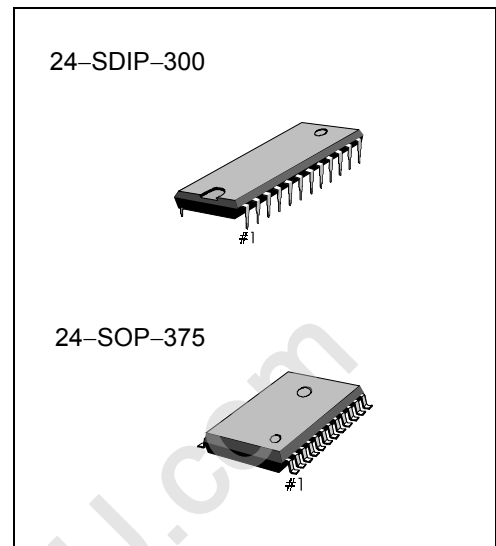


## INTRODUCTION

The KA22901/D is a monolithic integrated circuit which consists of a one-chip tuner and a no adjustment FM multiplex for AM/FM radios and headphone radios.

## FEATURES

- One chip tuner with built-in FM Multiplex
- No adjustment for FM detector and VCO
- No AM detect coil, IF coupling capacitor, FM IF bypass capacitor needed
- 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%, MPX: 0.2% (Typ))



## ORDERING INFORMATION

Device	Package	Operating Temperature
KA22901	24-SDIP-300	- 20°C ~ +75°C
KA22901D	24-SOP-375	

## BLOCK DIAGRAM

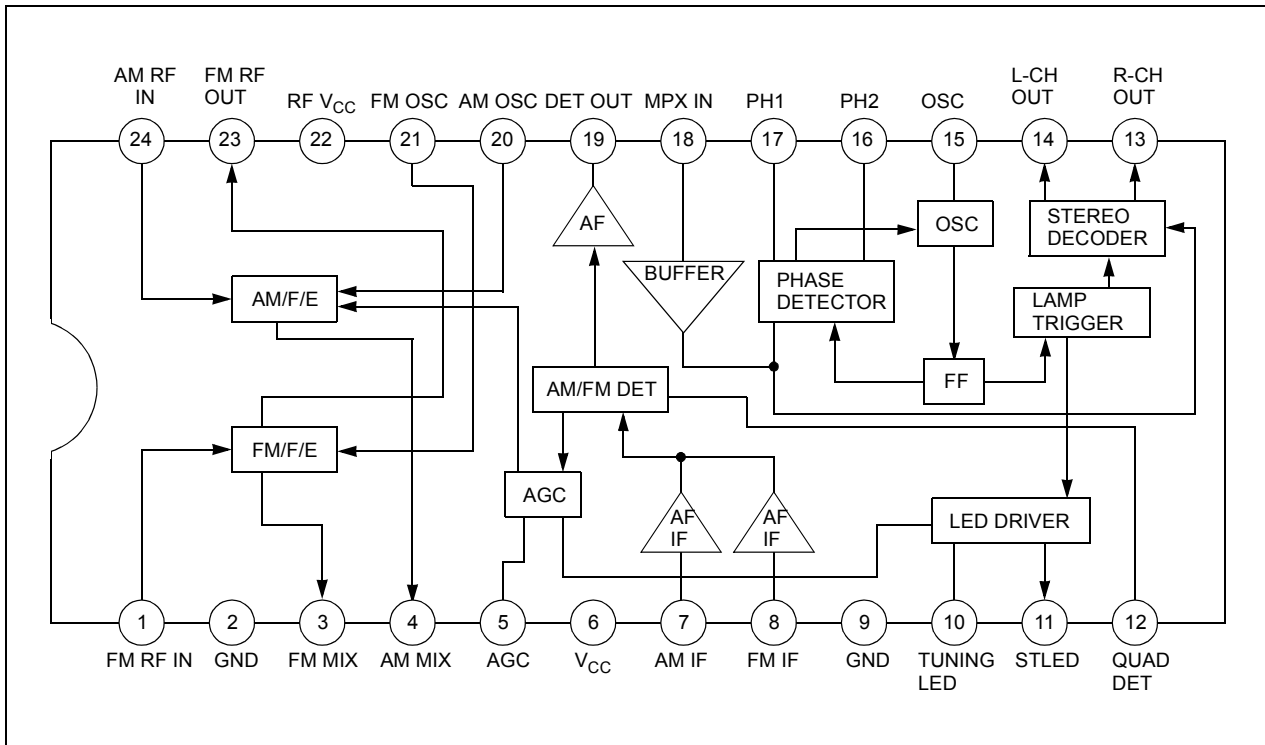


Figure 1.

