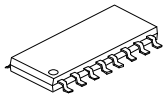
UTC TDA7088 LINEAR INTEGRATED CIRCUIT

FM RECEIVER CIRCUIT FOR BATTERY SUPPLY



SOP-16

DESCRIPTION

The UTC TDA7088 is a bipolar integrated circuit for use in mono portable and pocket radios. It is used when a minimum of peripheral components (of small dimensions and low costs) is important. The circuit contains a frequency-locked-loop(FLL) system with an Intermediate Frequency (IF) of about 70kHz. Selectivity is achieved by active RC-filters. De-tuning related to the IF and too weak input signals is suppressed by the mute circuit.

FEATURES

*Equipped with all stages of a mono receiver from antenna to audio output.
*Mute circuit
*Search tuning with a single varicap diode
*Mechanical tuning with integrating AFC
*AM application supported
*Power supply polarity protection
*Power supply voltage down to 1.8V

APPLICATIONS

*Mechanical tuning ; this is possible with or without integrating AFC circuit
*Electrical tuning; this is realized by one directional (band-up) search tuning facility, including RESET to the lower-band limit.

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE		UNIT
		MIN	MAX	
Supply Voltage	Vp	0	5	V
Storage Temperature	Tstg	-55	+150	°C
Operating ambient temperature	Tamb	-10	70	°C
Electrostatic handling; note 1	Ves			

Note 1: There is no special ESD protection circuit built-in; ESD data on request.

ELECTRICAL CHARACTERISTICS

(Over recommended operating free-air temperature range, V_{CC}=15V, f=1kHz, Unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	Vp		1.8	3	5	V
Supply Current	Ip		4.2	5.2	6.6	mA
Radio Input Frequency	f_{RF}		0.5		110	MHz
RF sensitivity input voltage (RMS value)	Vi(rms)	V_{OAF}=-3dB, V_{OAF}=0dB at Vi=1mV, mute off		3	6	μV
Signal handling		Δf=+-75kHz, THD<10%	100	200		mV
Audio Output Signal (RMS value)	Vo(rms)	RL=22kΩ	60	85	120	mV
Operating Ambient Temperature	Tamb		-10		70	°C

