 50 Hz

This identification output is useful for changing a vertical size and shifting a horizontal position on the screen.



#19 GND of the chroma stage.

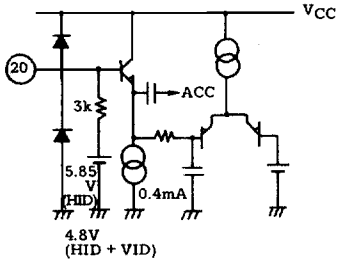
#20 PAL/NTSC chroma signal input

PAL/NTSC chroma signal is led to this terminal through band pass filter circuit.

The SECAM identification mode is determined by this terminal DC voltage.

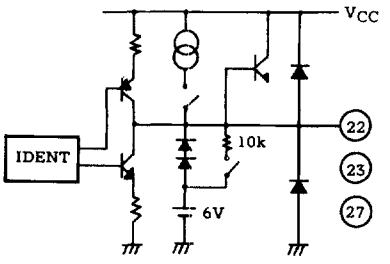
Open: Line Ident.

15 kΩ to GND: Line + Frame Ident.



TA8659AN

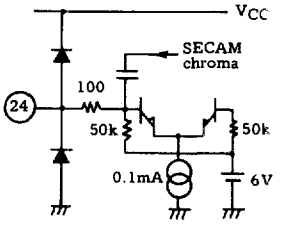
#22 PAL ident filter
#23 SECAM ident filter
#27 NTSC ident filter



#24 SECAM ident discriminator

A 4.328 MHz tuned tank circuit for SECAM identification is connected.

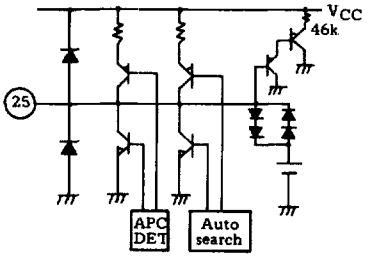
Adjust tank coil so that the recovered DC voltage at terminal 23 is maximum value for 4.328 MHz.



#25 APC filter

APC filter time constant is connected.

When the killer operates, automatic searching circuits operate to widen the pull-in range of the APC circuit. The external time constant also determines the searching speed.



#26 4.43 MHz X'tal IN

4.43 MHz X'tal is connected between terminal 26 and terminal 30.

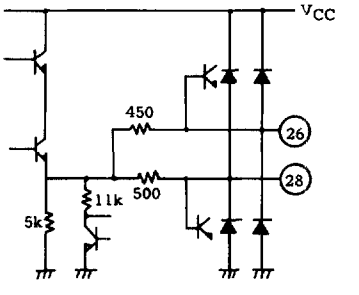
No adjustment is required.

#28 3.58 MHz X'tal IN

3.58 MHz X'tal is connected between terminal 28 and terminal 30.

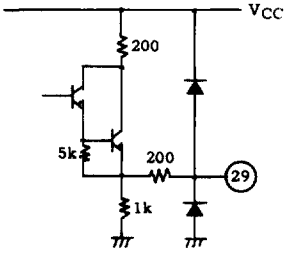
During a color system detection, the X'tals are switched at every 4 APC sweep period.

When 3.58 MHz Mode is not needed, 5.6 kΩ is connected between terminal 28 to GND.



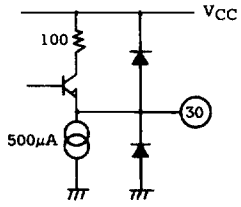
#29 Vertical output

Output terminal of vertical driver.



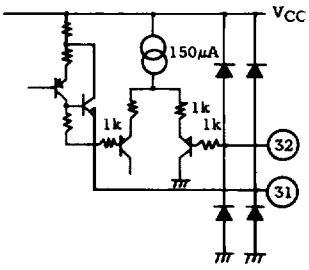
TA8659AN

#30 X'tal drive



#31 Ramp generator

A vertical sawtooth-wave generater circuit is composed of a ramp capacitor, a zener diode which determines sawtooth starting voltage, and a discharge resistor.



#32 Vertical NFB

AC and DC negative feedback terminal.