ABSOLUTE MAXIMUM RATINGS ( $T_a = 25\text{ }^\circ\text{C}$ )

Characteristic	Symbol	Value	Unit
Supply Voltage	$V_{CC}$	8	V
Power Dissipation	$P_D$	1200	mW
Operating Temperature	$T_{OPR}$	-20 ~ +75	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55 ~ +150	$^\circ\text{C}$
LED Driver Voltage	$V_{DR}$	10	V
LED Driver Current	$I_{DR}$	10	mA

## ELECTRICAL CHARACTERISTICS

(Ta = 25 °C, V<sub>CC</sub> = 3 V, 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	10	14	18	mA	1
		I <sub>CCQ2</sub>	AM, V <sub>I</sub> = 0	3.5	6.0	9	mA	1
F/E	-3 dB Limiting Sensitivity	V <sub>I(LIM)1</sub>	V <sub>O</sub> = -3dB	10	14	18	dBμ	1
	Oscillation Voltage	V <sub>OSC</sub>	f <sub>OSC</sub> = 98MHz	70	105	140	mV	2
FM IF	-3 dB Limiting Sensitivity	V <sub>I(LIM)2</sub>	V <sub>O</sub> = -3dB	39	44	49	dBμ	1
	Detector Output Voltage	V <sub>O(DET)1</sub>	V <sub>I</sub> = 80dBμ	55	80	110	mV	1
	Signal to Noise Ratio	S/N <sub>1</sub>	V <sub>I</sub> = 80dBμ	60	70	-	dB	1
	Total Harmonic Distortion	THD <sub>1</sub>	V <sub>I</sub> = 80dBμ	-	0.4	1	%	1
	AM Rejection Ratio	AMR	V <sub>I</sub> = 80dBμ	40	50	-	dB	1
	Tuning Indication Voltage	V <sub>L1</sub>	I <sub>LED</sub> = 1mA	39	44	49	dBμ	1
AM IF	Voltage Gain	G <sub>V1</sub>	V <sub>I</sub> = 23dBμ	20	40	80	mV	1
	Detector Output Voltage	V <sub>O(DET)2</sub>	V <sub>I</sub> = 60dBμ	50	60	100	mV	1
	Signal to Noise Ratio	S/N <sub>2</sub>	V <sub>I</sub> = 60dBμ	34	44	-	dB	1
	Total Harmonic Distortion	THD <sub>2</sub>	V <sub>I</sub> = 60dBμ	-	1	2	%	1
	Tuning Indication Voltage	V <sub>L2</sub>	I <sub>LED</sub> = 1mA	19	24	30	dBμ	1

Characteristic		Symbol	Test Conditions	Min.	Typ.	Max.	Unit	Test Circuit
MPX	Maximum Input Voltage	$V_{I(MAX)}$	Stereo, THD = 3%	250	350	–	mV	1
	Channel Separation	$CS_1$	Stereo, f = 100Hz	35	42	–	dB	1
		$CS_2$	Stereo, f = 1kHz	35	42	–	dB	1
		$CS_3$	Stereo, f = 10kHz	35	42	–	dB	1
	Total Harmonic Distortion	$THD_3$	Mono	–	0.2	1	%	1
		$THD_4$	Stereo	–	0.2	1	%	1
	Voltage Gain	$G_{V2}$	Mono	–5	–3	–1	dB	1
	Channel Balance	CB	Mono	–2	0	2	dB	1
	Lamp on Level	$VL_{(ON)}$	Pilot only	–	8	16	mV	1
		$VL_{(OFF)}$	Pilot only	2	6	–	mV	1
	Lamp Hysteresis	HY	–	–	2	–	mV	1
	Capture Range	CR	Pilot only	–	$\pm 3$	–	%	1
	Signal to Noise Ratio	$S/N_3$	Mono	60	70	–	dB	1

