

AM/FM RADIO

- VERY WIDE RANGE OF SUPPLY VOLTAGE 3 TO 16 V
- HIGH RECOVERED AUDIO SIGNAL
- DESIGNED FOR USE WITH EXTERNAL RATIO DETECTOR OR INTERNAL QUADRATURE DETECTOR
- VERY GOOD AM SIGNAL HANDLING (1V; $m = 0.8$)
- VERY SIMPLE DC SWITCHING OF AM-FM SECTIONS
- SUITABLE FOR CAPACITANCE, VARICAP AND INDUCTIVE TUNING
- VERY LOW TWEET
- COMMON (AM-FM) FIELD STRENGTH METER OUTPUT PIN

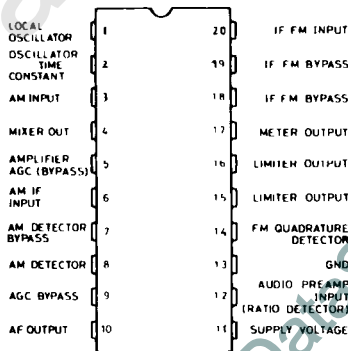


DESCRIPTION

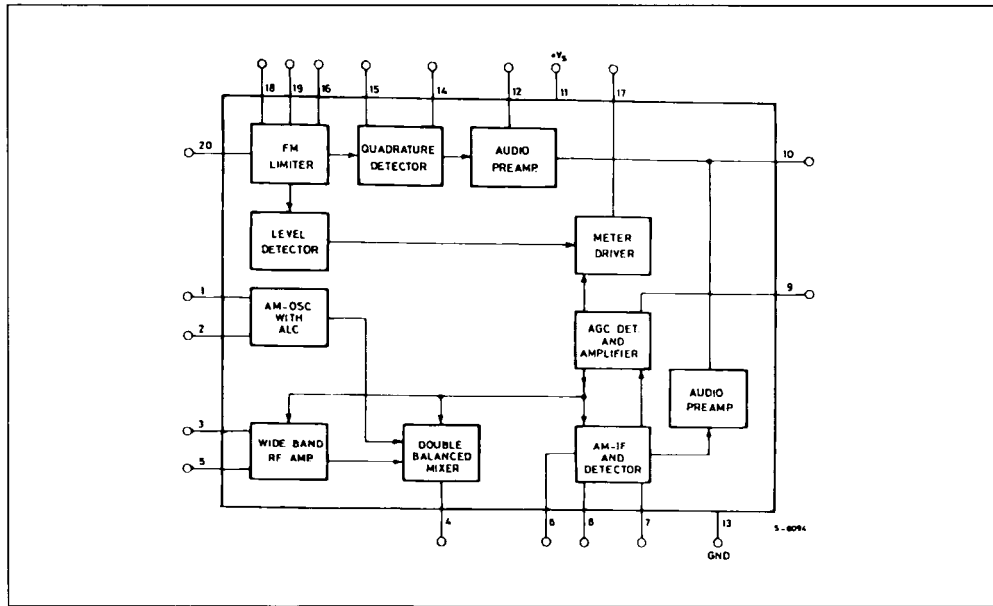
The TDA 2220A is a high performance AM/FM radio IC designed for use in a wide range of car radio, portable radio and home radio applications, operating on a supply voltage from 3 to 16 V. A special

feature of this device is that it may be used with an internal quadrature detector or an external ratio detector. The TDA 2220A is supplied in a 20 pin plastic DIP package.

