

## AM/FM TUNER + MPX

The KA2292 is a monolithic integrated circuit which consists of a 3V one chip tuner and FM multiplex for AM/FM radios and head-phone radios.

## FUNCTIONS

- \* FM Stage : RF/IF/AF amp, Quadrature Detector, MIX, OSC, Tuning Indicator.
- \* AM Stage : RF/IF/AF amp, Detector, MIX, OSC, AGC, Tuning Indicator.
- \* MPX Stage : PLL amp, Decoder, Flip Flop, VCO Stop, Phase Detector, Stereo Indicator.

## FEATURES

- 3V one chip tuner with built-in FM Multiplex
- No AM detect coil, IF coupling capacitor, FM IF by-pass capacitor needed.
- Built-in tuning indicator function.
- Built-in AM/FM selection switch.
- Minimum number of external parts required.
- Wide operating voltage range:  $V_{CC} = 1.8V \sim 7V$
- Low distortion (FM IF: 0.4%, AM IF: 1%, 0.2% (Typ)).

## BLOCK DIAGRAM

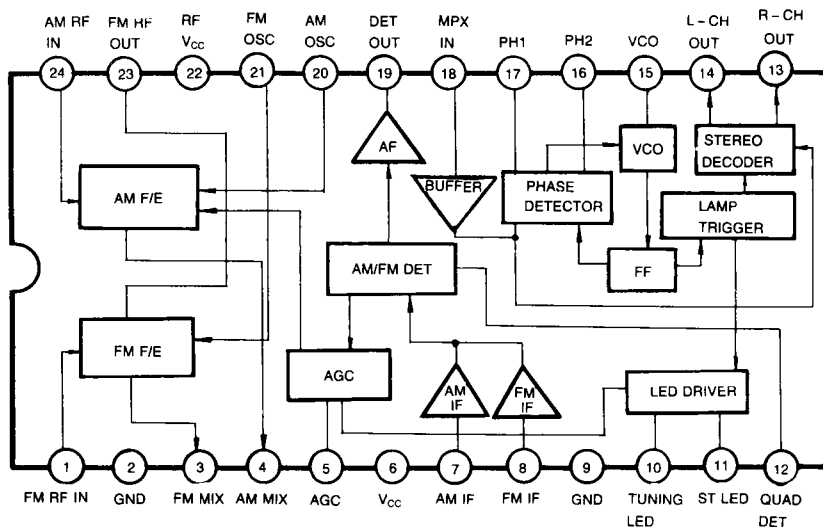
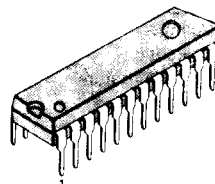
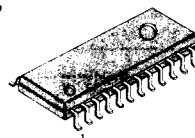


Fig. 1

24 SDIP



24 SOP



## ORDERING INFORMATION

Device	Package	Operating Temperature
KA2292	24 SDIP	- 20°C ~ + 75°C
KA2292D	24 SOP	

## ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Value	Unit
Supply Voltage	V <sub>CC</sub>	8	V
Power Dissipation	P <sub>D</sub>	1200	mW
Operating Temperature	T <sub>OPR</sub>	-20 ~ +75	°C
Storage Temperature	T <sub>STG</sub>	-55 ~ +150	°C
LED Drive Voltage	V <sub>DR</sub>	10	V
LED Drive Current	I <sub>DR</sub>	10	mA

## ELECTRICAL CHARACTERISTICS

(T<sub>a</sub> = 25°C, V<sub>CC</sub> = 3V, unless otherwise specified)

FM F/E : f = 98MHz, fm = 1KHz, Δf = 22.5KHz AM : f = 1MHz, fm = 1KHz, 30% Mod

FM IF : f = 10, 7MHz, fm = 1KHz, Δf = 22.5KHz MPX : f = 1KHz, L + R = 90%, P = 10%, V<sub>i</sub> = 150mV

