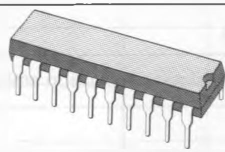
SGS-THOMSON MICROELECTRONICS

TDA2220

AM/FM RADIO

- VERY WIDE RANGE OF SUPPLY VOLTAGE 3 to 16V
- HIGH RECOVERED AUDIO SIGNAL (100 mV, Δf = ± 22.5 KHz or m = 0.3)
- 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

The TDA 2220 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 16V. A special feature of this device is that it may be used with an internal quadrature detector or an external ratio detector. The TDA 2220 is supplied in a 20 pin plastic DIP package.



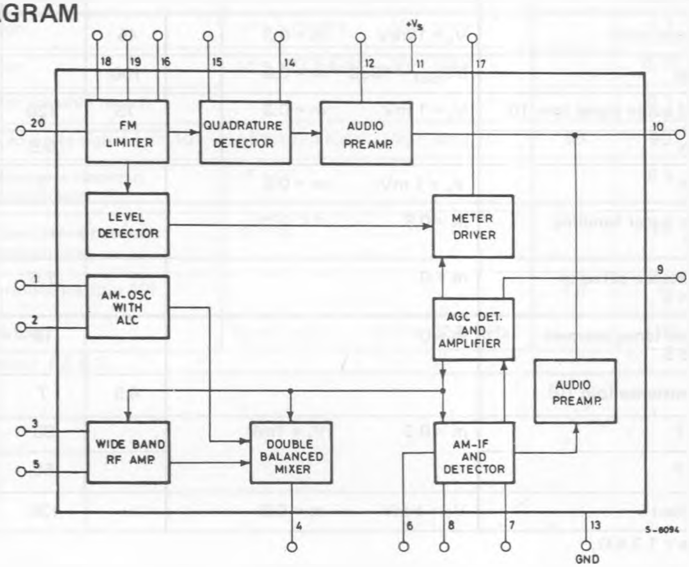
DIP-20 Plastic (0.4)

ORDERING NUMBER: TDA 2220

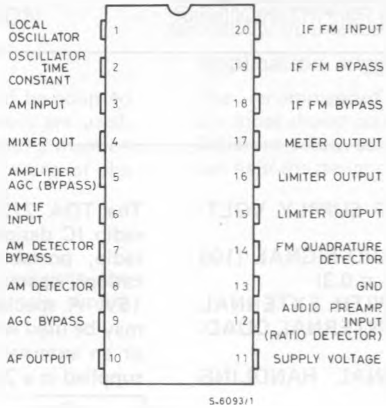
ABSOLUTE MAXIMUM RATINGS

V_s	Supply voltage	16	V
P_{tot}	Total power dissipation at $T_{amb} \leqslant 70°C$	800	mW
T_{op}	Operating temperature	-40 to 85	°C
T_{stg}, T_j	Storage and junction temperature	-55 to 150	°C

BLOCK DIAGRAM



CONNECTION DIAGRAM
(top view)



THERMAL DATA

$R_{th\ j-amb}$	Thermal resistance junction ambient	max 100 °C/W

ELECTRICAL CHARACTERISTICS (Refer to the test circuits, T_{amb} = 25°C, V_s = 9V, unless otherwise specified)

Parameter		Test conditions		Min.	Typ.	Max.	Unit
V_s	Supply voltage			3	9	16	V
I_d	Current drain	AM Section		10	16	21	mA
		FM Section		10	14	21	mA

AM SECTION (f_o = 1MHz; f_m = 1KHz)

Parameter		Test conditions		Min.	Typ.	Max.	Unit
V_i	Input sensitivity	S/N = 26 dB	m = 0.3		12	25	μV
$\frac{S+N}{N}$	Signal to noise ratio	V_i = 10mV	m = 0.3	45			dB
V_i	AGC range	ΔV_{out} = 10dB	m = 0.8	100			dB
V_o	Recovered audio signal (pin 10)	V_i = 1 mV	m = 0.3	75	120	170	mV
d	Distortion				0.5		%
d	Distortion	V_i = 1 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		KΩ
C_i	Input capacitance between pins 3 and 5	m = 0			18		pF
R_o	Output resistance (pin 10)			4.5	7	9.5	KΩ
	Tweet 2 IF	m = 0.3	V_i = 1mV		38		dB
	Tweet 3 IF				55		dB
V_m(*)	Meter output	V_i = 1 mV	m = 0.3		130		mV

(*) Meter resistance = 1.3 KΩ.