PIN CONNECTION (top view)



BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_s	Supply Voltage	16	V
P_{tot}	Total Power Dissipation at $T_{amb} \leq 70^\circ\text{C}$	800	mW
T_{op}	Operating Temperature	- 20 to 70	$^\circ\text{C}$
$T_{stg}-T_j$	Storage and Junction Temperature	- 55 to 150	$^\circ\text{C}$

THERMAL DATA

$R_{th\ j-amb}$	Thermal Resistance Junction Ambient	Max	100	$^\circ\text{C}/\text{W}$
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ELECTRICAL CHARACTERISTICS (refer to the test circuits, $T_{amb} = 25\text{ }^{\circ}\text{C}$, $V_s = 9\text{ V}$, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_s	Supply Voltage		3	9	16	V
I_d	Current Drain	AM Section		16	21	mA
		FM Section		14	21	

AM SECTION ($f_o = 1\text{ MHz}$; $f_m = 1\text{ KHz}$)

V_i	Input Sensitivity	S/N = 26 dB	$m = 0.3$		12	25	μV
$\frac{S+N}{N}$	Signal to Noise Ratio	$V_i = 10\text{ mV}$	$m = 0.3$	45	50		dB
V_i	AGC Range	$\Delta V_{out} = 10\text{ dB}$	$m = 0.8$	100			dB
V_o	Recovered Audio Signal (pin 10)	$V_i = 1\text{ mV}$	$m = 0.3$	75	120	170	mV
d	Distortion				0.4		%
d	Distortion	$V_i = 1\text{ mV}$	$m = 0.8$		2	3	%
V_H	Max Input Signal Handling Capability	$m = 0.8$	$d < 10\%$	1			V
R_i	Input Resistance between Pins 3 and 5	$m = 0$			7.5		K Ω
C_i	Input Capacitance between Pins 3 and 5	$m = 0$			18		pF
R_o	Output Resistance (pin 10)			4.5	7	9.5	K Ω
	Tweet 2 IF	$m = 0.3$	$V_i = 1\text{ mV}$		38		dB
	Tweet 3 IF				55		dB
V_m	Meter Output	$V_i = 1\text{ mV}$	$m = 0.3$	2.5	3.5		V
		$V_i = 5\text{ }\mu\text{V}$				200	mV

FM SECTION ($f_o = 10.7\text{ MHz}$; $f_m = 1\text{ KHz}$)

(RATIO DETECTOR)

V_i	Input Limiting Voltage	- 3 dB Limiting Point			25	36	μV
AMR	Amplitude Modulation Rejection	$\Delta f = \pm 22.5\text{ KHz}$	$m = 0.3$	50	60		dB
		$V_i = 3\text{ mV}$					
$\frac{S+N}{N}$	Signal to Noise Ratio	$\Delta f = \pm 22.5\text{ KHz}$	$V_i = 10\text{ mV}$	55	70		dB
d	Distortion	$\Delta f = \pm 75\text{ KHz}$	$V_i = 1\text{ mV}$		0.4	0.7	%
d	Distortion	$\Delta f = \pm 22.5\text{ KHz}$	$V_i = 1\text{ mV}$		0.2		%
V_o	Recovered Audio Signal (pin 10)	$\Delta f = \pm 22.5\text{ KHz}$	$V_i = 1\text{ mV}$	90	130	170	mV
R_i	Input Resistance between Pin 20 and Ground	$\Delta f = 0$			6.5		K Ω
C_i	Input Capacitance between Pin 20 and Ground	$\Delta f = 0$			14		pF
R_o	Output Resistance (pin 10)			4.5	7	9.5	K Ω
V_m	Meter Output	$\Delta f = \pm 22.5\text{ KHz}$	$V_i = 3\text{ mV}$	3.1	4.1		V
			$V_i = 500\text{ }\mu\text{V}$	1.5	2.3	3.0	V
			$V_i = 10\text{ }\mu\text{V}$			0.2	V

(*) Meter resistance = 1.3 K Ω .

ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
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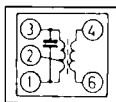
FM SECTION ($f_o = 10.7 \text{ MHz}$; $f_m = 1 \text{ KHz}$)

(QUADRATURE DETECTOR)

V_i	Input Limiting Voltage	- 3 dB Limiting Point		25	36	μV
AMR	Amplitude Modulation Rejection	$\Delta f = \pm 22.5 \text{ KHz}$ $m = 0.3$ $V_i = 10 \text{ mV}$		40		dB
$\frac{S + N}{N}$	Signal to Noise Ratio	$\Delta f = \pm 22.5 \text{ KHz}$ $V_i = 10 \text{ mV}$	55	65		dB
d	Distortion	$\Delta f = \pm 75 \text{ KHz}$ $V_i = 1 \text{ mV}$		0.7	1.5	%
d	Distortion	$\Delta f = \pm 22.5 \text{ KHz}$ $V_i = 1 \text{ mV}$		0.25		%
d	Distortion (double tuned)			0.1		%
V_o	Recovered Audio Signal (pin 10)	$\Delta f = \pm 22.5 \text{ KHz}$ $V_i = 1 \text{ mV}$	60	90	130	mV
R_i	Input Resistance between Pin 20 and Ground	$\Delta f = 0$		6.5		$\text{K}\Omega$
C_i	Input Capacitance between Pin 20 and Ground	$\Delta f = 0$		14		pF
R_o	Output Resistance (pin 10)		4.5	7	9.5	$\text{K}\Omega$
V_m	Meter Output	$\Delta f = \pm 22.5 \text{ KHz}$ $V_i = 3 \text{ mV}$	3.1	4.1		V
		$V_i = 500 \mu\text{V}$	1.5	2.3	3.0	V
		$V_i = 10 \mu\text{V}$			0.2	V