Characteristic		Symbol	Test Conditions	Min	Typ	Max	Unit	Test Circuit
Quiescent Circuit Current		I <sub>CCQ1</sub>	FM, V <sub>i</sub> = 0	8.4	13.2	20.0	mA	1
		I <sub>CCQ2</sub>	AM, V <sub>i</sub> = 0	4.4	8.4	13.4	mA	1
F/E	-3dB Limiting Sensitivity	V <sub>i(LIM)1</sub>	V <sub>O</sub> = -3dB		10		dB <sub>μ</sub>	1
	Oscillation Voltage	V <sub>OSC</sub>	f <sub>osc</sub> = 98MHz	40	70	110	mV	2
FM IF	-3dB Limiting Sensitivity	V <sub>i(LIM)2</sub>	V <sub>O</sub> = -3dB	40	46	53	dB <sub>μ</sub>	1
	Detector Output Voltage	V <sub>O(DET)1</sub>	V <sub>i</sub> = 80dB <sub>μ</sub>	55	80	110	mV	1
	Signal to Noise Ratio	S/N <sub>1</sub>	V <sub>i</sub> = 80dB <sub>μ</sub>	60	70		dB	1
	Total Harmonic Distortion	THD <sub>1</sub>	V <sub>i</sub> = 80dB <sub>μ</sub>		0.4	1	%	1
	AM Rejection Ratio	AMR	V <sub>i</sub> = 80dB <sub>μ</sub>	22	32		dB	1
	Tuning Indication Voltage	V <sub>LI</sub>	I <sub>LED</sub> = 1mA	45	51	56	dB <sub>μ</sub>	1
AM IF	Voltage Gain	G <sub>V1</sub>	V <sub>i</sub> = 26dB <sub>μ</sub>	40	70	110	mV	1
	Detector Output Voltage	V <sub>O(DET)2</sub>	V <sub>i</sub> = 60dB <sub>μ</sub>	55	80	110	mV	1
	Signal to Noise Ratio	S/N <sub>2</sub>	V <sub>i</sub> = 60dB <sub>μ</sub>	32	42		dB	1
	Total Harmonic Distortion	THD <sub>2</sub>	V <sub>i</sub> = 60dB <sub>μ</sub>		1	2	%	1
	Tuning Indication Voltage	V <sub>L2</sub>	I <sub>LED</sub> = 1mA	20	25	30	dB <sub>μ</sub>	1
MPX	Maximum Input Voltage	V <sub>i(MAX)</sub>	Stereo, THD = 3%	250	350		mV	1
	Channel Separation	CS <sub>1</sub>	Stereo, f = 100Hz	32	42		dB	1
		CS <sub>2</sub>	Stereo, f = 1KHz	32	42		dB	1
		CS <sub>3</sub>	Stereo, f = 10KHz	32	42		dB	1
	Total Harmonic Distortion	THD <sub>3</sub>	Mono		0.2	1	%	1
		THD <sub>4</sub>	Stereo		0.2	1	%	1
	Voltage Gain	G <sub>V2</sub>	Mono	-5	-3	-1	dB	1
	Channel Balance	CB	Mono	-2	0	2	dB	1
	Lamp on Level	V <sub>L(ON)</sub>	Pilot only		8	16	mV	1
		V <sub>L(OFF)</sub>	Pilot only		2	6	mV	1
	Lamp Hysteresis	HY			2		mV	1
Capture Range	CR	Pilot only	±1	±3	±5	%	1	
Signal to Noise Ratio	S/N <sub>3</sub>	Mono	60	70		dB	1	

