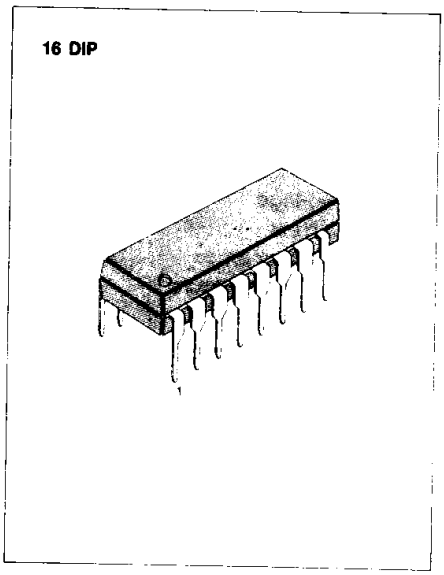
FM STEREO MULTIPLEX DECODER

The KA2261 is a monolithic integrated circuit consisting of a phase locked loop FM stereo demodulator. It was designed for use in car stereos, cassette recorders and other equipment.



FEATURES

- **A PLL is used for high multiplexing performance.**
- **Wide operating supply voltage range: V_{CC} = 3V ~ 14V**
- **Low quiescent circuit current (I_{CCQ} = 8.5mA, Typ).**
- **High SCA rejection ratio.**
- **High channel separation (45dB, Typ) and can be controlled by an external resistor.**
- **Built-in VCO disable and monaural muting circuits.**
- **Built-in stereo indicator lamp drive circuit.**

ORDERING INFORMATION

Device	Package	Operating Temperature
KA2261	16 DIP	−20°C ~ +70°C

BLOCK DIAGRAM

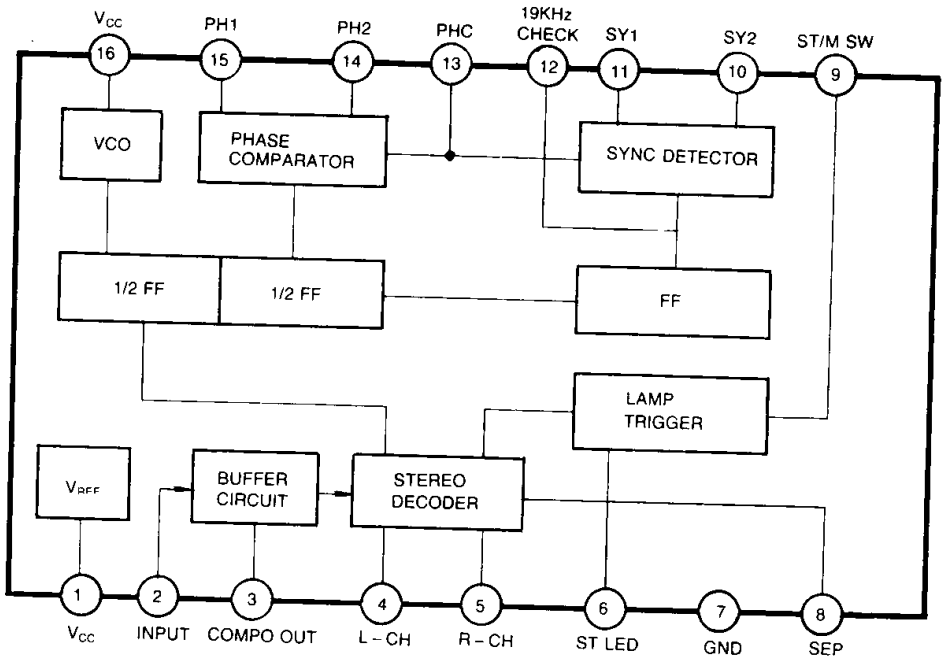


Fig. 1.