TEST CIRCUIT 1

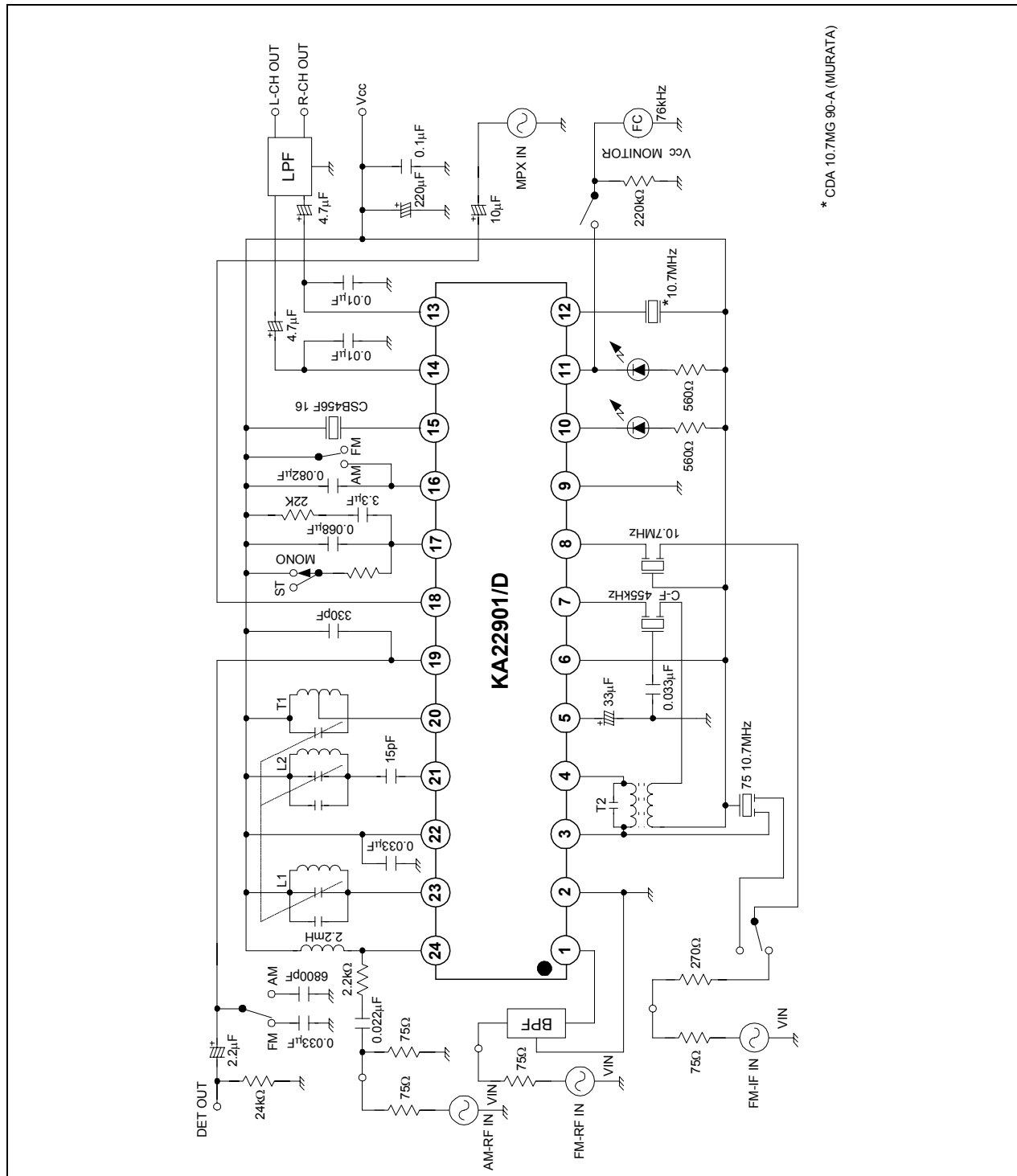


Figure 2.