BLOCK DIAGRAM

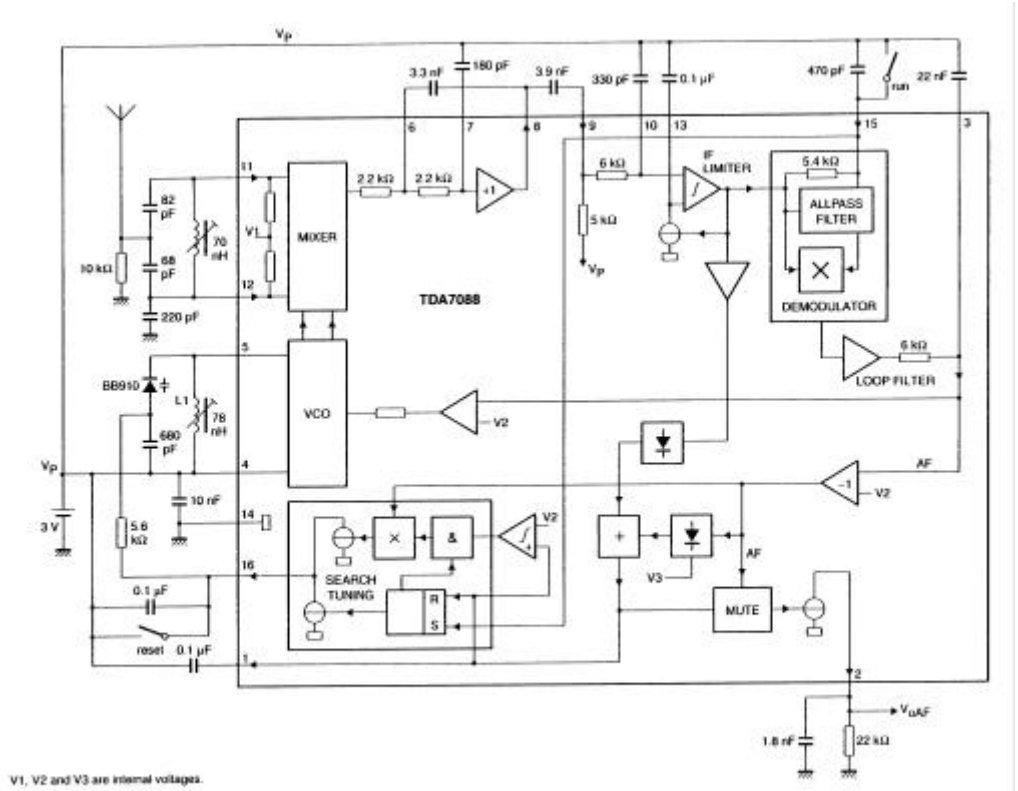


Fig.1 Block diagram and application circuit for search tuning.

PIN CONFIGURATIONS

PIN	SYMBOL	DESCRIPTION
1	MUTE	Mute output
2	V_{OAF}	Audio frequency output signal
3	LOOP	AF loop filter
4	V_P	+3V supply voltage
5	OSC	Oscillator resonant circuit
6	IFFB	IF feedback
7	C_{LP1}	Low-pass capacitor of 1 dB amplifier
8	V_{OIF}	IF output to external coupling capacitor (high-pass)
9	V_{iLF}	IF input to limiter amplifier
10	C_{LP2}	Low-pass capacitor of IF limiter amplifier
11	V_{iRF}	Radio frequency input
12	C_{iRF}	Radio frequency input
13	C_{LIM}	Limiter offset voltage capacitor
14	GND	Ground(0V)
15	C_{AP}	All-pass filter capacitor/input for search tuning
16	TUNE	Electrical tuning/AFC output

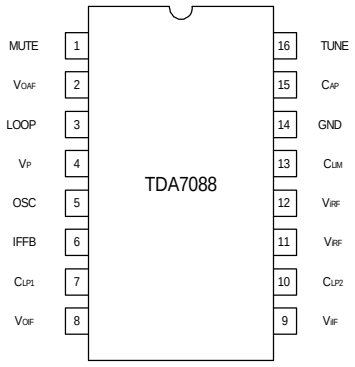


Fig.2

DC CHARACTERISTICS

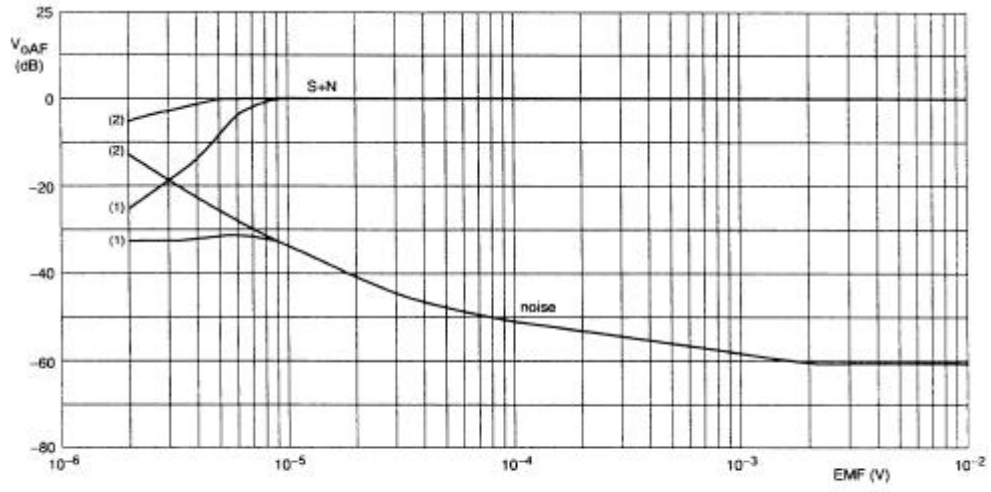
Vp=3V,Tamb=25°C, unless otherwise specified.