ABSOLUTE MAXIMUM RATINGS (T_a=25°C)

Characteristic	Symbol	Value	Unit
Supply Voltage	V_{CC}	16	V
Lamp Current	I_{LAMP}	40	mA
Power Dissipation	P_D	400	mW
Operating Temperature	T_{OPR}	−20 ~ +70	°C
Storage Temeprature	T_{STG}	−40 ~ +125	°C

ELECTRICAL CHARACTERISTICS

(T_a=25°C, V_{CC}=6V, f=1KHz, R_L=3.3KΩ, unless otherwise specified)

Characteristic		Symbol	Test Conditions	Min	Typ	Max	Unit
Quiescent Circuit Current		I_{CCQ}	V_I = 0		8.5	12	mA
Channel Separation		CS	V_I = 100mV, L + R = 90% P=10%, f=1KHz	35	45		dB
Total Harmonic Distortion	Mono	THD 1	V_I = 100mV		0.2		%
	Stereo	THD 2	L+R=90mV, P=10mV		0.7		%
Output Voltage		V_O	V_I = 100mV, f = 1KHz	66	85	115	mV
Channel Balance		CB	V_I = 100mV, f = 1KHz		0.5	1.5	dB
Lamp on Level		$VL_{(ON)}$	L+R=90%, P=10%		65		mV
Lamp Hysteresis		HY			3.5	6.0	dB
Maximum Input Level		$VI_{(MAX)}$	THD=2%		450		mV
SCA Rejection Ratio		SCA_{REJ}	L+R=90%, P=10%		70		dB
Signal to Noise Ratio		S/N	V_I = 100mV, f = 1KHz		75		dB
Carrier Leakage		V_{LKG}	V_I = 100mV, L + R = 90% P=10%		32		dB
Capture Range		CR	V_I = 100mV, L + R = 90% P=10%		±3		%
Input Impedance		Z_I		15	20		KΩ

TEST CIRCUIT

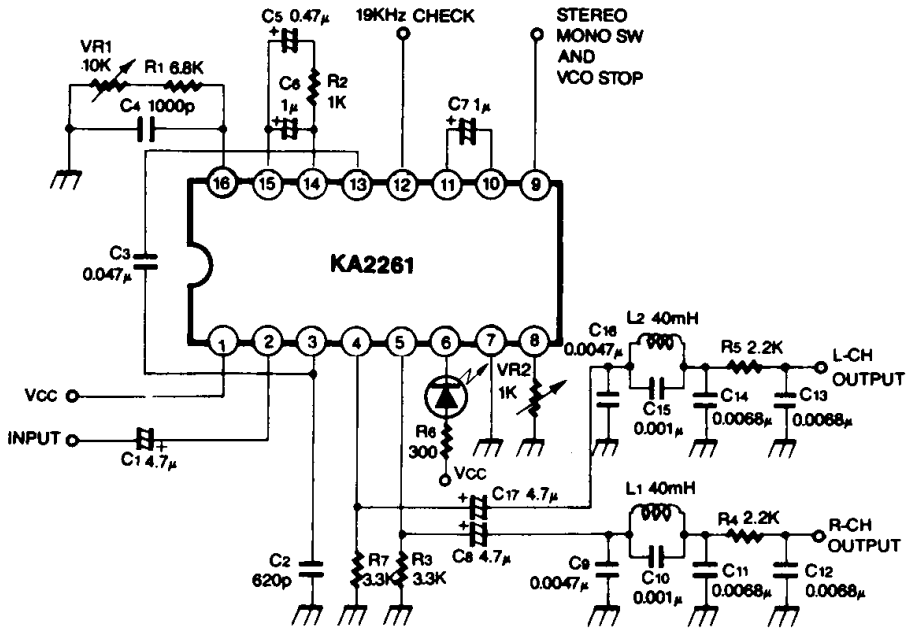
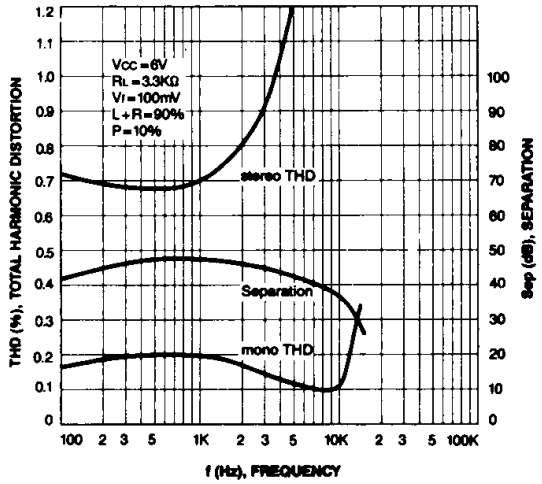
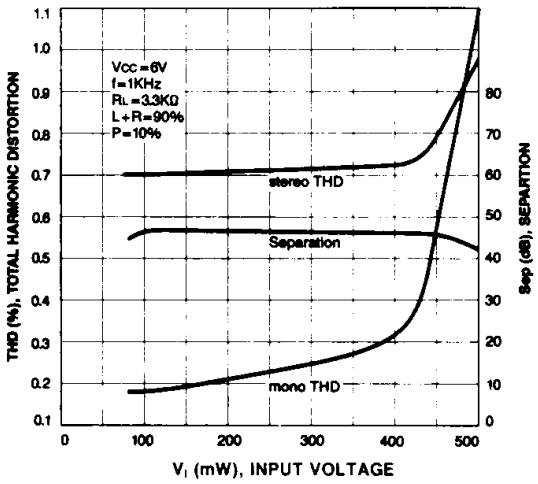


