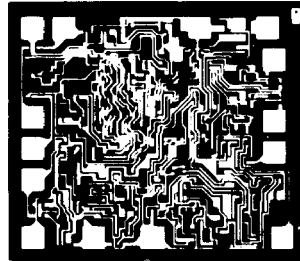


## ULN-3809A PHASE-LOCKED LOOP STEREO DECODER

### FEATURES

- Unity Voltage Gain
- I<sup>2</sup>L and Ion Implant Technology
- Wide Dynamic Range
- Low Distortion
- Excellent Channel Separation
- No Tuning Coils
- Automatic Stereo/Mono Switching
- Stereo Indicator Lamp Driver
- Direct Replacement for MC1309
- 14-Pin Dual In-Line Plastic Package

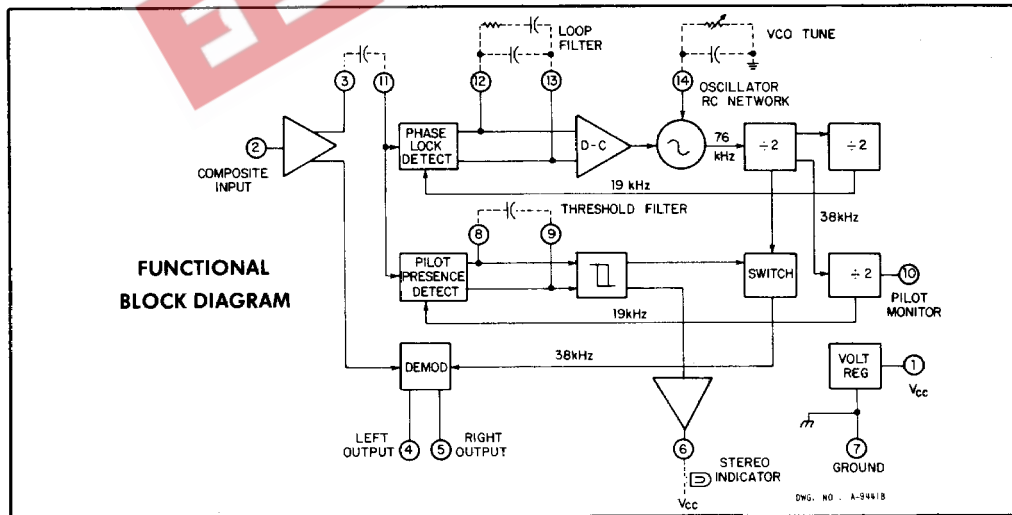


**S**PRAGUE Type ULN-3809A phase-locked loop decoder demodulates standard composite F-M stereo input signals within the range of 0.25 to 1.7 V<sub>pp</sub> without the use of tuning coils.

Integrated circuit design allows tuning with a single resistive adjustment. The decoder automatically switches between stereo and monaural operation by detection and evaluation of the 19-kHz pilot carrier signal.

Type ULN-3809A exhibits 35 dB suppression of the 19-kHz pilot and 45 dB rejection of the regenerated 38-kHz subcarrier at demodulator output terminals. Stereo channel separation is typically 47 dB. With a composite input signal of 850 mV, total harmonic distortion for the unit is typically 0.06%.

Type ULN-3809A is designed to work within a range of supply voltages from 4.5 to 16 V.



## ULN-3809A PHASE-LOCKED LOOP STEREO DECODER

### ABSOLUTE MAXIMUM RATINGS

Supply Voltage, $V_{CC}$	16 V
Nominal Lamp Current, $I_{LAMP}$	50 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

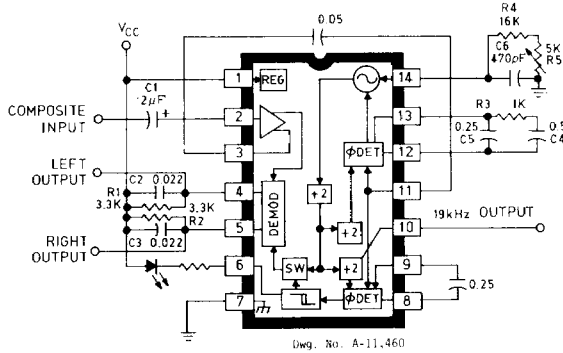
\*Derate at the rate of 8.3 mW/°C above  $T_A = +70^\circ\text{C}$ .

