SGS-THOMSON MICROELECTRONICS

TDA1220L

LOW VOLTAGE AM-FM RADIO

The TDA1220L is a monolithic integrated circuit in a 16-lead dual in-line plastic package designed for use in 4.5V-6V portable AM-FM radio receivers.

The functions incorporated are:

AM SECTION

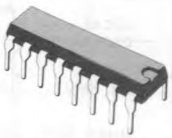
- Preamplifier and double balanced mixer
- One pin local oscillator
- IF amplifier with internal AGC
- Detector and audio preamplifier

FM SECTION

- IF amplifier and limiter
- Quadrature detector
- Audio preamplifier

The TDA1220L is suitable for AM applications up to 30MHz and for FM-IF and features:

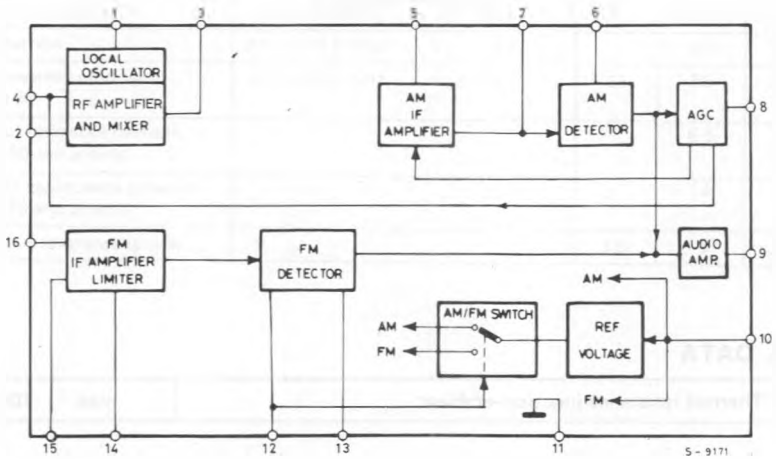
- High sensitivity and low noise
- Very low tweet
- High signal handling
- Low battery drain
- AM sensitivity regulation facility
- Operating supply voltage: 2.5V to 9V
- Very simple DC switching of AM-FM



DIP-16 Plastic
(0.25)

ORDERING NUMBER: TDA1220LK

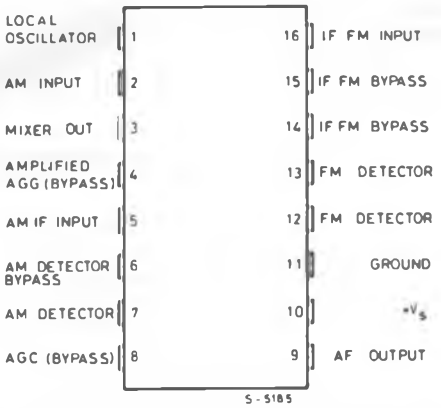
BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

V_s	Supply voltage	12	V
P_{tot}	Total power dissipation at $T_{amb} < 110°C$	400	mW
T_{op}	Operating temperature	-20 to 85	°C
T_{stg}, T_j	Storage and junction temperature	-55 to 150	°C

CONNECTION DIAGRAM



THERMAL DATA

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

ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C, V_s = 4.5V unless otherwise specified, refer to test circuit)

Parameter		Test conditions	Min.	Typ.	Max.	Unit
I_d	Drain current	AM section		10	15	mA
		FM section		7	11	mA

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

V_I	Input sensitivity	S/N = 26 dB	m = 0.3		15	25	μV
S/N		V_i = 10 mV	m = 0.3	45	50		dB
V_i	AGC range	ΔV_{out} = 10 dB	m = 0.8	94	100		dB
V_o	Recovered audio signal (pin 9)	V_i = 1 mV	m = 0.3	70	90	120	mV
d	Distortion				0.4	1	%
V_H	Max input signal handling capability	m = 0.8	d < 10%	1			V
R_i	Input resistance between pins 2 and 4	m = 0			7.5		KΩ
C_i	Input capacitance between pins 2 and 4	m = 0			18		pF
R_o	Output resistance (pin 9)			3.5	5	6.5	KΩ
	Tweet 2 IF	m = 0,3	V_i = 1 mV		40		dB
	Tweet 3 IF				55		dB

FM SECTION (f_o = 10.7 MHz; f_m = 1 KHz)

