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NTE1547
Integrated Circuit
Video Chroma Deflection System for Color TV

Description:

The NTE1547 combines the video–chroma subsystem and the deflection combination on a single monolithic integrated integrated circuit to provide a color television video–chroma–deflection system.

This device includes a video amplifier, color demodulator that is designed to provide color differential output, and improved sync–separator, horizontal oscillator with saw tooth wave type AFC, horizontal pre–driver in a 42–Lead DIP type plastic package.

Features:

Video–Chroma Section

- Minimum number of external parts required
- Stabilized with respect to variation of temperature and supply voltage
- A few initial adjustments required

Deflection System

- Excellent temperature stability of horizontal oscillator
- Exact 50% duty cycle output due to the 2–f_H oscillator and flip–flop circuit
- Excellent inter–race
- Stable sync separator with V/H input terminals.

Absolute Maximum Ratings: (T_A = +25°C unless otherwise specified)

Supply Voltage, V_3max	15V
Supply Current, I_{33}max	40mA
Input Signal Level, e_{IN}	$5V_{P–P}$
Demodulator Min Load Resistance, R_{LD}	1.8kΩ
Horizontal Drive Peak Current, $–I_{24}$	30mA
Horizontal Drive Operating Current, $–I_{24}$	15mA
Vertical Ouptut Current, I_{26}max	–5mA
Sync Separator Input Level, V_{38}max/V_{39}max	$3V_{P–P}$
Pin7 Max Operating Current, I_7	5mA
Pin2 Max Operating Current, I_2	4mA
Power Dissipation, P_D	2.2W
Derate Above 25°C	17.6mW/°C
Operating Temperature Range, T_{opr}	–20° to +65°C
Storage Temperature Range, T_{stg}	–55° to +150°C

Electrical Characteristics: (V_3 = 12V, T_A = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Video Section						
12v Supply Current	I_{CC3}	Measure Pin3 Currnt	60	82	100	mA
Video Gain	v_{22}/v_6	V_6 = 4.25V, v_6 = 4MHz, $1V_{P-P}$, V_5 = 10V, V_B = 8V	2.0	3.5	5.0	dB
Contrast Gain Control Range	ΔG_V	V_6 = 4.25V, v_6 = 500kHz, $1V_{P-P}$, V_5 = 5 to 10V	11.2	12.3	13.4	dB
Video Frequency Characteristics	ΔG_{Vf}	V_6 = 4.25V, V_5 = 10V, V_B = 8V, v_6 = 4MHz, 0.5MHz, $1V_{P-P}$, 20log (22 (4MHz)/22 (0.5MHz))	–3.5	–1.5	0.5	dB
DC Restoration Ratio	K	V_{41} = 4.1V, Change APL 10% to 90%, measure pedestal level change of Pin22	63	70	77	%
Max. Video Output		Pin5 OPEN, Change V_{40} DC Voltage, Measure 90% of Voltage Change at Pin22	5.0	7.5	–	V_{P-P}
Video DC Output Temperature Coefficient		V_6 = 3.25V, V_{41} = 4.1V, T_A = –20° to +65°C	–2.5	0	+2.5	mV/°C
Inv. Amp Gain	v_7/v_6	V_6 = 4.25V, v_6 = 4MHz, $1V_{P-P}$, v_5 = 10V, V_B = 8V	2.2	3.5	4.6	dB
Inv. Amp Differential Gain	DG_R	V_6 = 3.3 to 5.2V, v_6 = 3.58MHz, $100mV_{P-P}$	–	2.5	10.0	%
Inv. Amp Frequency Characteristics	ΔG_{Rf}	V_6 = 4.25V, V_5 = 10V, V_B = 8V, v_6 = 4MHz, 500kHz, $1V_{P-P}$, 20log (v_7 (4MHz)/v_7 (0.5MHz))	–3.5	–0.1	0.5	dB
Inv. Amp 3.58MHz Linearity	L_7	V_6 = 4V, v_6 = 3.58MHz	1.6	–	–	V_{P-P}
Chroma (1) (Gate Pulse and Blanking Pulse is applied)						
Max. Chroma Output	e_{CH}	V_1 = 12V, V_5 = 10V, V_8: OPEN, v_9: $120mV_{P-P}$(B:C = 1:1), V_G = 8V, V_B = 15V, Measure Pin12	0.5	0.75	1.05	V_{P-P}
Burst Output	e_B		0.45	0.70	0.95	V_{P-P}
ACC Characteristics (1)	e_a	V_1 = 12V, V_5 = 10V, V_8: OPEN, v_9 = $1.5mV_{P-P}$(B:C = 1:1), measure Chroma Amplitude Pin12	0.16	0.34	–	V_{P-P}
ACC Characteristics (2)	A	v_9 = $100mV_{P-P}$, $300mV_{P-P}$(B:C = 1:1), Chroma Amplitude Ratio at Pin12 A = $v_{12}(v_9 = 300mV_{P-P})/v_{12}(v_9 = 100mV_{P-P})$	–	1.0	1.3	
Color Control Residual Signal	e_{CS}	V_1 = 0V, V_5 = 10V, V_8: OPEN, S_1: 1, S_2: 1, V_G = 5V, V_B = 15V, v_9 = $120mV_{P-P}$(B:C = 1:1)	–	–	3	mV_{P-P}
Uni Color Control Gain Range	Δe_{cu}	V_1 = 12V, V_5 = 5 to 10V, V_8: OPEN, S_1: 1, S_2: 1, V_G = 8V, V_B = 15V, v_9 = $120mV_{P-P}$(B:C = 1:1)	7.5	8.5	9.5	dB
Uni Color Control Phase Range	$\Delta\phi_{cu}$	Ssame as above. Burst Chroma Phase Change at Pin12	–	4	10	deg.
HUE Phase Control Range (1)	$\Delta\phi_{bH1}$	V_1 = 12V, V_5 = 10V, V_8 = 0 to 12V, v_9 = $120mV_{P-P}$, V_G = 8V, V_B = 15V, Burst Chroma Phase Change at Pin12, S_1: 1, S_2: 1	75	105	–	deg
HUE Phase Control Range (2)	$\Delta\phi_{bH2}$	Same as above. Phase cahnge from V_8 OPEN	37	51	62	deg