ELECTRICAL CHARACTERISTICS (Continued)

Parameter		Test conditions	Min.	Typ.	Max.	Unit
FM SECTION (f_o = 10.7MHz; f_m = 1KHz)		**(RATIO DETECTOR)**				
V_i	Input limiting voltage	–3 dB limiting point		25	36	µV
AMR	Amplitude modulation rejection	Δf = ± 22.5KHz m = 0.3 V_I = 3mV	50	60		dB
$\frac{S+N}{N}$	Signal to noise ratio	Δf = ±22.5KHz V_i = 10mV	55	65		dB
d	Distortion	Δf = ±75KHz V_i = 1mV		0.4	0.7	%
d	Distortion	Δf = ±22.5 KHz V_I = 1mV		0.2		%
V_o	Recovered audio signal (pin 10)	Δf = ±22.5KHz V_I = 1mV	75	120	170	mV
R_i	Input resistance between pin 20 and ground	Δf = 0		6.5		KΩ
C_i	Input capacitance between pin 20 and ground	Δf = 0		14		pF
R_o	Output resistance (pin 10)		4.5	7	9.5	KΩ
V_m(*)	Meter output	V_i = 1 mV Δf = ± 22.5 KHz		110		mV
FM SECTION (f_o = 10.7MHz, f_m = 1KHz)		**(QUADRATURE DETECTOR)**				
V_i	Input limiting voltage	–3dB limiting point		25	36	µV
AMR	Amplitude modulation rejection	Δf = ±22.5KHz m = 0.3 V_i = 3mV	35	44		dB
$\frac{S+N}{N}$	Signal to noise ratio	Δf = ±22.5KHz V_I = 10mV	55	65		dB
d	Distortion	Δf = ±75KHz V_i = 1mV		0.7	1.5	%
d	Distortion	Δf = ±22.5 KHz V_i = 1mV		0.25		%
d	Distortion (double tuned)			0.1		%
V_o	Recovered audio signal (pin 10)	Δf = ±22.5KHz V_i = 1mV	60	90	130	mV
R_i	Input resistance between pin 20 and ground	Δf = 0		6.5		KΩ
C_i	Input capacitance between pin 20 and ground	Δf = 0		14		pF
R_o	Output resistance (pin 10)		4.5	7	9.5	KΩ
V_m(*)	Meter output	V_i = 1 mV Δf = ± 22.5 KHz		110		mV

(*) Meter resistance = 1.3 KΩ.

Fig. 1 - Test circuit with FM ratio detector

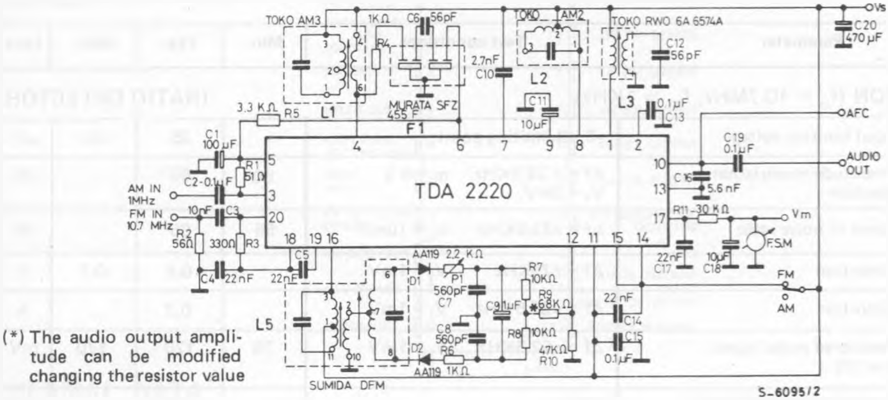


Fig. 2 - P.C. board and component layout of the circuit of fig. 1 (1:1 scale)