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage (pin4)	Vp	1.8	3	5	V
Supply Current (pin4)	Ip	4.2	5.2	6.6	mA
DC voltage on pin1	V1	2.5	2.55	2.6	V
DC voltage on pin3	V3	2.64	2.69	2.74	V
DC voltage on pins 6 and 7	V6,7	2.38	2.44	2.5	V
DC voltage on pin 8	V8	1.6	1.67	1.74	V
DC voltage on pin 9,10 and 13	V9,10,13	2.42	2.47	2.52	V
DC voltage on pins 11 and 12	V11,12	0.91	0.94	0.98	V
DC voltage on pin 15	V15	2.06	2.12	2.18	V
AF output current on pin2	I2	45	60	80	μA
Oscillator current on pin5	I5	275	375	500	μA

AC CHARACTERISTICS

Vp=3V,Tamb=25°C, fiRF=96MHz modulated with fmod=1kHz and +-22.5kHz deviation; Vi=400μV(measured as EMF,Rs=75Ω) and measurements taken in Fig.4;unless otherwise specified.

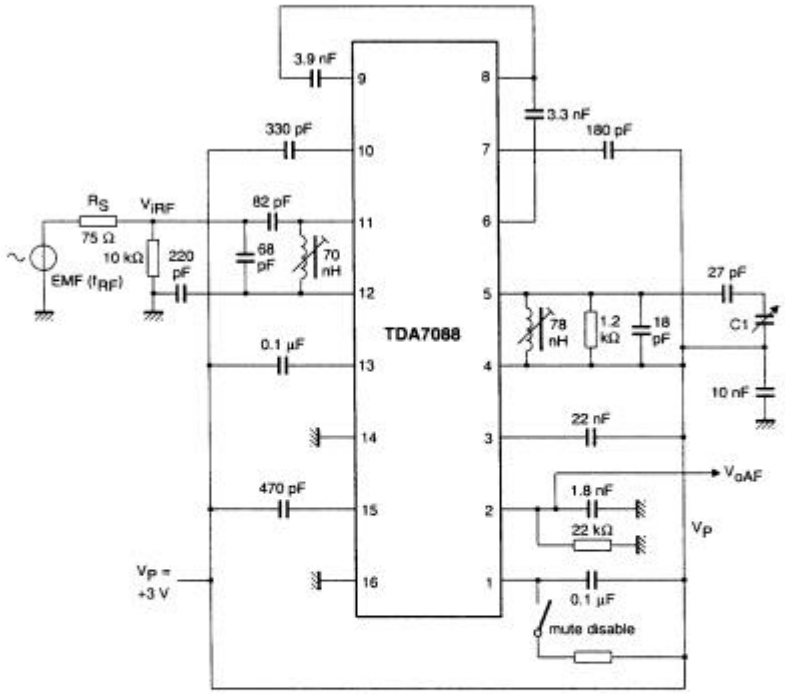
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
RF sensitivity input voltage (RMS value)	Vi(rms)	V_{OAF}=-3dB;V_{OAF}=0dB at Vi=1mV;see Fig.3				
		Mute off		3	6	μV
		Mute on	3	6	12	μV
		(S+N)/N =26dB		5	10	μV
Signal handling	Vi(rms)	Δf=+-75kHz,THD<10%	100	200		mV
Signal plus noise-to-noise ratio	(S+N)/N	See Fig.3	52	56		dB
Total harmonic distortion	THD	Δf=+-22.5kHz		1	1.4	%
		Δf=+-75kHz		2.4	3.3	%
AM suppression	αAM	FM:1kHz,+-75kHz, AM:1kHz,m=0.8	47	52		dB
Ripple rejection	RR1000	100mV RMS ripple on Vp,f=1kHz	7	10		dB
Audio output signal (RMS value)	Vo(rms)	RL=22kΩ	60	85	120	mV
Search Tuning (with BB910 and C16=0.1μF) see Fig.1						
Minimum output voltage on pin16	V16	Limiting point		Vp - 1.85		V
Tuning steepness	ΔV/Δt	Voltage at pin16	95	210	420	mV/s
Oscillator steepness	$\Delta F_{osc}/\Delta t$		1.25	2.83	5.6	MHz/s
AFC steepness	$\Delta I_{AFC}/\Delta V3$	Voltage at pin3	4.75	9.5	19	μS



(1) Mute on.
(2) Mute off.