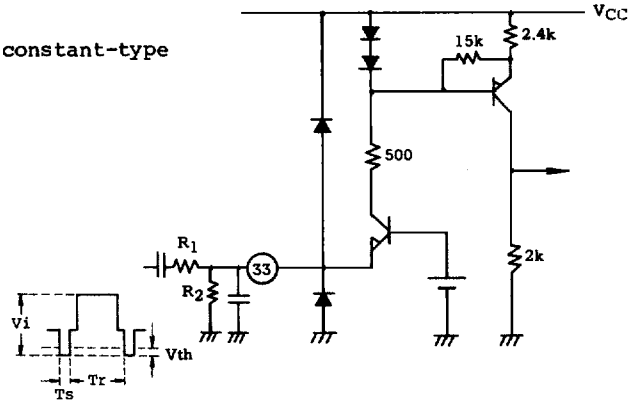
The waveform of terminal #32 is equivalent to that of terminal #31 according to the internal operational amplifier.

#33 Sync sepa. input

Input terminal of emitter-time constant-type sync separator.

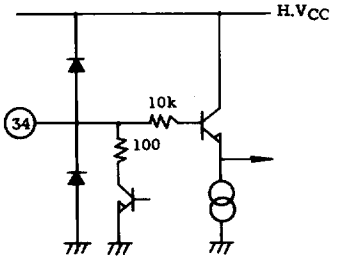
Sync sepa. level is--

$$Vth \approx \frac{(6 + Vi)\ R1Tr}{R1Tr + R2Ts}$$



#34 Gate Pulse Filter

An external filter for a gate pulse is connected.

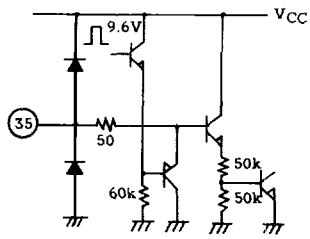


TA8659AN

#35 Flyback pulse input/Sync pulse output

Flyback pulse is used as a horizontal blanking of color differential signal output (#2, #64), color primary signal output (#41, #42, #43), and 1H delay line output (#14), and also used as a masking pulse for a gate pulse generator, PAL matrix switching, and a SECAM permutator switching.

This terminal is also the output of sync signal. During sync period, the terminal voltage of #35 turns to high.



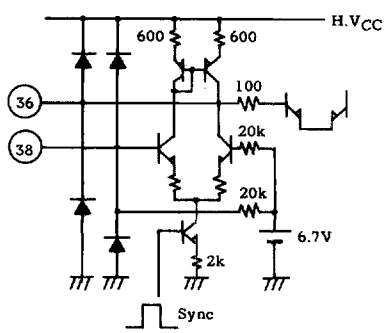
#36 AFC filter

#38 Integrated flyback pulse input

A sawtooth-type horizontal AFC circuit is composed. #38 is an input terminal of integrated flyback pulse (sawtooth).

#36 is an AFC filter terminal for 32 fH VCO.

A time constant for integration of flyback pulse should be switched so that a screen position is equivalent for 15.734 kHz and 15.625 kHz of horizontal frequency.

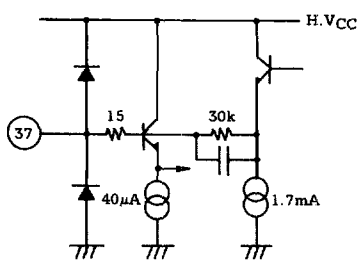


#37 32 fH VCO

Adjustment-free, 32 fH Voltage-Controlled Oscillator.

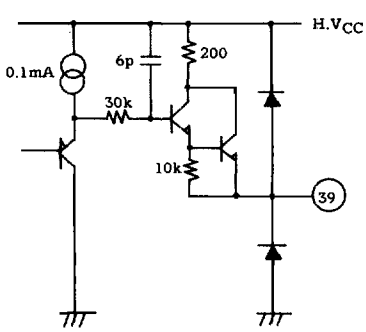
A ceramic resonator is connected.

A wide pull-in range covers both 15.625 kHz and 15.734 kHz of horizontal frequency.



#39 Horizontal drive output

An emitter follower output of horizontal predriver. An external load resister is required.



TA8659AN

#40 H. V_{CC}

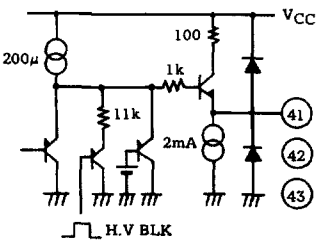
Supply terminal for a horizontal deflection circuit. Recommended supply voltage is 9.0V. (9.0V zener diode is required.)
A by-pass capacitance is connected to terminal 50.

