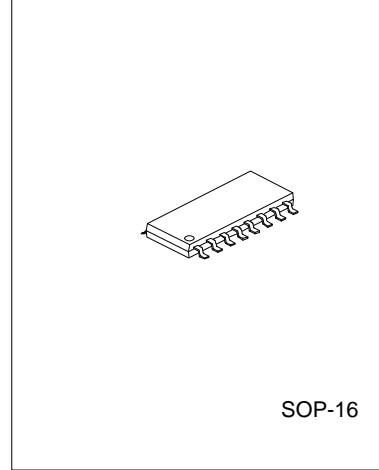


UTC TDA7088 LINEAR INTEGRATED CIRCUIT

FM RECEIVER CIRCUIT FOR BATTERY SUPPLY

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.

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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	V_p		1.8	3	5	V
Supply Current	I_p		4.2	5.2	6.6	mA
Radio Input Frequency	f_{iRF}		0.5		110	MHz
RF sensitivity input voltage (RMS value)	$V_i(rms)$	$VOAF=-3dB$, $VOAF=0dB$ at $V_i=1mV$, mute off		3	6	μV
Signal handling		$\Delta f=\pm 75kHz$, $THD<10\%$	100	200		mV
Audio Output Signal (RMS value)	$V_o(rms)$	$R_L=22k\Omega$	60	85	120	mV
Operating Ambient Temperature	T_{amb}		-10		70	$^{\circ}C$

BLOCK DIAGRAM

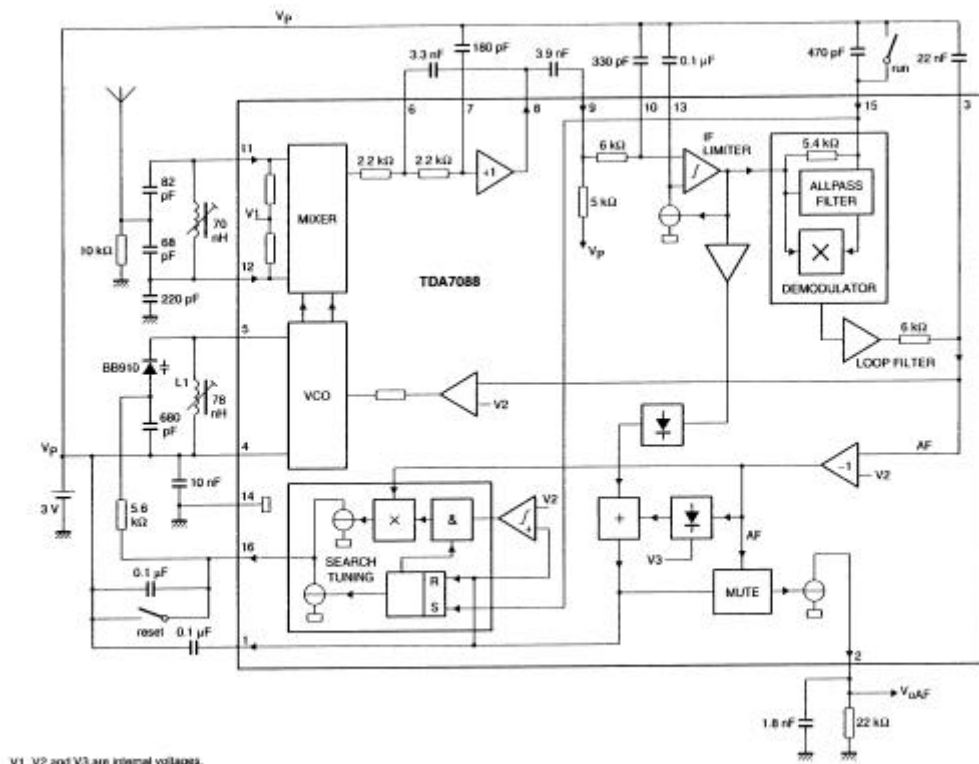


Fig.1 Block diagram and application circuit for search tuning.

UTC TDA7088 LINEAR INTEGRATED CIRCUIT

PIN CONFIGURATIONS

PIN	SYMBOL	DESCRIPTION
1	MUTE	Mute output
2	VOAF	Audio frequency output signal
3	LOOP	AF loop filter
4	Vp	+3V supply voltage
5	OSC	Oscillator resonant circuit
6	IFFB	IF feedback
7	CLP1	Low-pass capacitor of 1 dB amplifier
8	VOIF	IF output to external coupling capacitor (high-pass)
9	ViLF	IF input to limiter amplifier
10	CLP2	Low-pass capacitor of IF limiter amplifier
11	ViRF	Radio frequency input
12	CrRF	Radio frequency input
13	CLIM	Limiter offset voltage capacitor
14	GND	Ground(0V)
15	CAP	All-pass filter capacitor/input for search tuning
16	TUNE	Electrical tuning/AFC output

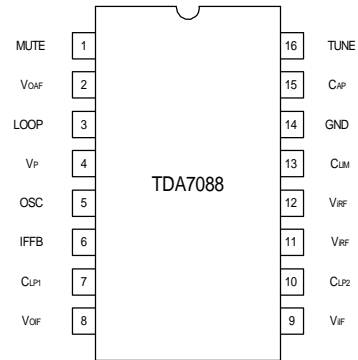


Fig.2

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

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AC CHARACTERISTICS

$V_p=3V, T_{amb}=25^{\circ}C, f_{iRF}=96MHz$ modulated with $f_{mod}=1kHz$ and $\pm 22.5kHz$ deviation; $V_i=400\mu V$ (measured as EMF, $R_s=75\Omega$) and measurements taken in Fig.4; unless otherwise specified.