APPLICATION INFORMATION

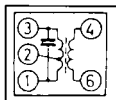
L1 - 455 kHz IF COIL



C _o (pF)	f (MHz)	Q _o	TURNS		
			1-2	2-3	4-6
1-3	455	1-3	57	116	24
180	455	70			

TOKO AM3 - 10 x 10 mm.
RCL - 4 A7525N

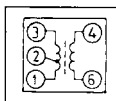
L2 - AM DETECTOR COIL



C _o (pF)	f (KHz)	Q _o	TURNS		
			1-2	2-3	4-6
1-3	455	1-3	173	94	9
180	455	70			

TOKO AM2 - 10 x 10 mm.
RCL - 4 A7524EK

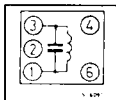
L3 - AM OSCILLATOR COIL



f (KHz)	L (μH)	Q _o	TURNS		
			1-2	2-3	4-6
796	220	80	2	75	8

TOKO - 10 x 10 mm.
RWO - 6 A6574N

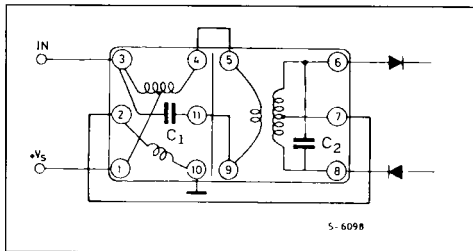
L4 - FM DETECTOR COIL



C _o (pF)	f (MHz)	Q _o	TURNS		
			1-3	4-5	6-7
1-3	10.7	100	12	-	-
82	10.7	100			

TOKO - 10 x 10 mm.
KACS - K 586 HM

L5 - RATIO DETECTOR

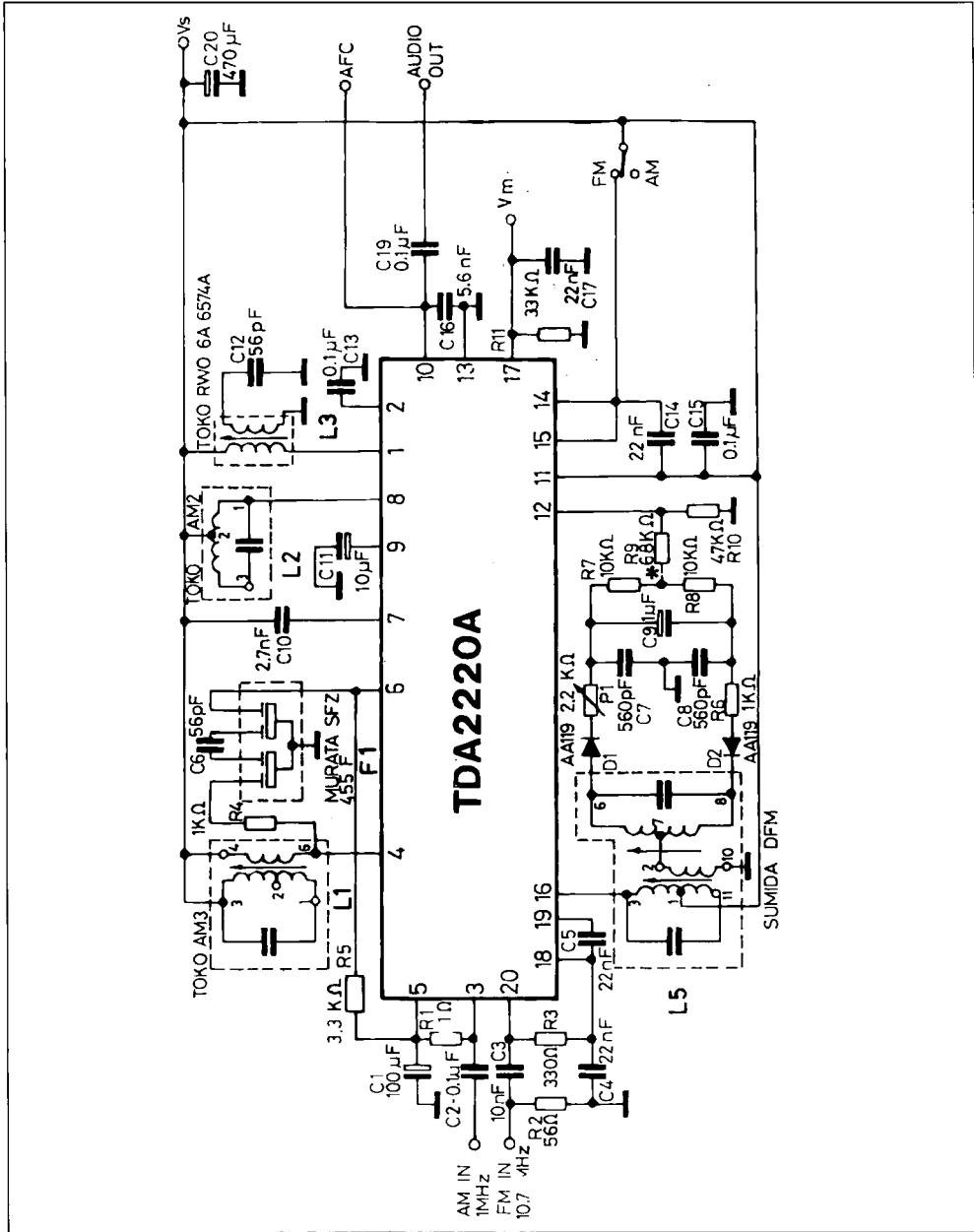


C ₁ (pF)	C ₂ (pF)	f (MHz)	Q _o
			3-11/4-8
3-11	6-8	10.7	70
27	47		

SUMIDA
DFM

TURNS					
1-3	1-4	2-10	5-9	6-7	7-8
11	6 1/2	5 1/2	1 1/2	7	7

Figure 1 : Test Circuit with FM Ratio Detector.



(*) The audio output amplitude can be modified changing the resistor value.

Figure 2 : Test Circuit with FM Quadrature Detector.

