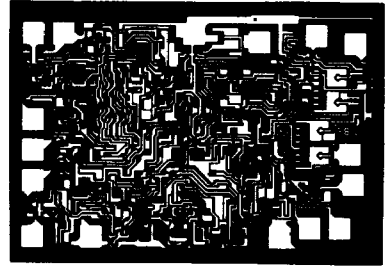


ULN-3812A PHASE-LOCKED LOOP STEREO DECODER

FEATURES

- Internal Temperature Compensation
- Single-Adjustment Tuning
- Automatic Stereo/Mono Switching
- Stereo Indicator Lamp Driver
- 70 dB SCA Rejection
- Operating Voltage — 9 to 16 V
- Low Harmonic Distortion
- Replaces ULN-2245A, CA3145, ULN-2244A, μ A758, LM1800, and MC1311
- 16-Pin Dual In-Line Plastic Package



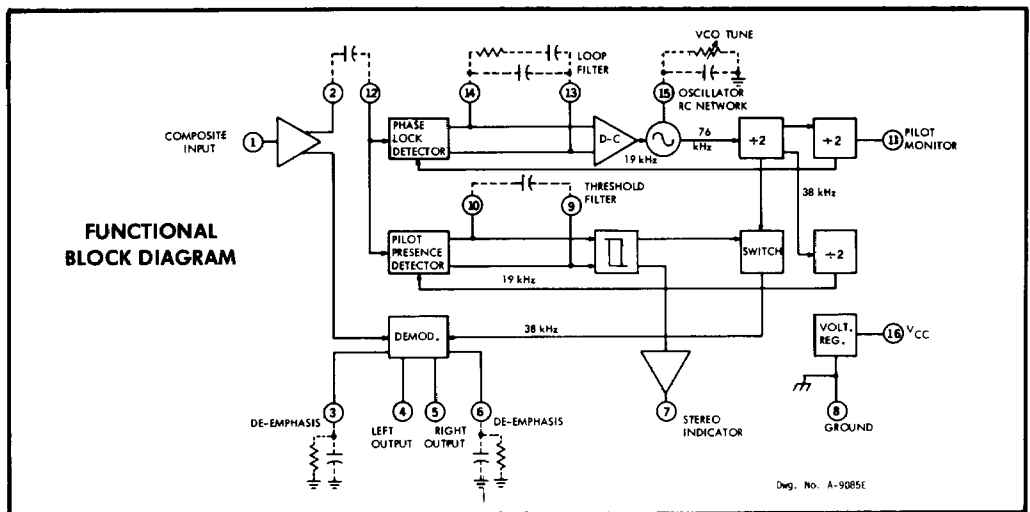
REQUIRING only a single, non-critical resistive tuning adjustment, the Type ULN-3812A integrated circuit derives left and right audio channels from the standard composite stereo signal. This phase-locked loop stereo decoder can also be used in a number of subscription TV decoder schemes or in various proposed TV stereo systems.

Using phase-lock techniques, the subcarrier (38 kHz for F-M stereo) is regenerated in phase with and at exactly twice the frequency of the transmitted pilot signal. Switching between monaural and stereo op-

eration is accomplished automatically by the presence of the pilot signal.

Low-impedance emitter-follower outputs and an internal voltage regulator for increased stability make Type ULN-3812A suitable for both line-operated and automotive applications. It is designed to operate over a wide supply-voltage range and will function with supplies as low as 9 V.

Type ULN-3812A is functionally and pin compatible with the Type ULN-2245A decoder and, except for a reduced audio-output impedance, is also interchangeable with Type ULN-2244A.



ABSOLUTE MAXIMUM RATINGS

Supply Voltage, V_{CC} (Continuous)	+16 V
(<15s)	+22 V
Lamp Supply Voltage, V_{LAMP}	+22 V
Lamp Current, I_{LAMP}	150 mA
Output Current, I_4 or I_5	10 mA
Package Power Dissipation, P_D	670 mW*
Operating Temperature Range, T_A	-20°C to +85°C
Storage Temperature Range, T_S	-65°C to +150°C