V_i	Input limiting voltage	-3 dB limiting point			26	36	μV
AMR	Amplitude modulation rejection	Δf = ± 22.5 KHz V_i = 3 mV	m = 0.3	35	46		dB
S/N	Ultimate quieting	Δf = ± 22.5 KHz	V_i = 1 mV	55	64		dB
d	Distortion	Δf = ± 22.5 KHz	V_i = 1 mV		0.3	0.6	%
V_o	Recovered audio signal (pin 9)	Δf = ± 22.5 KHz	V_i = 1 mV	55	80	100	mV
R_i	Input resistance between pin 16 and ground				6.5		KΩ
C_i	Input capacitance between pin 16 and ground				14		pF
R_o	Output resistance (pin 9)			3.5	5	6.5	KΩ

ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C, V_s = 3V unless otherwise specified, refer to test circuit)

Parameter		Test conditions		Min.	Typ.	Max.	Unit
I_d	Drain current	AM section			9	14	mA
		FM section			6	10	mA
AM SECTION (f_o = 1 MHz; f_m = 1 KHz)							
V_i	Input sensitivity	S/N = 26 dB	m = 0.3		15	25	μV
S/N		V_i = 10 mV	m = 0.3	45	50		dB
V_i	AGC range	ΔV_{out} = 10 dB	m = 0.8	94	100		dB
V_o	Recovered audio signal (pin 9)	V_i = 1 mV	m = 0.3	70	95	120	mV
d	Distortion				0.4	1	%
V_H	Max input signal handling capability	m = 0.8	d < 10%	1			V
R_i	Input resistance between pins 2 and 4	m = 0			7.5		KΩ
C_i	Input capacitance between pins 2 and 4	m = 0			18		pF
R_o	Output resistance (pin 9)			3.5	5	6.5	KΩ
	Tweet 2 IF	m = 0,3	V_i = 1 mV		40		dB
	Tweet 3 IF				55		dB
FM SECTION (f_o = 10.7 MHz; f_m = 1 KHz)							
V_i	Input limiting voltage	-3 dB limiting point			40	75	μV
AMR	Amplitude modulation rejection	Δf = ± 22.5 KHz V_i = 3 mV	m = 0.3	35	42		dB
S/N	Ultimate quieting	Δf = ± 22.5 KHz	V_i = 1 mV	55	64		dB
d	Distortion	Δf = ± 22.5 KHz	V_i = 1 mV		0.3	0.7	%
		Δf = 75 KHz			0.9		%
V_o	Recovered audio signal (pin 9)	Δf = ± 22.5 KHz	V_i = 1 mV	55	80	100	mV
R_i	Input resistance between pin 16 and ground				6.5		KΩ
C_i	Input capacitance between pin 16 and ground				14		pF
R_o	Output resistance (pin 9)			3.5	5	6.5	KΩ