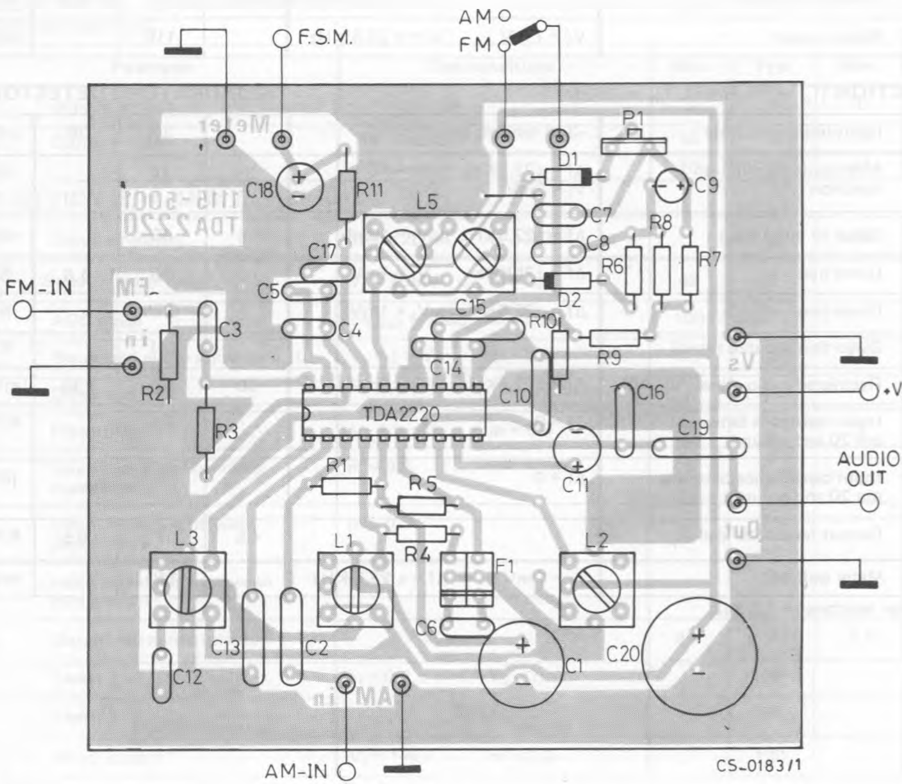


Fig. 3 - Test circuit with FM quadrature detector

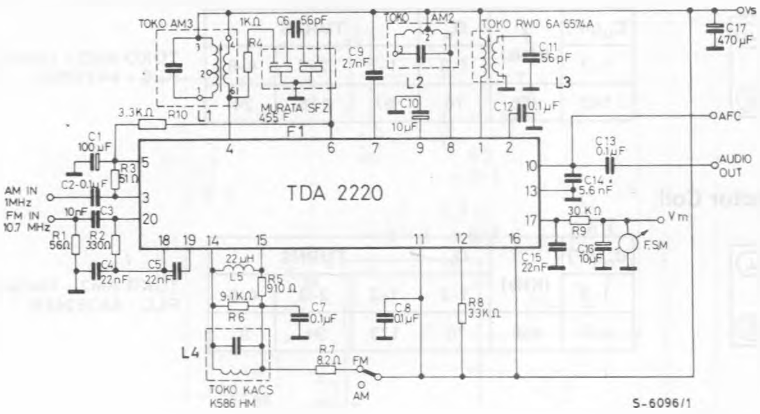
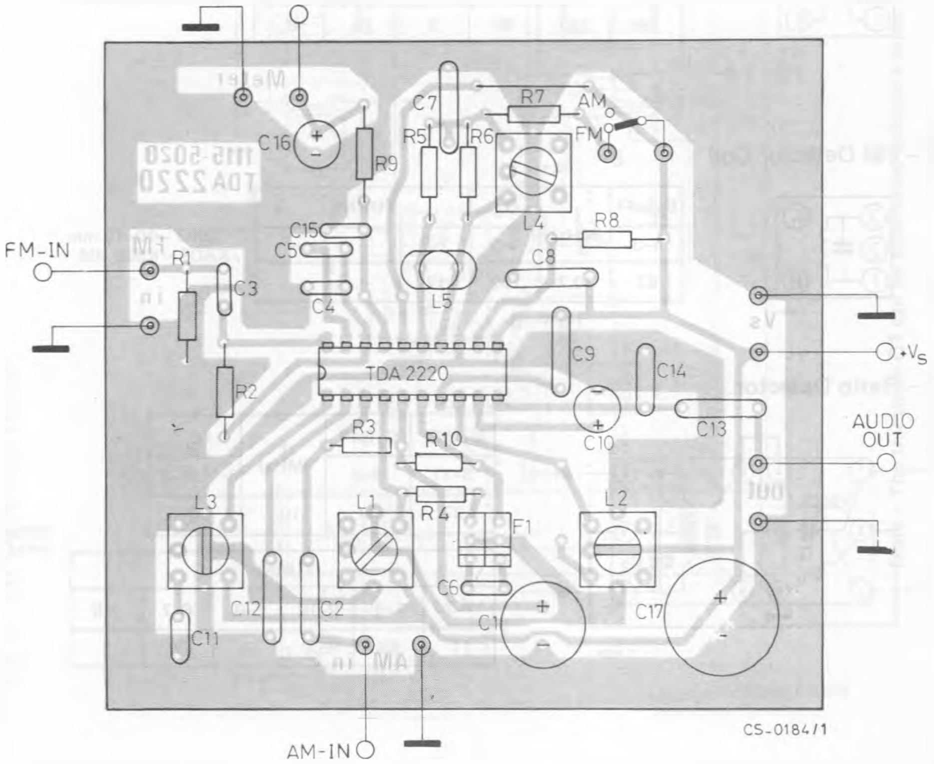
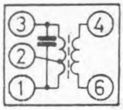