#41, #42, #43 Color primary signal output

#41: R out

#42: G out

#43: B out



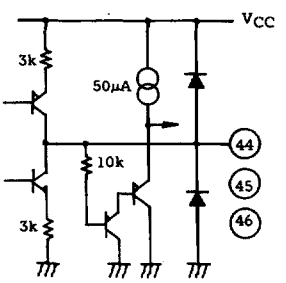
#44, #45, #46 Clamp capacitor

Clamp capacitor for DC restoration is connected.

#44: R

#45: G

#46: B



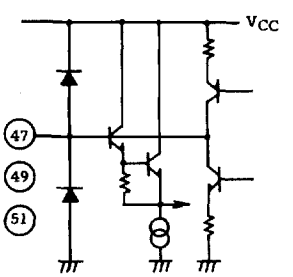
#47, #49, #51 External RGB signal input

An input decoupling capacitor is used as a clamp capacitor. Input signal level is 0.7 Vp-p.

#47: R input

#49: G input

#51: B input

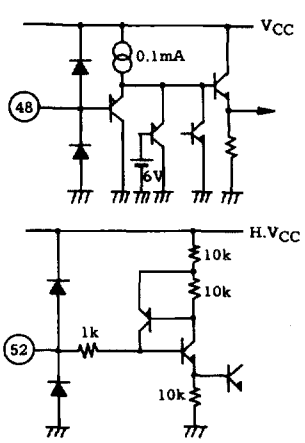


#48 Brightness control

#50 GND for video circuit and deflection circuit

#52 X-ray protector

The input terminal of the X-ray protector.
#39 Hor. drive terminal turns to low when the input voltage of this terminal exceeds the specified threshold voltage. (1.3V typ.)

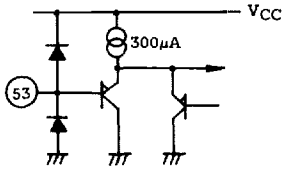


TA8659AN

#53 EXT/TV switching signal input

Fast blanking pulse is acceptable.

The threshold level is 1.0V typ.

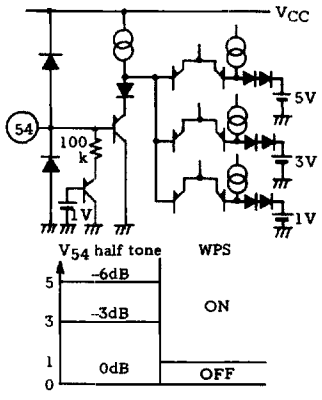


#54 Half-tone/Full-tone switching signal input

When a half-tone circuit is active, the TV video signal amplitude becomes smaller than nominal level.

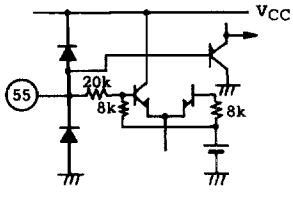
WPS (White peak supress) switch

This terminal also switches the white peak supress circuits. When this circuit is active, in case the RGB output voltage becomes higher than 7.5V, the contrast control terminal voltage is lowered by the internal open collector circuit. Time constant is determined by external capacitance and variable resistor value at #59.

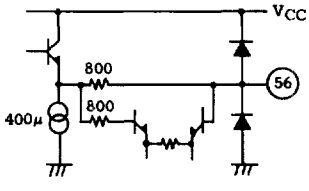


#55 Picture sharpness control/mute switch.

When #55 voltage becomes lower than 0.7V, the mute function operates. The brightness control circuits become the same condition as when 3V is applied at #48, EXT/TV switch turns to TV mode, and the video signal and the color differential signal are cut.



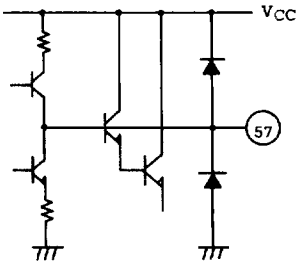
#56 Second-order differential video signal input



TA8659AN

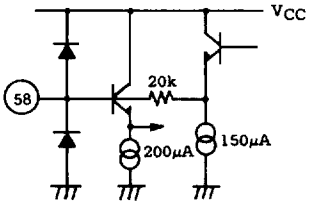
#57 Pedestal clamp

A terminal for a pedestal clamp capacitor.



#58 Video input

A video signal of sync negative should be applied.



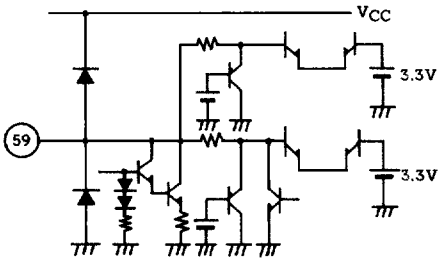
#59 TV contrast control with uni-color control

Text contrast control

Video gain and color gain are controlled simultaneously. The typical gain control range is -20 dB.