Electrical Characteristics (Cont'd): (V_3 = 12V, T_A = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Chroma (2) (Gate Pulse and Blanking Pulse is applied)						
Color Control Phase Change	$\Delta\phi_{cc}$	V_1 = 0 to 12V, V_5: OPEN, V_8: OPEN, v_9 = 120mV_{P-P}(B:C = 1:1), V_G = 8V, V_B = 15V, S_1: 1, S_2: 1	–	3	5	deg
Burst–Chroma Phase Difference	$\Delta\phi_{bc}$	Same as above. V_1: OPEN	–8	0	+8	deg
APC Pull–In Range	f_P	v_{14} = 0.6V_{P-P} (Burst), Measure Pin16 Frequency Difference between f_c and f_0 when APC is Out	±250	±350	–	Hz
Killer Senstivity	e_{bk}	v_{14} Burst Amplitude when V_1 = 2V, S_1: 1, S_2: 2	18	29	45	mV_{P-P}
Residual Carrier of Demodulator Output	$e_{car\ R}$ $e_{car\ G}$ $e_{car\ B}$	v_{14}: AC GND, 3.58MHz Component at Pin19, Pin20, and Pin21, S_1: 1, S_2: 2	–	–	300	mV_{P-P}
Color Diff. Signal Output	e_{OR}	S_1: 1, S_2: 2, v_{14} = 3.56945MHz, 0.2V_{P-P}, CH: 3.579549MHz	1.45	1.85	2.30	V_{P-P}
	e_{OG}		0.49	0.62	0.77	V_{P-P}
	e_{OB}		1.55	1.95	2.42	V_{P-P}
Color Diff. Signal Relative Output	R–Y/B–Y	Same as above	0.85	0.95	1.05	V_{P-P}
	G–Y/B–Y		0.25	0.31	0.38	V_{P-P}
Color Diff. Signal Max. Output	e_{ORM}	S_1: 1, S_2: 2, v_{14} = 3.56945MHz, 1.2V_{P-P}, CW: 3.579545MHz	4.5	5.5	–	V_{P-P}
	e_{OGM}		1.4	1.8	–	V_{P-P}
	e_{OBM}		4.5	5.5	–	V_{P-P}
Relative Phase	ϕ_{R-Y}	S_1: 1, S_2: 2, v_{14}: Burst 0.6V_{P-P}, Chroma 0.2V_{P-P}	100	107	112	deg
	ϕ_{G-Y}		230	240	250	deg
Chroma (3) (Gate Pulse and Blanking Pulse is applied)						
Demodulator Bandwidth	f_{BR} f_{BG} f_{BB}	S_1: 1, s_2: 2, v_{14}: 10kHz to 5MHz, 0.2V_{P-P}, –3dB Frequency (0db: 10kHz)	1.13	1.77	3.16	MHz
Blanking Operation Voltage		S_1: 1, S_2: 2, v_{14}: Burst 0.6V_{P-P}, Chroma 0.2V_{P-P}, Blanking Pulse Height when Demodulator Output is Disappear	10.4	11.1	–	V
Demodulator Output DC Voltage	E_{OR} E_{OG} E_{OB}	S_1: 1, S_2: 2, v_{14}: AC GND	7.00	7.71	8.35	V
Demodulator Output Difference Voltage	$E_{O(R-G)}$ $E_{O(R-B)}$ $E_{O(B-G)}$	Same as above	–0.3	–	+0.3	V
Demodulator DC Output Thermal Coefficient	$\Delta E_{OR\phi}$ $\Delta E_{OG\phi}$ $\Delta E_{OB\phi}$	Same as above. T_A = –20° to +65°C	–3	0	2	mV/°C
DC Output Voltage Difference Component Thermal Coefficient	$\Delta E_{O(R-G)\phi}$ $\Delta E_{O(R-B)\phi}$ $\Delta E_{O(B-G)\phi}$	Same as above	–2	0	+2	mV/°C
Color Control Pin Voltage	V_1	Measure Pin1 Open Circuit Voltage	5.4	6.0	6.52	V
Uni Color Control Pin Voltage	V_5	Measure Pin5 Open Circuit Voltage	6.9	7.5	8.02	V
Hue Control Pin Voltage	V_8	Measure Pin8 Open Circuit Voltage	5.4	6.0	6.52	V