TEST CIRCUIT 2

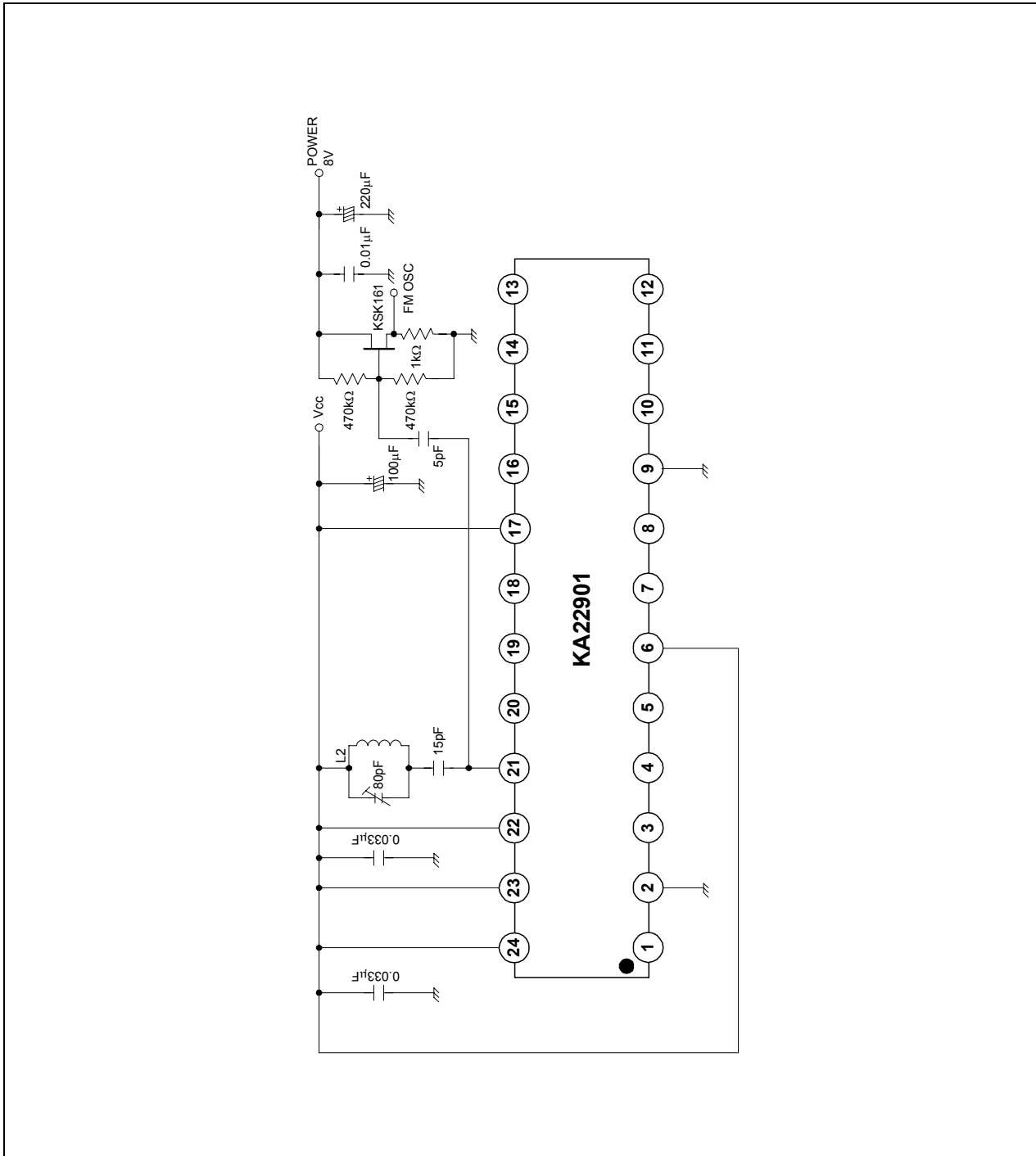
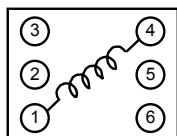


Figure 3.

COIL SPECIFICATION

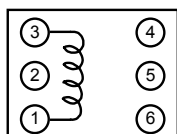
L1 FM RF



f (MHz)	Qo	TURNS		
		1-4		
100	100	2 1/2		

0.5mmφ

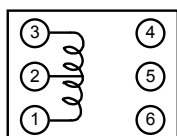
L2 FM OSC



f (MHz)	Qo	TURNS		
		1-3		
100	100	2 3/4		

0.5mmφ

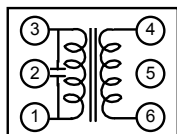
T1 AM OSC



f (MHz)	Qo	TURNS			L (uH)
		1-3	2-3		
796	115	13	73		288

KOREA TOKO  
0.08mmφ

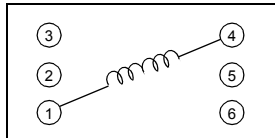
T2 AM IFT (MIX OUT)



Co (pF)	f (MHz)	Qo	TURNS		
			1-3	4-6	
180	455	120	180	15	

KOREA TOKO  
0.08mmφ

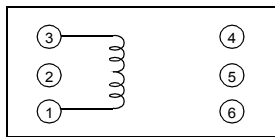
L1 FM RF



KST-FR1

F (MHz)	Qo	TURNS		KWANG SUNG PART NO
		1-4	WIRE	
100	100	2*(1/2)	0.5m/m	KST-FR1

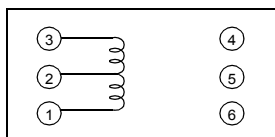
L2 FM OSC



KST-FO1

F (MHz)	Qo	TURNS		KWANG SUNG PART NO
		1-3	WIRE	
100	100	2*(3/4)	0.5m/m	KST-FO1

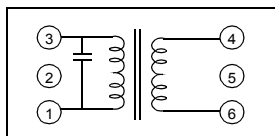
T1 AM OSC



KSI-AO1

F (MHz)	Qo	TURNS		L (uH)	KWANG SUNG PART NO
		1-3	2-3		
796	115	13	73	288	KSI-AO1

T2 AM IFT (MEX OUT)