Contrast control terminal for external RGB signal.

The typical gain control range is -12 dB.

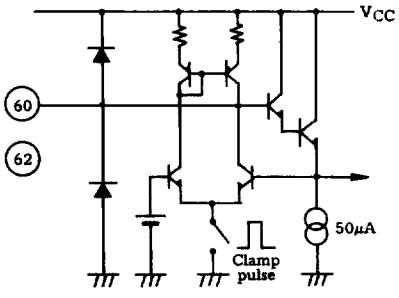


#60, #62 Color differential signal input

The decoupling capacitor is used as a clamp capacitor.

#60: R-Y input

#62: B-Y input



#61 V_{CC} for video & vertical deflection stage. (12V)

By-pass capacitance is connected to #50.

#68 V_{CC} for RGB output stage. (12V)

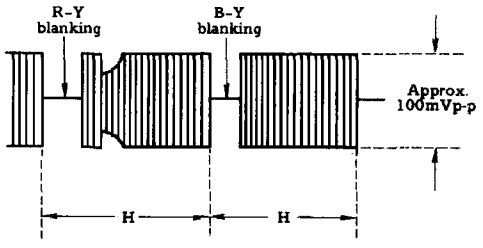
By-pass capacitance is connected to #50.

TA8659AN

ALIGNMENT PROCEDURE

Bell Filter Coil (TRF-5415) Adjustment

1. Receive the SECAM color bar signal.
2. Connect the synchroscope to terminal pin 2.
3. Adjust Filter Coil for the flat level of amplitude in each color bar waveform on the scope.

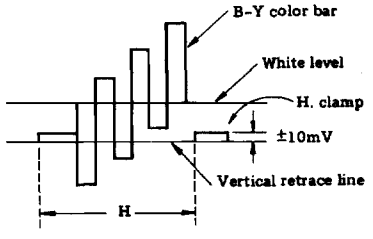


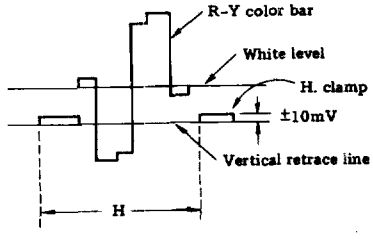
Ident Coil (TRF-5423) Adjustment

1. Receive the SECAM color bar signal.
2. Connect the DC voltmeter (digital voltmeter) to pin 23.
3. Adjust Ident Coil for the maximum indication on the meter.

B-Y, R-Y Demod Coil (TRF-5414) Adjustment

1. Receive the SECAM color bar signal.
2. Set the Color, Brightness and Contrast Controls free.
3. Connect the synchroscope to pin 60.
4. Adjust Coil (B-Y) so that the white level in picture part reaches the vertical retrace line.
5. Then change the connection of synchroscope from pin 60 to pin 62.
6. Adjust Coil (R-Y) so that the white level in picture part reaches the vertical retrace line.