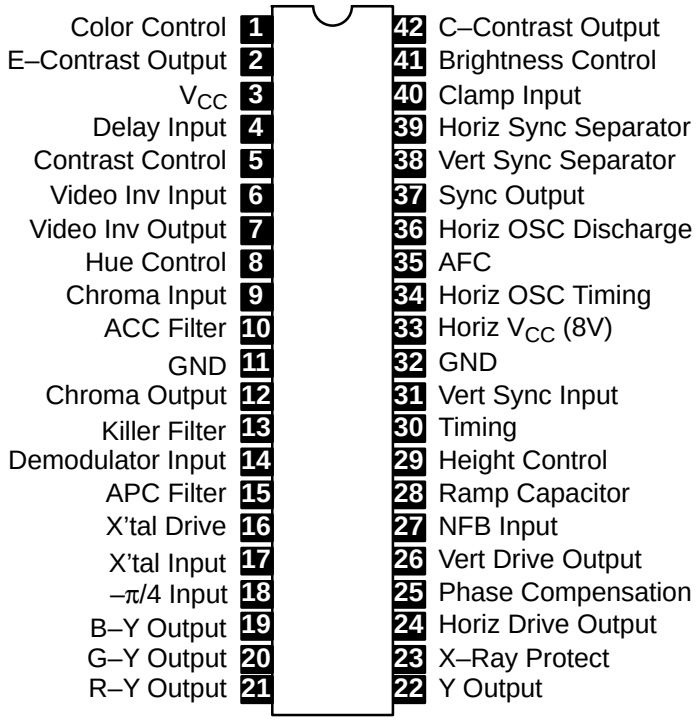
Electrical Characteristics (Cont'd): (V_3 = 12V, T_A = +25°C unless otherwise specified)