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
RF sensitivity input voltage (RMS value)	$V_i(\text{rms})$	$VOAF=-3dB; VOAF=0dB$ at $V_i=1mV$; see Fig.3		3	6	μV
		Mute off	3	6	12	μV
		Mute on		5	10	μV
(S+N)/N = 26dB						
Signal handling	$V_i(\text{rms})$	$\Delta f = \pm 75kHz, THD < 10\%$	100	200		mV
Signal plus noise-to-noise ratio	(S+N)/N	See Fig.3	52	56		dB
Total harmonic distortion	THD	$\Delta f = \pm 22.5kHz$		1	1.4	%
		$\Delta f = \pm 75kHz$		2.4	3.3	%
AM suppression	α_{AM}	FM: 1kHz, $\pm 75kHz$, AM: 1kHz, $m=0.8$	47	52		dB
Ripple rejection	RR1000	100mV RMS ripple on $V_p, f=1kHz$	7	10		dB
Audio output signal (RMS value)	$V_o(\text{rms})$	$RL=22k\Omega$	60	85	120	mV
Search Tuning (with BB910 and C16=0.1 μF) see Fig.1						
Minimum output voltage on pin16	V16	Limiting point		$V_p - 1.85$		V
Tuning steepness	$\Delta V/\Delta t$	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	$\Delta I_{AFC}/\Delta V_3$	Voltage at pin3	4.75	9.5	19	μS

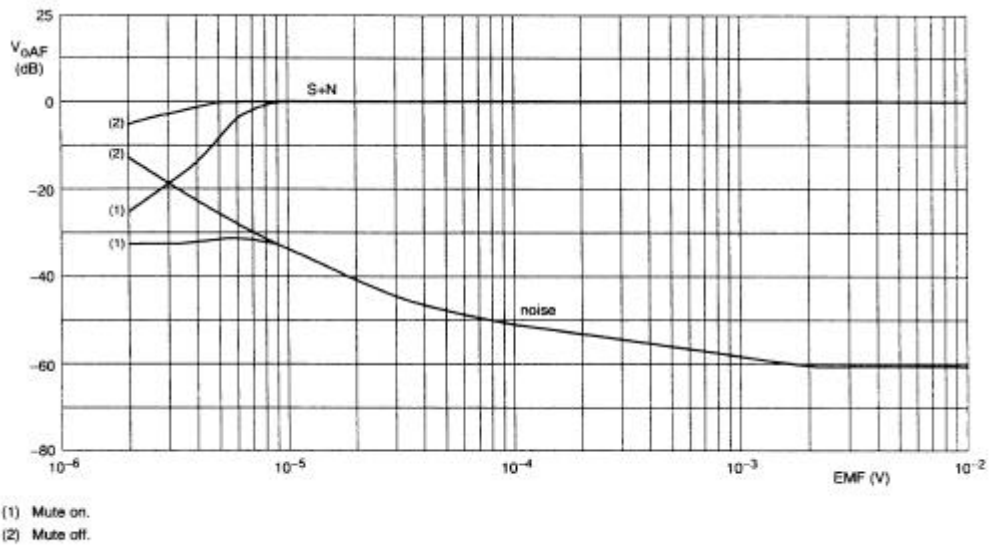
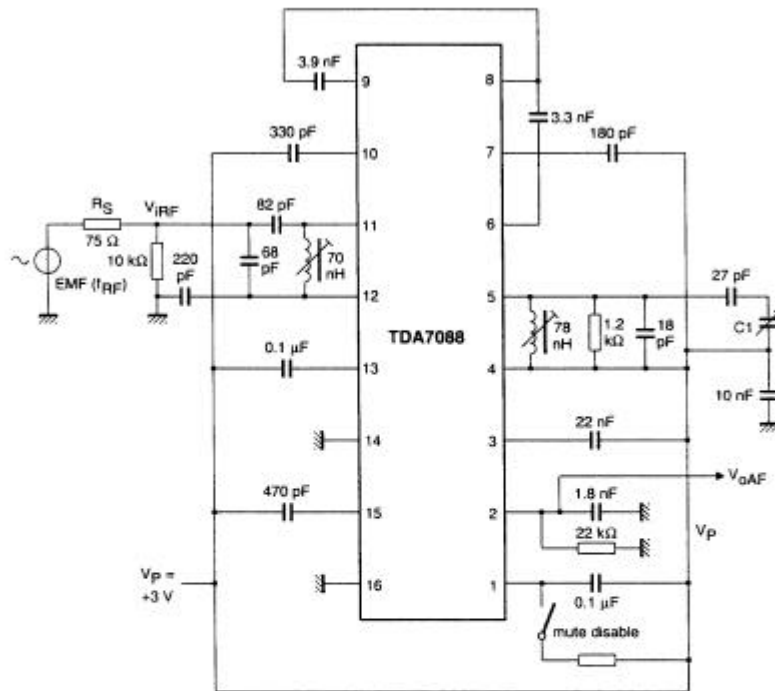