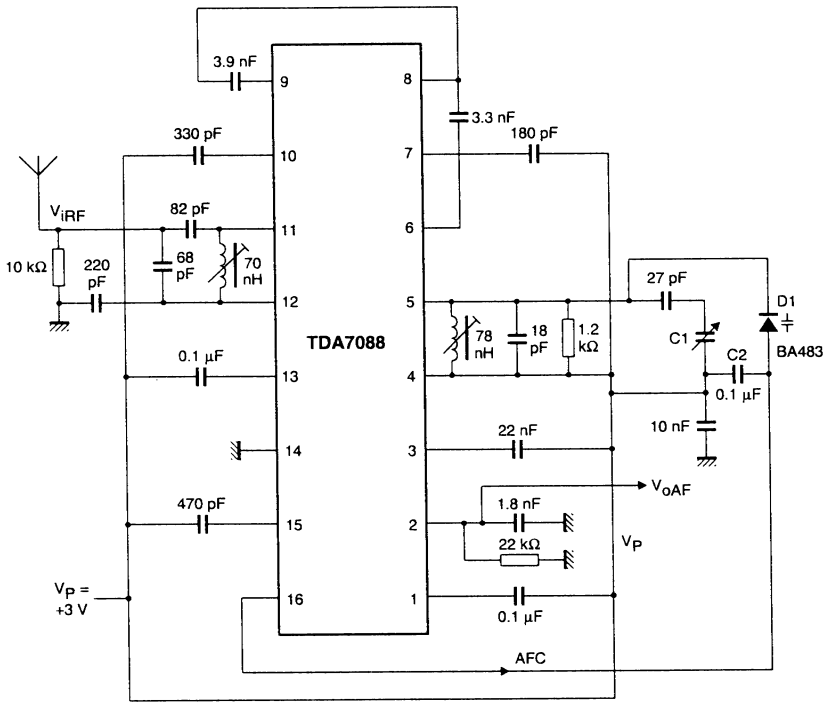
Fig.3 Input sensitivity.

TEST CIRCUIT



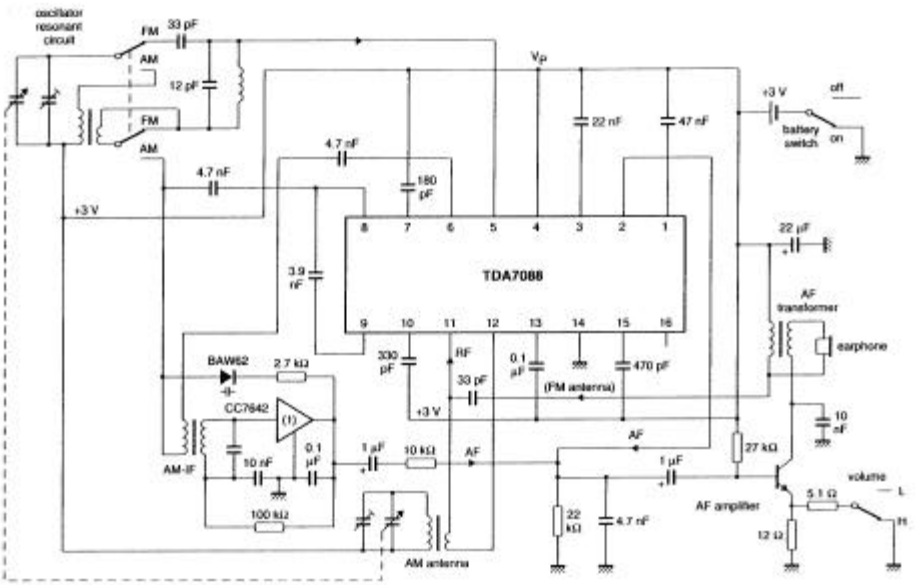
C1 = Toko 2A-15BT-R01.

Fig.4 Test circuit and application for mechanical tuning.



C1 = Toko 2A-15BT-R01.

Fig.5 Application circuit with AFC for mechanical tuning.



(1) CC7642: AM-IF amplifier/demodulator type number WU-xi 742 Fty.

Fig.6 AM application circuit.