Fig. 2

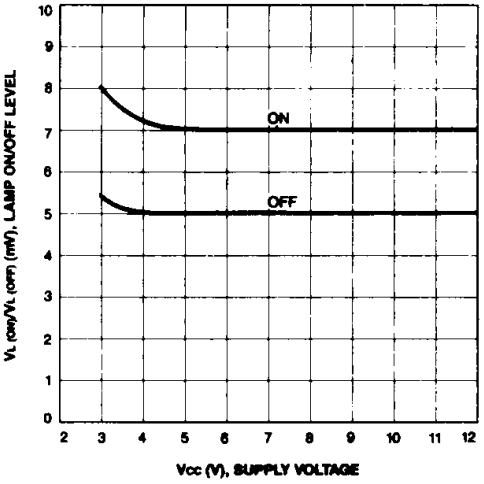
SEPARATION TOTAL HARMONIC DISTORTION —FREQUENCY



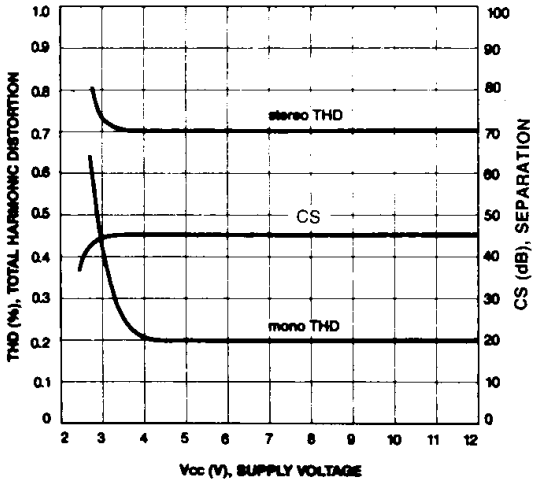
SEPARATION TOTAL HARMONIC DISTORTION — INPUT VOLTAGE



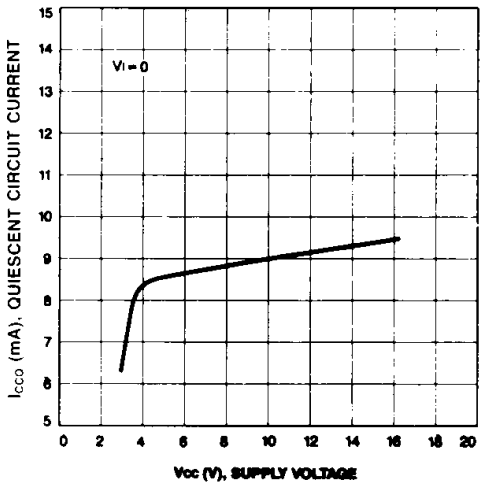
LAMP ON/OFF LEVEL-SUPPLY VOLTAGE



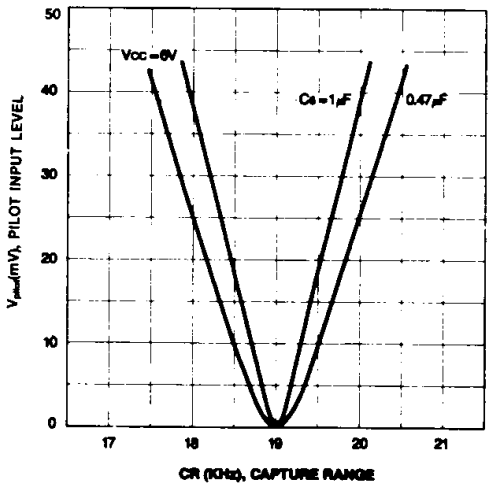
SEPARATION TOTAL HARMONIC DISTORTION — SUPPLY VOLTAGE



QUIESCENT CIRCUIT CURRENT-SUPPLY VOLTAGE



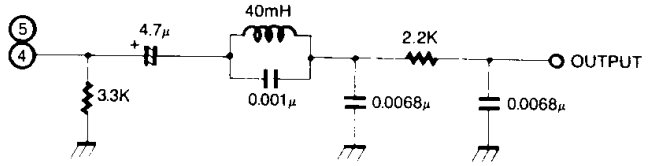
CAPTURE RANGE



APPLICATION INFORMATION
External Components (Refer to Test Circuit)

1. Input coupling capacitor (Pin 2)
   The recommended value is 4.7μF. If smaller values than 4.7μF are used, low frequency separation will worsen, and if larger values are used, the DC operating point will require time for stabilization.

2. Demodulator output (Pin 4, 5)
   These components provide R and L channel output load circuits. The recommended circuits are follows:



3. Separation control (Pin 8)
   This component is a variable resistor used to adjust the out signal separation.

4. Low pass filter (Pins 10, 11)