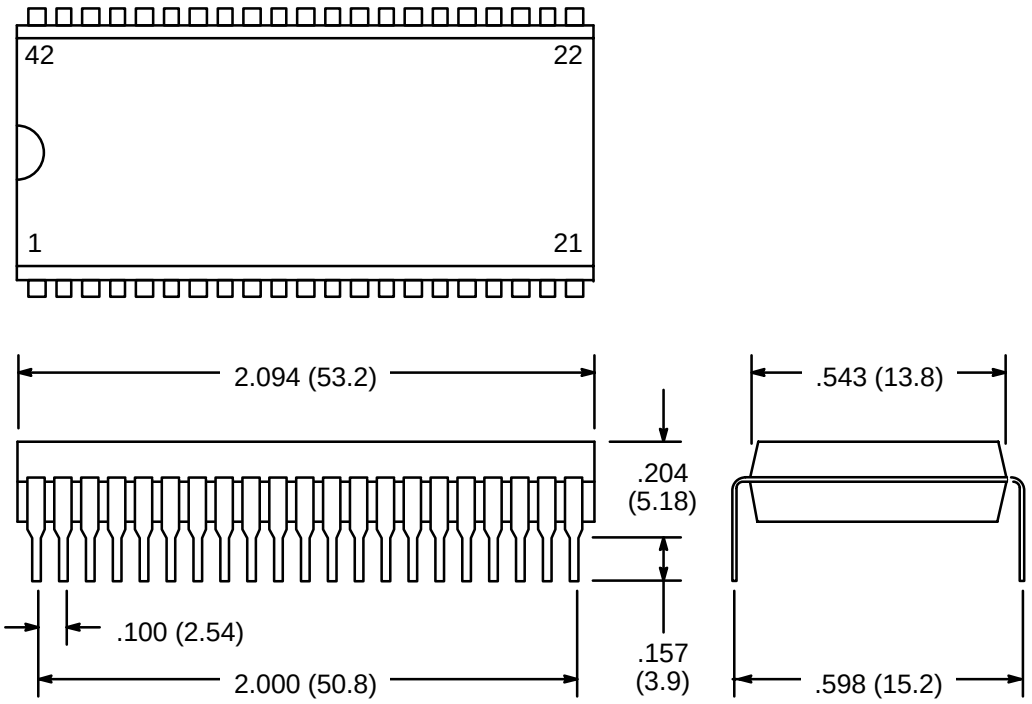
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Horizontal (1)						
Horizontal V_{CC}	V_{33}	V_B = 20.3V	7.4	8.2	9.0	V
Recommended Supply Current	I_{33}		22	26	30	mA
Horizontal Frequency	f_H	S_{39}: b, S_{38}: b, S_{35}: ON, V_X = 4V	150.69	15.569	16.069	kHz
f_H Thermal Drift	Δf_{HT}	Same as above. T_A = –20° to +65°C	–70	80	230	Hz
AFC Clamping Voltage	V_{CL}	Measure Pin35 Open, Circuit Voltage S_1: ON	3.71	4.2	4.75	V
AFC Input Current	I_{IN35}	S_1: ON, S_5: 2	2.2	3.42	5.1	mA
AFC Output Current	I_{O35}	S_1: ON, S_5: 2	2.4	3.99	5.6	mA
Horizontal Drive Saturation Voltage	V_{OL24}	S_1: ON, S_3: ON, Measure V_{24}	–	–	0.3	V
Horizontal Drive Output Duty Cycle	T_{O24}	S_{39}: b, S_{38}: b, S_{35}: OPEN, V_X = 4V, H Level Period/1 Cycle Period = 100, Measure v_{24} Wave Form	45	50	55	%
Oscillator Starting Voltage	V_{33}min	Minimum V_{33} when Output Duty of Pin24 is 50%	–	–	4.0	V
Starting Supply Current	I_{33}min	V_{33} = 4V, Measure I_{33}	5.5	8.8	11.5	mA
AFC Pull–In Range	Δf_{HPULL}	S_{38}: a, S_{35}: ON, S_{39}: a, Changing V_X, Measure Pull–In Range	–	±600	–	Hz
Horizontal (2)						
AFC Hold–In Range	$\Delta f_{H\ HOLD}$	Same as Pull–In Range, Measure Hold–In Range	–	±1000	–	Hz
X–Ray Protector Voltage Range	V_{IN23}	Measure V_{23} when v_{24} Output becomes L Level ,T_A = +25°C	0.50	0.88	1.10	V
X–Ray Protector Current Sensitivity	I_{IN23}	Measure I_{23} when v_{23} Output becomes L Level, T_A = +25°C	0.060	0.178	1.000	µA
X–Ray Protector Operating Voltage	$V_{IN23\phi}$	Same as V_{IN23}, T_A = –20° to +65°C	0.30	0.84	1.28	V
X–Ray Protector Operating Current	$I_{IN23\phi}$	Same as I_{IN23}, T_A = –20° to +65°C	0.030	0.178	2.000	µA
Sync Separator						
Sync Separator Sensitiviety (1)	I_{IN39}	Pin38: OPEN, Measure I_{39} when V_{37} is Low–to–High	18.1	35.0	11.3	µA
Sync Separator Sensitiviety (2)	I_{IN38}	Pin39: OPEN, Measure I_{38} when V_{37} is Low–to–High	13.3	21.4	54.2	µA
Sync Output High Level	V_{OH37}	Pin38: OPEN	7.04	8.19	9.34	V
Sync Output Low Level	V_{OL37}		0	1.5	2.4	V
Sync Clamp Voltage	V_{CL31}	Measure V_{31} at I_{31} = –1mA	–0.85	–0.63	–0.5	V
Vertical						
Vertical Free–Running Frequency	f_V	S_{31}: ON, Measure Pin28	56	60	64	Hz
Retrace Time	T_r	Pin28 Output Pulse	500	690	850	µs