Fig. 4 - P.C. board and component layout of the circuit of fig. 3 (1:1 scale)



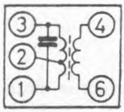
L1 - 455 kHz IF Coil



C_o (pF)	f (MHz)	Q_o	TURNS		
1-3		1-3	1-2	2-3	4-6
180	455	70	57	116	24

TOKO AM3 - 10x10 mm
RLC - 4A7525N

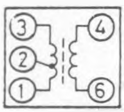
L2 - AM Detector Coil



C_o (pF)	f (KHz)	Q_o	TURNS		
1-3		1-3	1-2	2-3	4-6
180	455	70	173	94	9

TOKO AM2 - 10x10 mm.
RLC - 4A7524EK

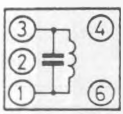
L3 - AM Oscillator Coil



f (kHz)	L (μH)	Q_o	TURNS		
	1-3	1-3	1-2	2-3	4-6
796	220	80	2	75	8

TOKO - 10x10 mm.
RWO - 6A6574N

L4 - FM Detector Coil

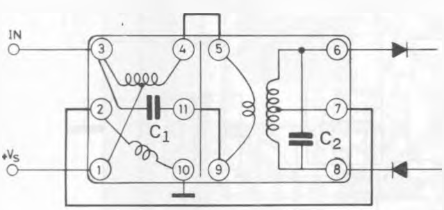


S-6097

C_o (pF)	f (MHz)	Q_o	TURNS		
1-3		1-3	1-3	–	–
82	10.7	100	12	–	–

TOKO - 10x10 mm
KACS - K586 HM

L5 - Ratio Detector



S-6098

C_1 (pF)	C_2 (pF)	f (MHz)	Q_o
3-11	6-8		3-11/4-8
27	47	10.7	70

TURNS					
1-3	1-4	2-10	5-9	6-7	7-8
11	6½	5½	½	7	7

SUMIDA
DFM

APPLICATION INFORMATION

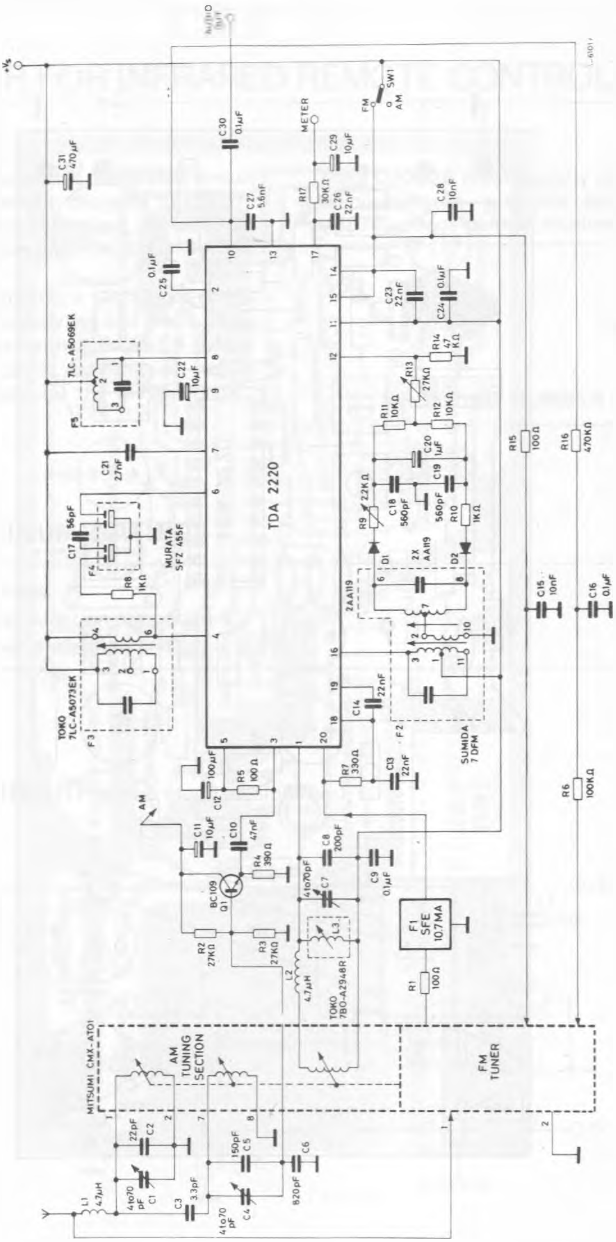


Fig. 5 - AM/FM car radio receiver

Note - The transistor Q1 can be eliminated using the tuner of fig. 7.

Fig. 6 - P.C. board and component layout of the circuit of fig. 5 (1:1 scale)