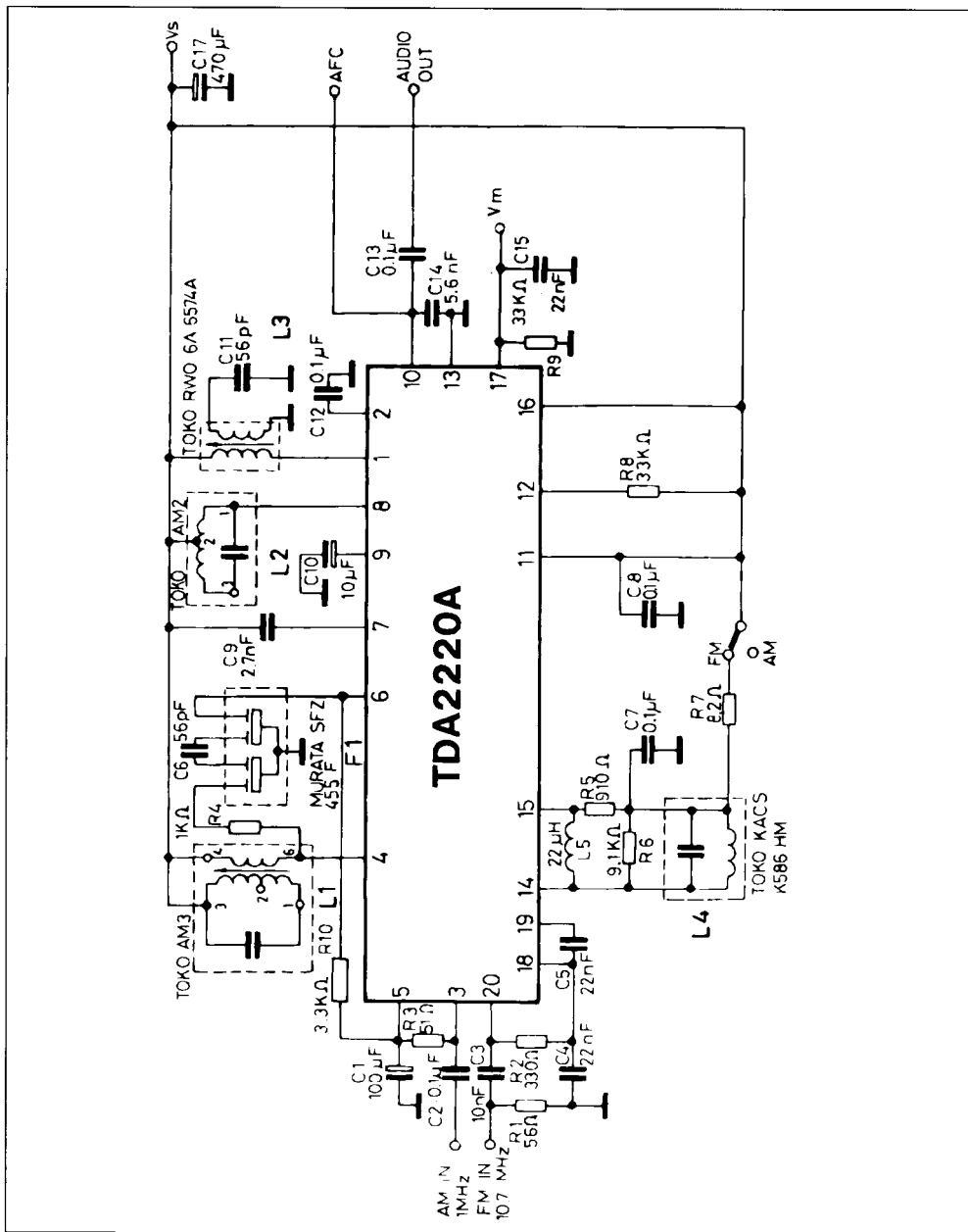
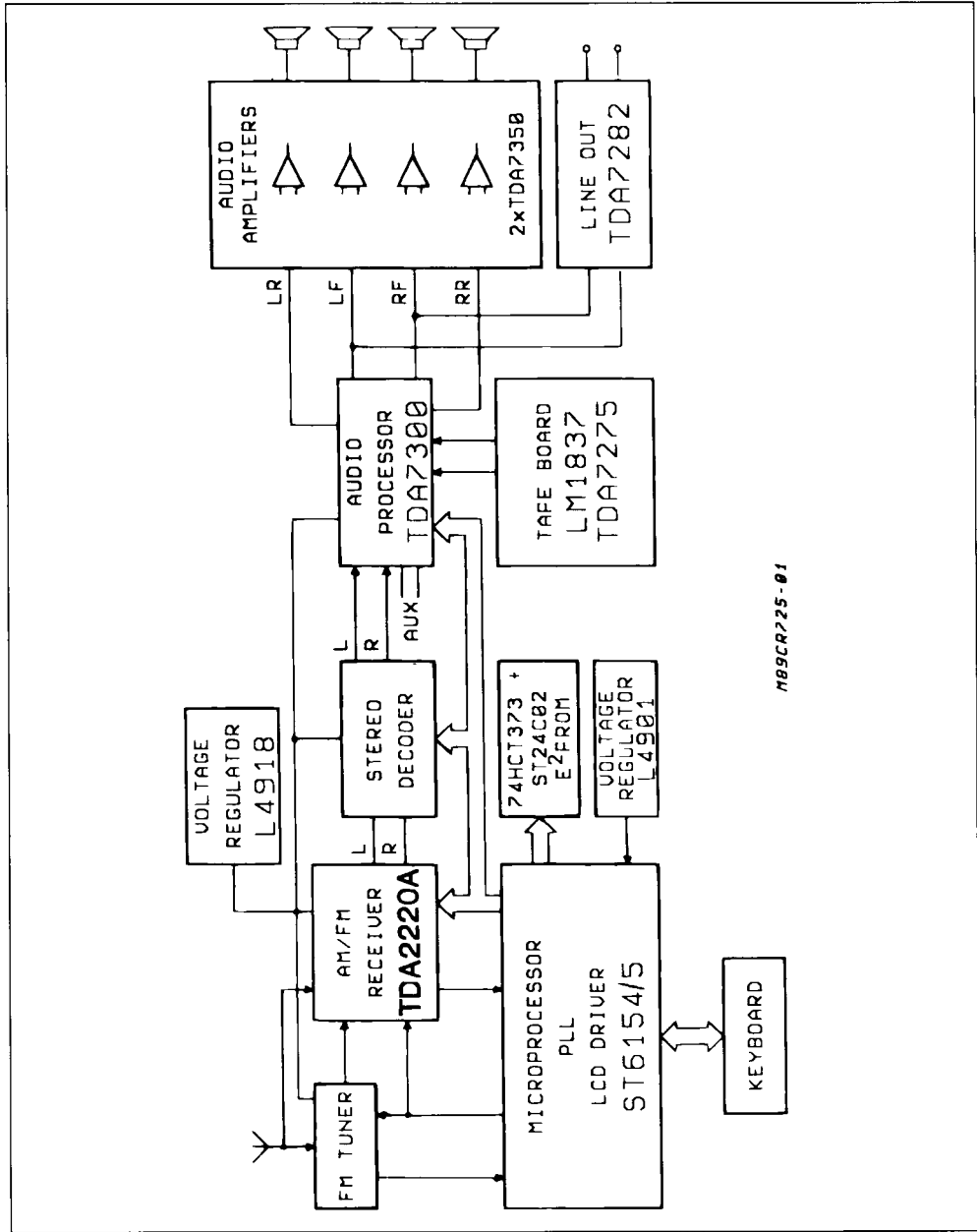


Figure 3 : Car Radio System..



MB99CR725-01