KSI-AA1

Co(pF)	F (kHz)	Qo	TURNS		KWANG SUNG PART NO
1-3			1-3	4-6	
180	455	120	146	14	KSI-AA1



APPLICATION CIRCUIT

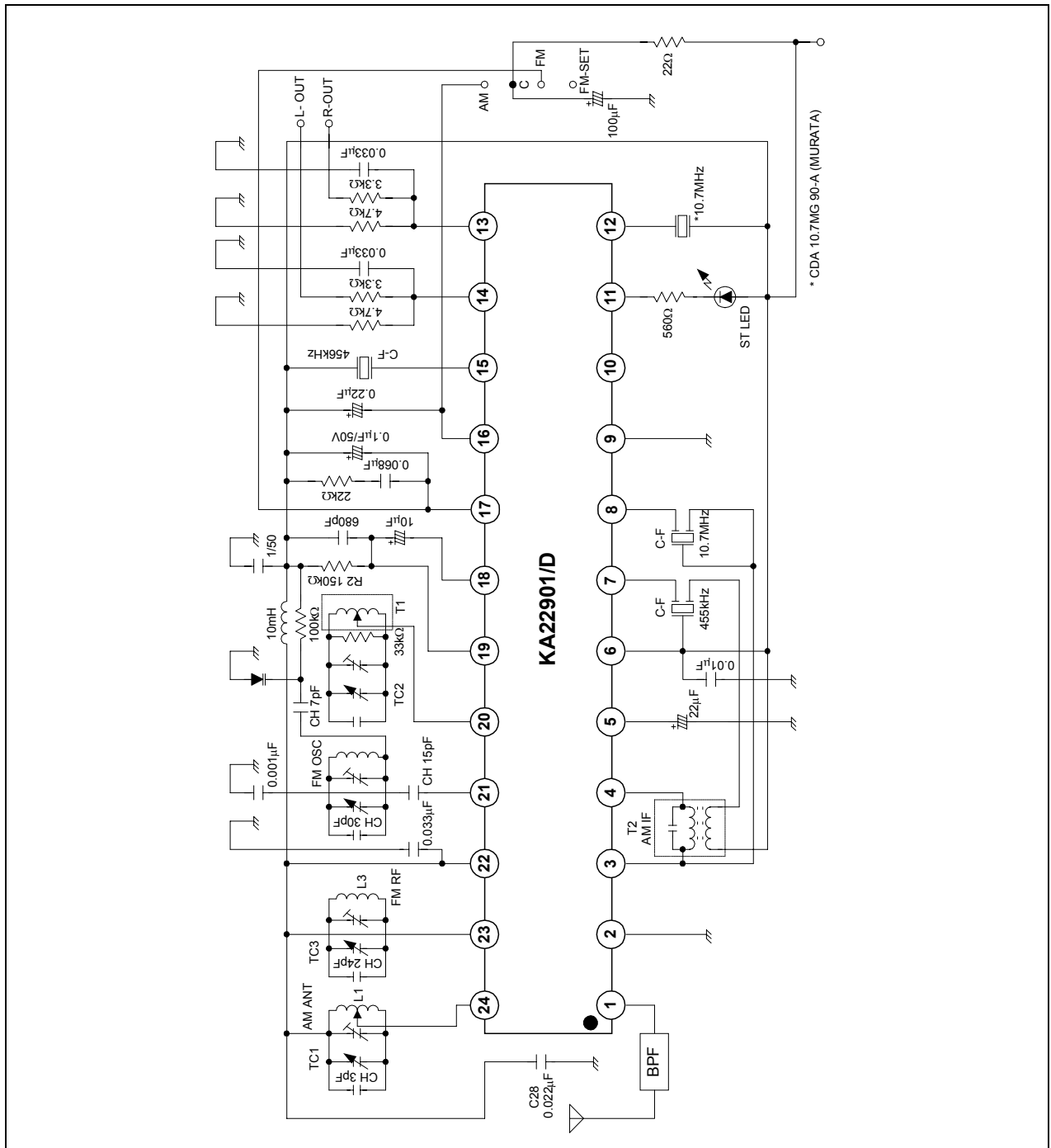


Figure 4.

NOTES