NTE1500 & NTE1501
Integrated Circuit
7–Step LED Driver Circuit

Description:
The NTE1500 and NTE1501 are integrated circuits designed for driving 7–dot LED displays. The NTE1500 responds logarithmically to the input signal while the NTE1501 responds linearly. Because an adjustment pin for output current is provided, the brightness of the LED can be controlled.

Features:
- Linear (NTE1501) and Logarithmic (NTE1500) Response
- 7–LED Bar Graph Display Driver
- Brightness is Externally Adjustable
- High Output Current: 25mA Max
- Series Connection Capable for Driving more than 7–Dot Displays

Absolute Maximum Ratings: (T_A = +25°C unless otherwise specified)
Supply Voltage, V_{CC} 18V
Circuit Voltage, V_I 7.5V
Input Voltage, V_I 16V
Output Voltage, V_O 16V
Supply Current, I_{CC} 25mA
Output Current, I_O 25mA
Power Dissipation, P_D 1800mW
Operating Ambient Temperature Range, T_{opr} . . . . –30° to +75°C
Storage Temperature Range, T_{stg} . . . . –55° to +150°C

Electrical Characteristics: (T_A = +25°C, V_{CC} = 9V unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Current	I_{tot}	V_2 = 0	4	–	18	mA
Output Inflow Current	$I_{(SINK)9–15}$	V_I = 3.55V, V_7 = 3.5V	13	–	25	mA
Reference Voltage	V_{REF}		3.55	3.75	3.95	V
Output Offset Voltage (Amp)	$V_{O(offset)}$	V_{CC} = 16V, G_V = 20dB, V_2 = 0	–150	–	+150	mV
Voltage Gain (Amp)	G_V	V_2 = 50mV	18	20	22	dB
Output Pin Leakage Current	$I_{O(Leak)}$	V_{CC} = 18V	0	–	20	µA

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Bias Current (Amp)	I_{Bias2}	V_{CC} = 18V, V_2 = 0	−2	–	0	μA
	I_{Bias3}	V_{CC} = 18V, V_3 = 0	−2	–	0	μA
Input Bias Current (Comparator)	I_{Bias7}	V_{CC} = 18V, V_2 = 10V, V_3 = 0, V_7 = 0	−10	–	0	μA
	I_{Bias1}	V_{CC} = 18V, V_3 = 10V, V_I = 0, V_2 = 0, $V_6 = V_7$	−10	–	0	μA
Comparator Level (NTE1500)	GD_1 *	V_7 = 3.5, V_8 = 0	−17	−15	−13	dB
	GD_2		−9	−7	−5	dB
	GD_3		−4	−3	−2	dB
	GD_4		−1	0	1	dB
	GD_5		1.5	2.0	2.5	dB
	GD_6		3.5	4.0	4.5	dB
	GD_7		4.5	5.0	5.5	dB
Comparator Level (NTE1501)	GD_1	V_7 = 3.65, V_8 = 0	0.4	0.5	0.6	dB
	GD_2		0.85	1.0	1.15	dB
	GD_3		1.35	1.5	1.65	dB
	GD_4		1.85	2.0	2.15	dB
	GD_5		2.35	2.5	2.65	dB
	GD_6		2.85	3.0	3.15	dB
	GD_7		3.35	3.5	3.65	dB

* The comparator reference voltage is 3.5V and 2.0V is 0dB (V_{CC}opr = 5V to 16V).

Pin Connection Diagram

Output	1	16 V_{CC}
Input (−)	2	15 LED7
Input (+)	3	14 LED6
LED Current Input	4	13 LED5
LED Current Input	5	12 LED4
V_{ref}	6	11 LED3
R2	7	10 LED2
R1	8	9 LED1
GND	17	

1.102 (28.0) Max

17

8   1

9   16

.256 (6.5)

.866 (22.0) Max

.300 (7.62)

.200 (5.08)

.200 (5.08)

.100 (2.54)

.122 (3.0)