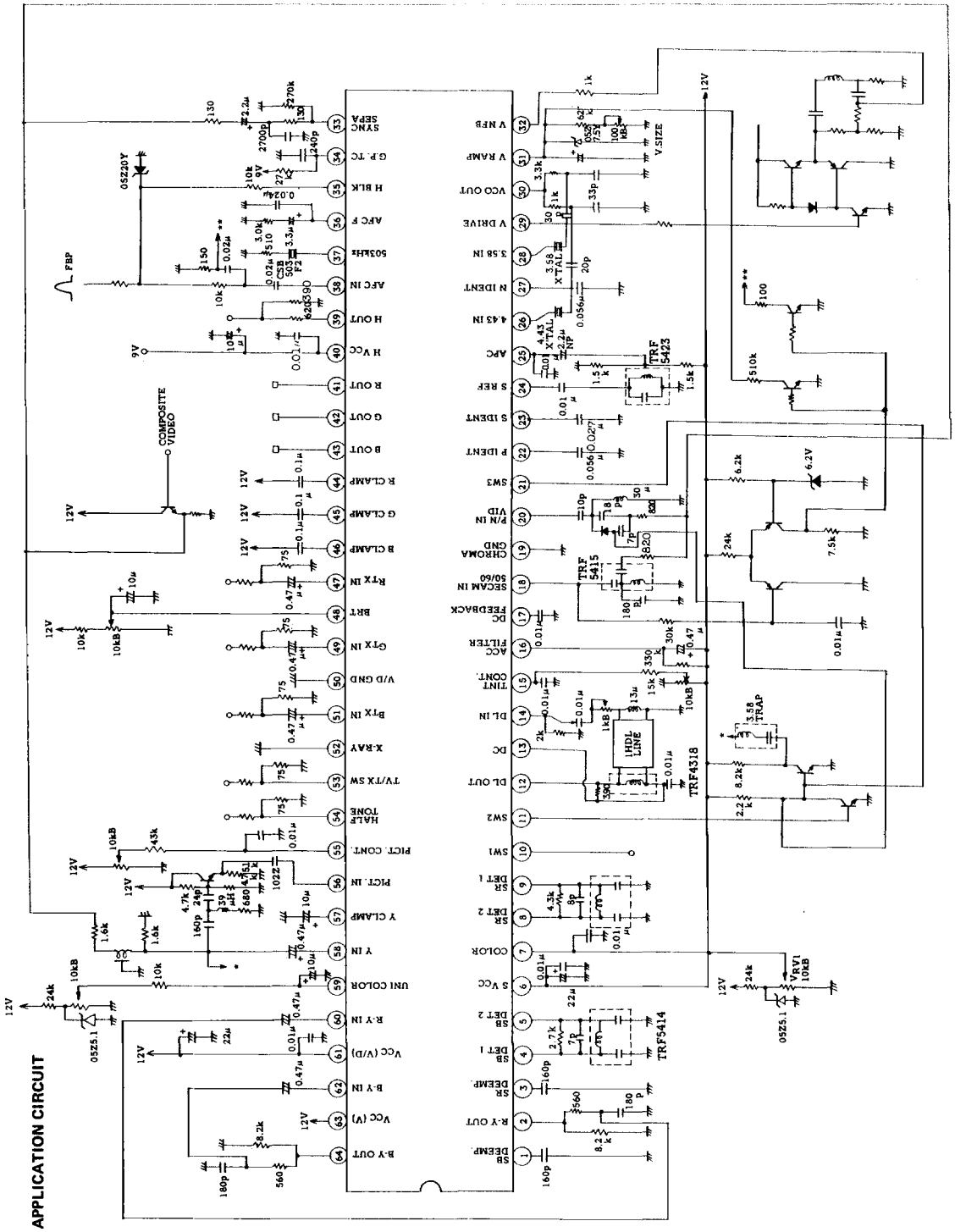




PAL Matrix Adjustment

1. Receive the color programme of Philips pattern.
2. Set the Color Control V.R., to obtain the proper color.
3. If the PAL matrix adjustment is incorrect, a Venetian Blind will appear in the color bars area. This needs adjustment.
4. At first, adjust DL Phase ADJ. Coil (TRF-5418) to minimize the Venetian Blind.
5. Next adjust 1H-DL ADJ. V.R. to minimize the Blind.
6. If the Venetian Blind still remains, readjust 1H-DL Phase ADJ. Coil to minimize the Blind.
7. Repeating item 5 and 6 procedures, adjust the V.R. and Coil until the Blind does not appear.

TA8659AN


APPLICATION CIRCUIT
12V
9V
SYNC SEPA
G.P. TC
H BLK
AFC F
503Hz
AFC IN
H OUT
H VCC
R OUT
G OUT
B OUT
R CLAMP
G CLAMP
B CLAMP
RTX IN
BRT
GTX IN
V/D GND
BTX IN
X-RAY
TV/TX SW
HALF TONE
PICT. CONT.
PICT. IN
Y CLAMP
Y IN
UNI COLOR
R-Y IN
Vcc (V/D)
B-Y IN
Vcc (V)
B-Y OUT
V NFB
V RAMP
VCC OUT
V DRIVE
3.58 IN
N IDENT
4.43 IN
AFC
S REF
S IDENT
P IDENT
SW3
P/N IN
CHROMA GND
SECAM IN
FEEDBACK
DC FILTER
TINT CONT.
DL IN
DC
DL OUT
SW2
SW1
SR DET 1
SR DET 2
COLOR
S VCC
SB DET 2
SB DET 1
SR DEEMP
R-Y OUT
SB DEEMP
V.SIZE
TRF 5423
TRF 5415
TRF4318
TRF5414
1HDL LINE
3.58 TRAP
4.43 XTAL
3.58 XTAL
FBP
COMPOSITE VIDEO
0525.1
VR1 10kB