Electrical Characteristics (Cont'd): (V_3 = 12V, T_A = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Vertical (Cont'd)						
f_V Pull–In Range	$\Delta f_{V\ PULL}$	S_{31}: ON/OFF, Pin31 to V_R, S_{31}: OFF, f_{OSC28} = 60Hz, S_{31}: ON, Measure f_{OSC28}, $\Delta f_{V\ PULL} = f_{OSC28}$ = 60Hz	11.1	12.1	12.9	Hz
Ramp Max. Voltage	V_{O28}	V_{30} = 6V, Measure V_{28}	7.05	7.65	8.25	V
Ramp Max. Current	I_{O28}	V_{30} = 6V, Measure I_{28}, S_6: ON	16.7	26.8	48.4	mA
Max. Common Mode Input Voltage	V_{IH28}	S_{26}, S_{27}: ON, V_{30} = 0V, V_{28} = 6 to 12V, Measure V_{28} when V_{27} is saturated	11.9	–	–	V
Min. Common Mode Input Voltage	V_{IL28}	Same as above. V_{28} = 6 to 0V	–	2.86	3.7	V
Pin28 Input Current	I_{I28}	S_{26}, S_{27}: ON, V_{30} = 0V, Measure I_{28} at V_{28} = 6V	0.25	0.98	4.50	µA
Pin27 Input Current	I_{I27}	Same as above. Measure I_{27} at V_{28} = 4V	0.18	0.94	6.21	µA
Max. Vertical Output Voltage	V_{OH26}	S_{26}: OFF, S_{27}: ON, V_{30} = 6V, Measure V_{26}	5.6	6.3	7.2	V
Min. Vertical Output Voltage	V_{OL26}	S_{26}, S_{27}: OFF, V_{30} = 6V, Measure V_{26}	–	–	0.3	V
Pin29 Bias Voltage	V_{29}	Measure V_{29} when I_{29} = –0.2mA	3.7	3.9	4.1	V

Pin Connection Diagram




42
22
1
21
2.094 (53.2)
.204
(5.18)
.543 (13.8)
.100 (2.54)
2.000 (50.8)
.157
(3.9)
.598 (15.2)