Fig.3 Input sensitivity.

UTC TDA7088 LINEAR INTEGRATED CIRCUIT

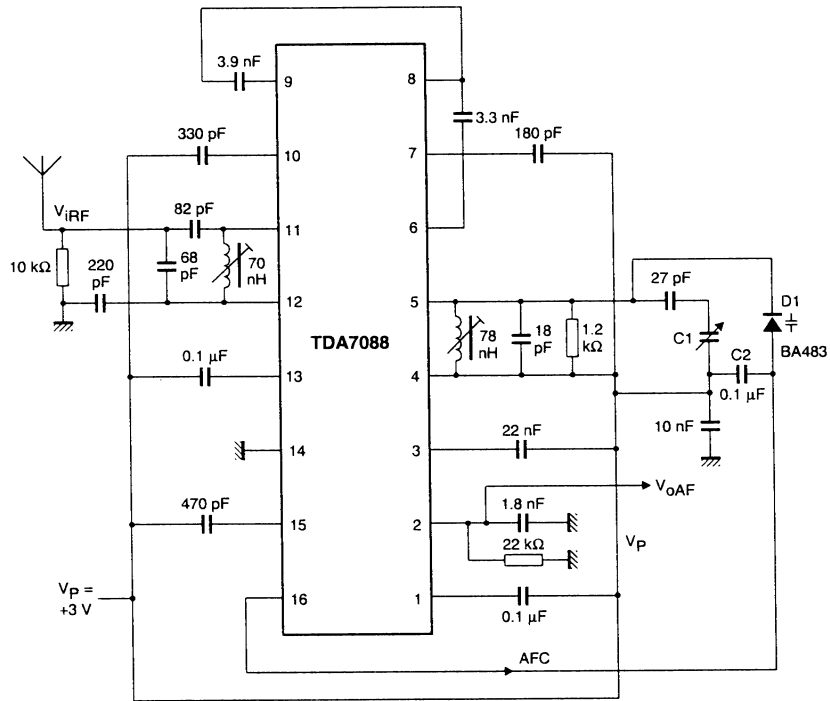
TEST CIRCUIT



C1 = Toko 2A-15BT-R01.

Fig.4 Test circuit and application for mechanical tuning.

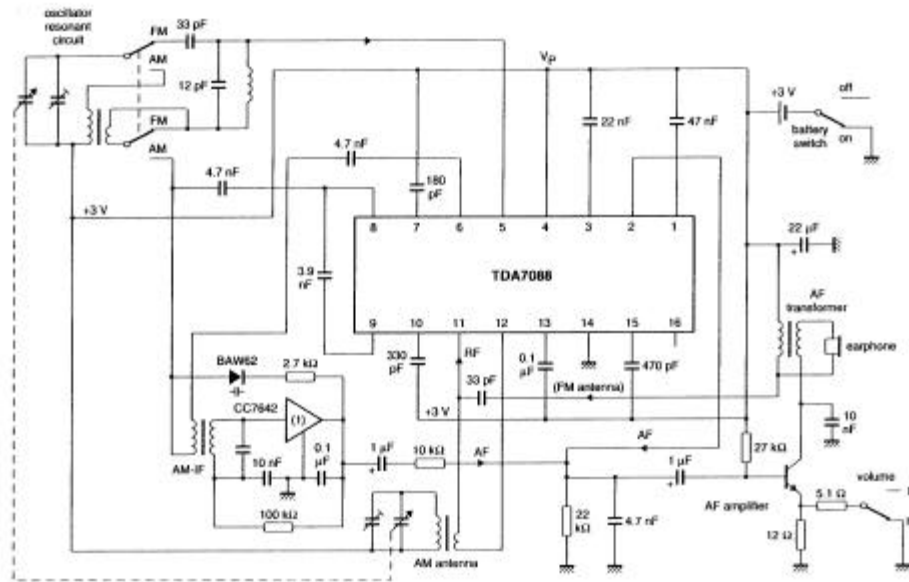
UTC TDA7088 LINEAR INTEGRATED CIRCUIT



C1 = Toko 2A-15BT-R01.

Fig.5 Application circuit with AFC for mechanical tuning.

UTC TDA7088 LINEAR INTEGRATED CIRCUIT



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

Fig 6 AM application circuit.