   This capacitor is used to filter the 19KHz signal detected by the phase comparator. The recommended value is 1μF. If made too small, the lamp may light improvely when a large mono input signal or external noise is received, too large a capacitance value will take more time to switch between mono and stereo modes.

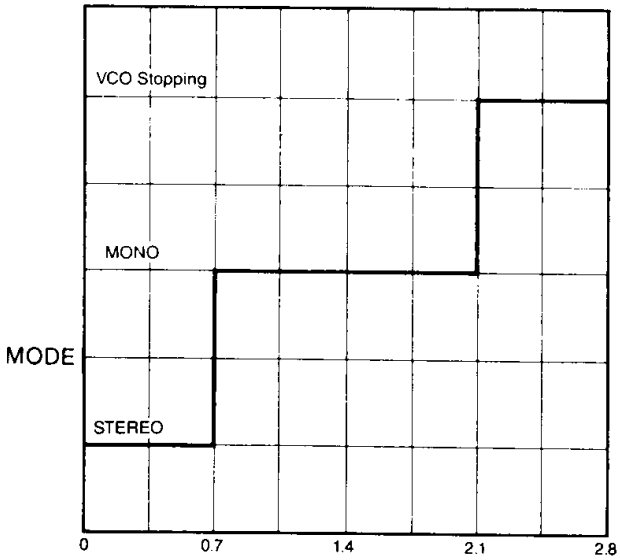
5. Preamplifier output capacitor (Pins 3, 13)
   This capacitor coupled preamplified with phase comparator. The recommanded value is 0.047μF.

6. Phase compensation capacitor (Pin 3, GND)
   This capacitor is prepared in order to compensate the phase advanced.

7. Loop filter (Pins 14, 15)
   This is the low pass filter for the PLL, which is determined the capture range. The recommended value as follows:
   $V_i \leq 250mV$ $C_{14\text{-}15} = 0.47\mu F$
   $V_i \geq 250mV$ $C_{14\text{-}15} = 1\mu F$

8. Control of Pin 9
   Function of Pin 9 is a change-over of stereo/mono and VCO stopping.

SCHEMATIC DIAGRAM of PIN 9 CONTROL



9. VCO network (Pin 16)
   Since the VCO has a negative temperature coefficient, the RC network compensates by using a polyester film capacitor and a resistor.