TEST CIRCUIT 1

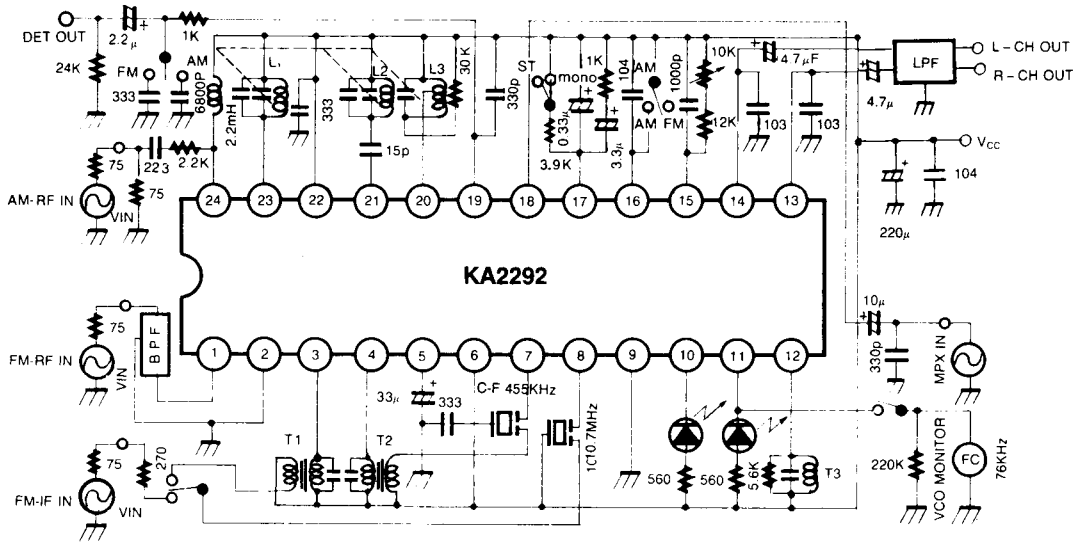


Fig. 2

\*POLYESTER FILM CAPACITOR

TEST CIRCUIT 2

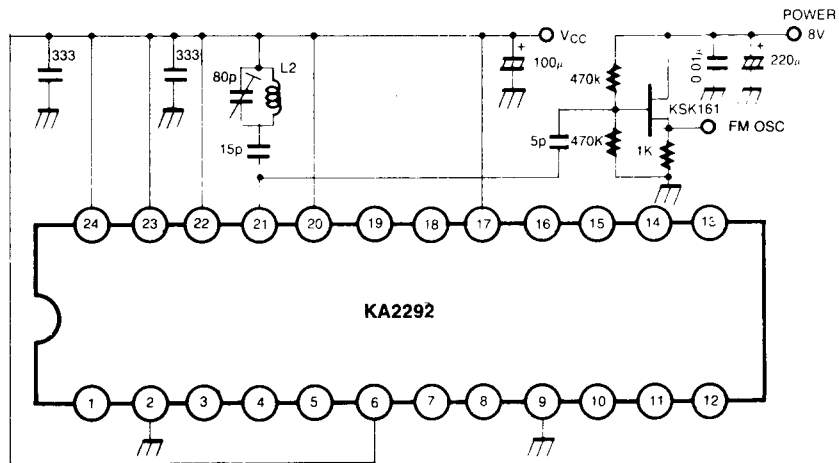
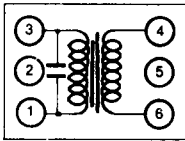


Fig. 3

COIL SPECIFICATION

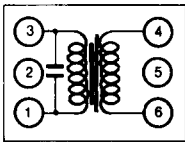
T1 FM IFT (MIX OUT)



C <sub>0</sub> (pF)	f (MHz)	Q <sub>0</sub>	TURNS	
			1-3	4-6
75	10.7	70(min)	11	2

KOREA TOKO  
0.1mmφ

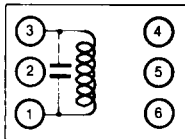
T2 AM IFT (MIX OUT)



C <sub>0</sub> (pF)	f (MHz)	Q <sub>0</sub>	TURNS	
			1-3	4-6
180	455	70(min)	180	15

KOREA TOKO  
0.08mmφ

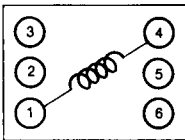
T3 FM IFT (DET)



C <sub>0</sub> (pF)	f (MHz)	Q <sub>0</sub>	TURNS	
			1-3	4-6
47	10.7	80(min)	14	

KOREA TOKO  
0.1mmφ

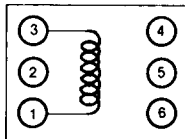
L1 FM RF



f (MHz)	Q <sub>0</sub>	TURNS	
		1-4	
100	100	2½	

0.5mmφ

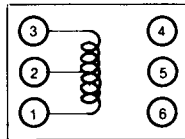
L2 FM OSC



f (MHz)	Q <sub>0</sub>	TURNS	
		1-3	
100	100	2¾	

0.5mmφ

L3 AM OSC



f (KHz)	Q <sub>0</sub>	TURNS		L (μH)
		1-2	2-3	
796	80(min)	13	73	288

KOREA TOKO  
0.08mmφ

APPLICATION CIRCUIT