**ELECTRICAL CHARACTERISTICS at  $T_A = +25^\circ\text{C}$ ,  $V_{CC} = 9.0\text{ V}$ ,  
 $V_{in} = 1.7\text{ Vpp}$ ,  $f_m = 1.0\text{ kHz}$  (L or R only), Pilot Level = 10% unless otherwise specified**

Characteristic	Test Conditions	Limits			Units
		Min.	Typ.	Max.	
Max. Standard Composite Input Signal	$V_{CC} = 6.0\text{ V}$ , 0.5% THD	0.85	1.7	—	Vpp
	$V_{CC} = 9.0\text{ V}$ , 0.5% THD	1.7	2.1	—	Vpp
Max. Monaural Input Signal	$V_{CC} = 6.0\text{ V}$ , 1.0% THD	0.85	1.7	—	Vpp
	$V_{CC} = 9.0\text{ V}$ , 1.0% THD	1.7	2.2	—	Vpp
Input Impedance		15	30	—	k $\Omega$
Stereo Channel Separation	$f = 100\text{ Hz}$	—	45	—	dB
	$f = 1.0\text{ kHz}$	30	47	—	dB
	$f = 10\text{ kHz}$	—	40	—	dB
Monaural Gain		0.6	0.9	—	V/V
Channel Balance		—	0	1.0	dB
Total Harmonic Distortion	Stereo, $V_{in} = 850\text{ mVpp}$	—	0.06	—	%
	Mono, $V_{in} = 850\text{ mVpp}$	—	0.08	—	%
Ultrasonic Frequency Rejection	19 kHz	—	35	—	dB
	38 kHz	—	45	—	dB
SCA Rejection		—	75	—	dB
Stereo Switch Level	Lamp ON	—	9.0	12	mV
	Lamp OFF	2.0	4.5	—	mV
Mono/Stereo Switch Transient	No Lamp	—	0	—	mV
Capture Range	Pilot = 60 mVrms	—	7.0	—	%
Supply Current		—	11	—	mA

NOTE: THD and channel separation are measured after a bandpass filter (200 Hz to 10 kHz).

APPLICATIONS INFORMATION



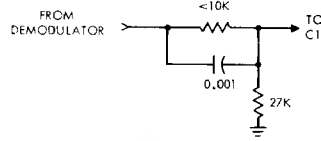
Uwg. No. A-11,460

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 eliminat-

ing  $C_5$ , and decreasing the value of  $C_6$  while increasing the values of  $R_4$  and  $R_5$  (increases capture-range and beat-note distortion).

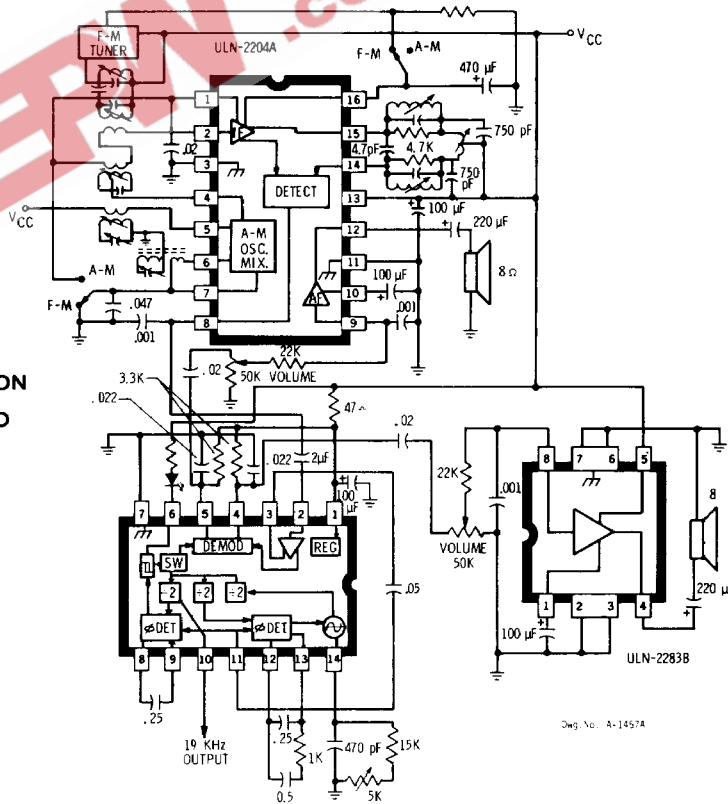
2. Typical I-F amplifier frequency response restricts channel separation to about 32 dB. This restriction can be counteracted by the network shown below. Exact circuit values will be determined by the I-F amplifier design.



Uwg. No. A-10,656

- To manually disable the stereo decoder, ground pin 8 and connect pin 14 to ground through a resistance of 3.3 kΩ.
- Capacitor  $C_6$  should be temperature-stable (NPO).

MINIMUM-COST APPLICATION IN A-M/F-M STEREO RADIO



Uwg. No. A-14574