Fig. 1 - Test circuit

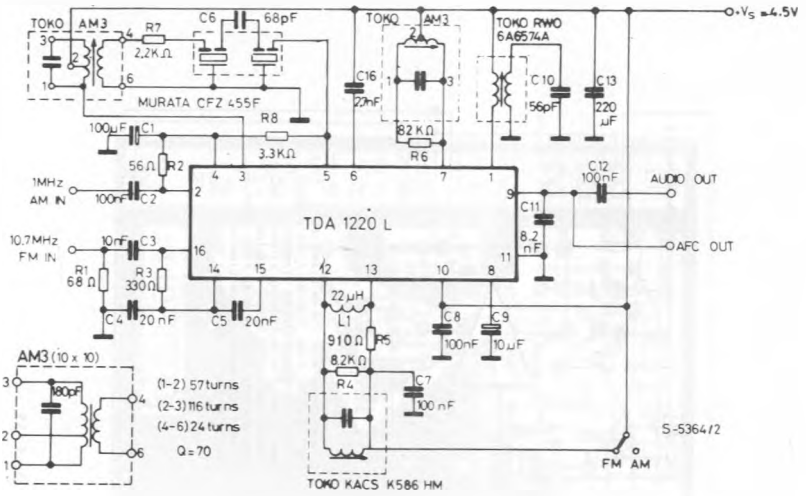
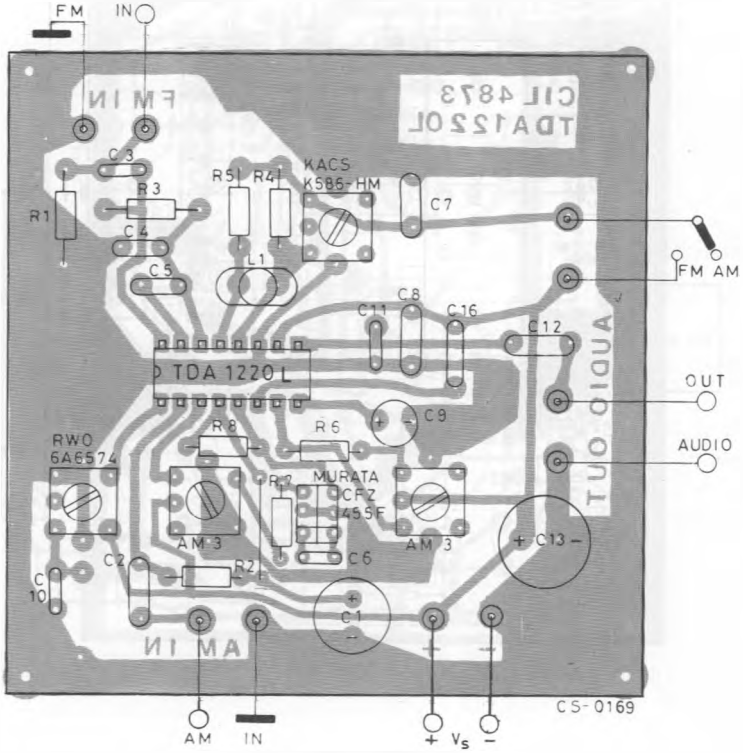


Fig. 2 - PC board and component layout (1:1 scale) of the test circuit.



APPLICATION INFORMATION

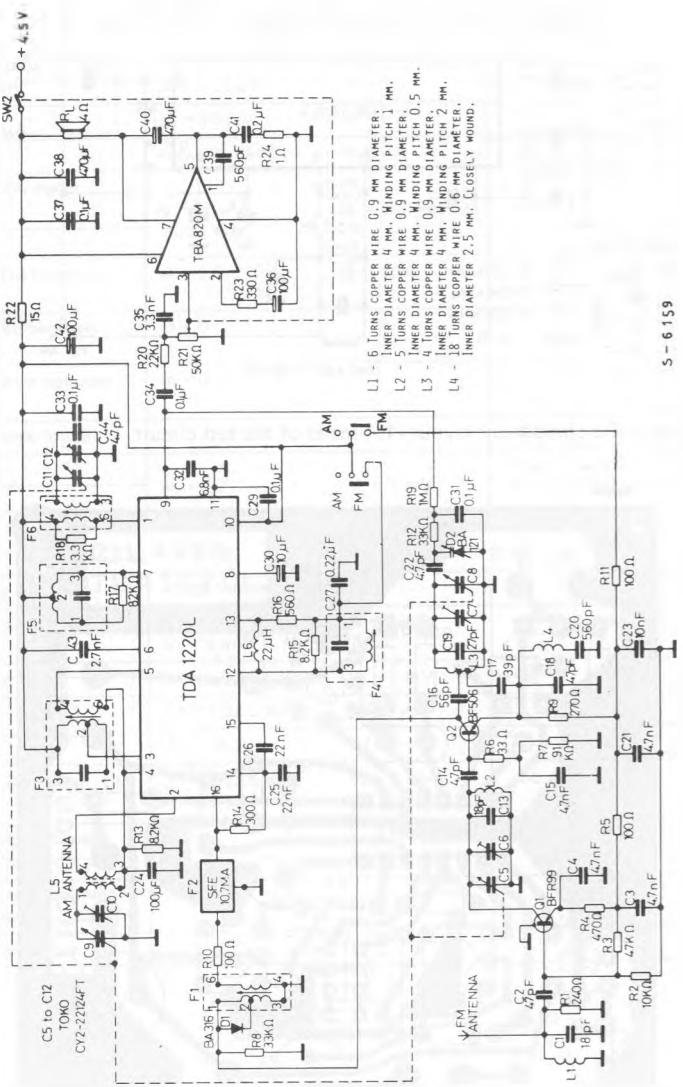
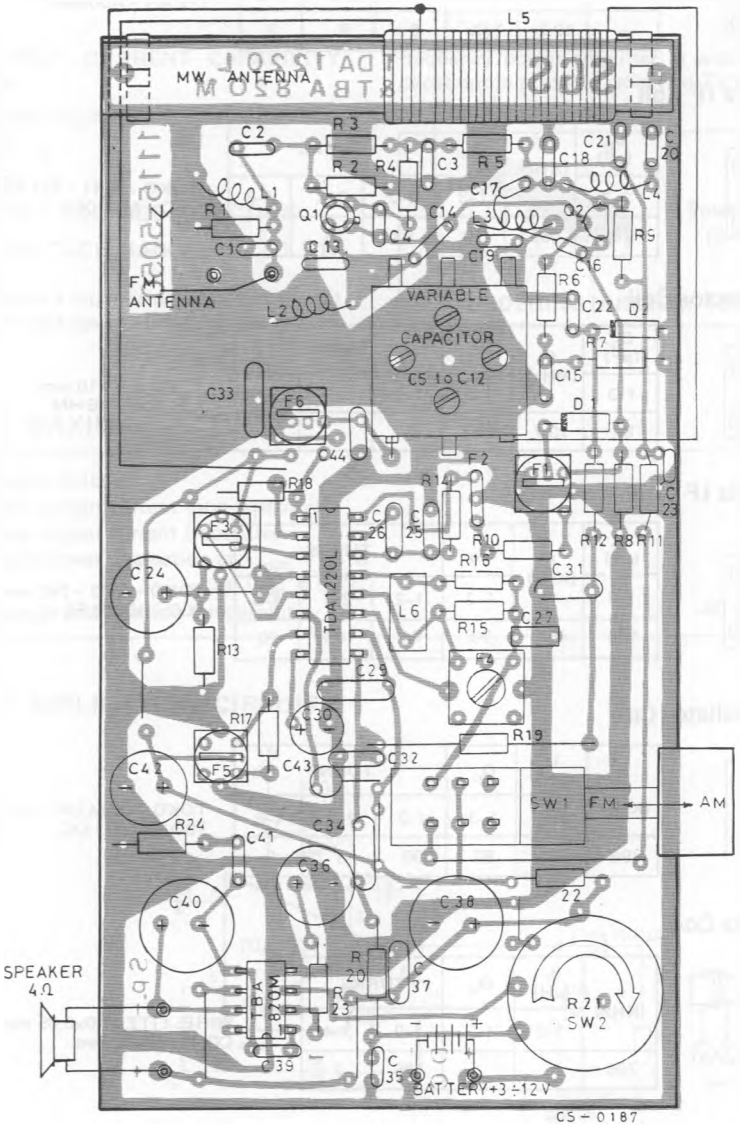