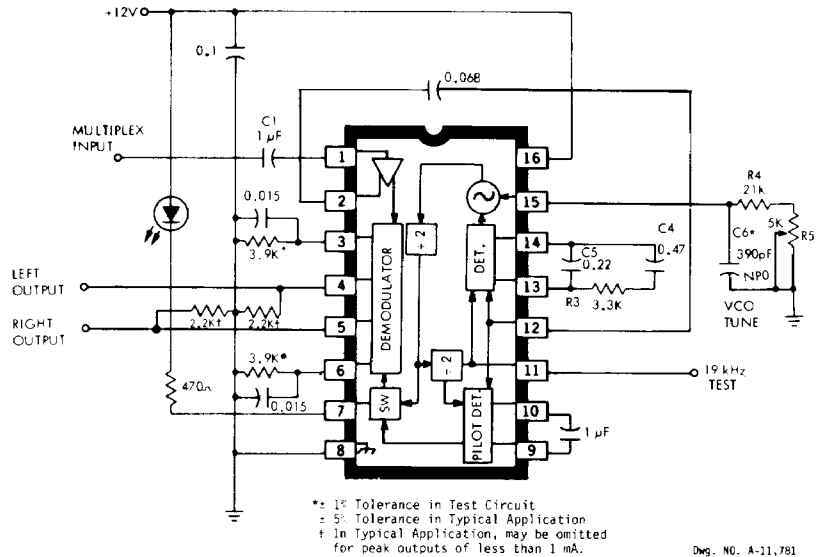
*Derate at the rate of 8.3 mW/°C above $T_A = +70^\circ\text{C}$.

ELECTRICAL CHARACTERISTICS at $T_A = +25^\circ\text{C}$, $V_{CC} = +12\text{V}$, Composite Input = 300 mV_{rms} (L = R, Pilot OFF), Pilot Level = 30 mV_{rms}, $f_m = 400\text{ Hz}$ or 1 kHz, unless otherwise specified.

Characteristic	Test Conditions	Limits			Units	Notes
		Min.	Typ.	Max.		
Input Impedance	Pin 2	20	35	—	k Ω	
Output Impedance	Pin 4 or 5	—	50	—	Ω	
Audio Voltage Gain	Desired Channel	0.7	1.0	1.4	V/V	
Stereo Channel Separation	$f_m = 100\text{ Hz}$	—	30	—	dB	
	$f_m = 400\text{ Hz}$	30	40	—	dB	3
	$f_m = 10\text{ kHz}$	—	30	—	dB	
Monaural Channel Balance	Pilot Level = 0 V	—	0.1	1.5	dB	
Total Harmonic Distortion	Multiplex Level = 600 mV	—	0.4	1.5	%	3
Ultrasonic Frequency Rejection	19 kHz	25	35	—	dB	
	38 kHz	25	40	—	dB	
SCA Rejection	67 kHz	—	70	—	dB	1
Stereo Switch Level	Pilot Only, Lamp ON	—	14	25	mV _{rms}	
	Pilot Only, Lamp OFF	2.0	7.0	—	mV _{rms}	
VCO Tuning Resistance	Pin 15	20	23	26	k Ω	2
VCO Frequency Drift	-20°C < T_A <+25°C	—	±0.5	±2.0	%	
	+25°C < T_A <+70°C	—	±0.5	±2.0	%	
Stereo Lamp Hysteresis	Lamp OFF to Lamp ON	3.0	6.0	—	dB	
Capture Range	Permissible Tuning Error	—	4.0	—	%	
Output Voltage Shift	Stereo to Mono Operation	—	±30	—	mV	
Lamp Output Current	Short Circuit, Lamp ON	50	100	—	mA	
	Lamp OFF	—	1.0	100	μA	
Lamp Driver Terminal Voltage	$I_{LAMP} = 50\text{ mA}$	—	1.3	2.0	V	
Supply Current	Lamp OFF	—	20	40	mA	
Power Supply Rejection	200 Hz, 200 mV _{rms}	—	40	—	dB	

- NOTES: 1. Measured with a stereo composite signal of 80% stereo, 10% pilot, and 10% SCA.
 2. Total resistance from pin 15 to ground, to set reference frequency at pin 11 to 19 kHz $\pm 10\text{ Hz}$.
 3. Measured with Toko 208BLR-3152N filter, or equivalent.

APPLICATION INFORMATION

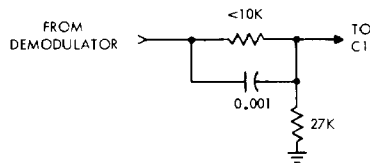


TEST CIRCUIT AND TYPICAL APPLICATION

1. If relaxed performance is acceptable, the external circuit can be simplified by decreasing the value of C_1 (reduces separation at low frequencies), decreasing the values of C_4 and R_3 while eliminating C_5 , and decreasing the value of C_6 while increasing the values of R_4 and R_5 (increases capture-range and beat-note distortion).
2. Typical I-F amplifier frequency response restricts channel separation to about 32 dB. This restric-

tion can be countered by the network shown below. Exact circuit values will be determined by the I-F amplifier design.

3. The network at pin 15 should be temperature stable (NPO).
4. To manually disable the stereo decoder, ground pin 9 and connect pin 15 to ground through a resistance of 3.3 k Ω .



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