Fig. 3 - Portable AM/FM radio

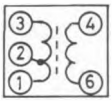
APPLICATION INFORMATION

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



APPLICATION INFORMATION (continued)

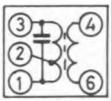
F1 - 10.7 MHz IF Coil



C_o (pF)	f (MHz)	Q_o	TURNS			
		1-3	1-2	2-3	4-6
–	10.7	1.05	6	8	2

TOKO - FM1 - 7x7 mm.
119 AN - A5066R

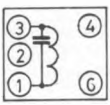
F3 - 455 KHz IF Coil



C_o (pF)	f (KHz)	Q_o	TURNS			
1-3		1-3	1-2	2-3	4-6
180	455	70	63	81	7

TOKO - AM1 - 7x7 mm.
7LC - A5070EK

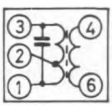
F4 - FM Detector Coil



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

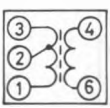
F5 - 455 KHz IF Coil



C_o (pF)	f (KHz)	Q_o	TURNS		
1-3		1-3	1-2	2-3	4-6
180	455	70	41	103	20

TOKO - AM3 - 7x7 mm.
7LC - A5073 EK

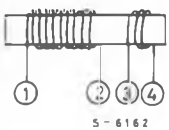
F6 - AM Oscillator Coil



f (KHz)	L (µH)	Q_o	TURNS		
	1-3	1-3	1-2	2-3	4-6
796	320	80	90	3	9

TOKO - OAM320 - 7x7 mm.
780 - A5071 DC

L5 - Antenna Coil



f (KHz)	L (µH)	Q_o	TURNS	
	1-2	1-2	1-2	3-4
796			105	7

WIRE: LITZ - 10x0.05 mm.
CORE: 10x80 mm.