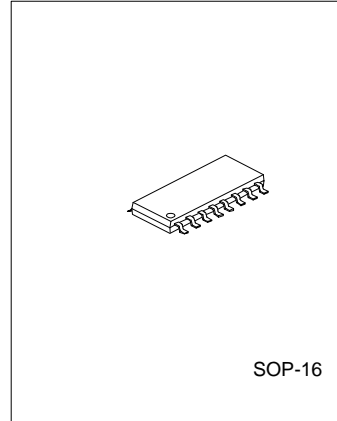


# UTC TDA7088 LINEAR INTEGRATED CIRCUIT

## 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.

# UTC TDA7088 LINEAR INTEGRATED CIRCUIT

## 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	$\mu V$
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

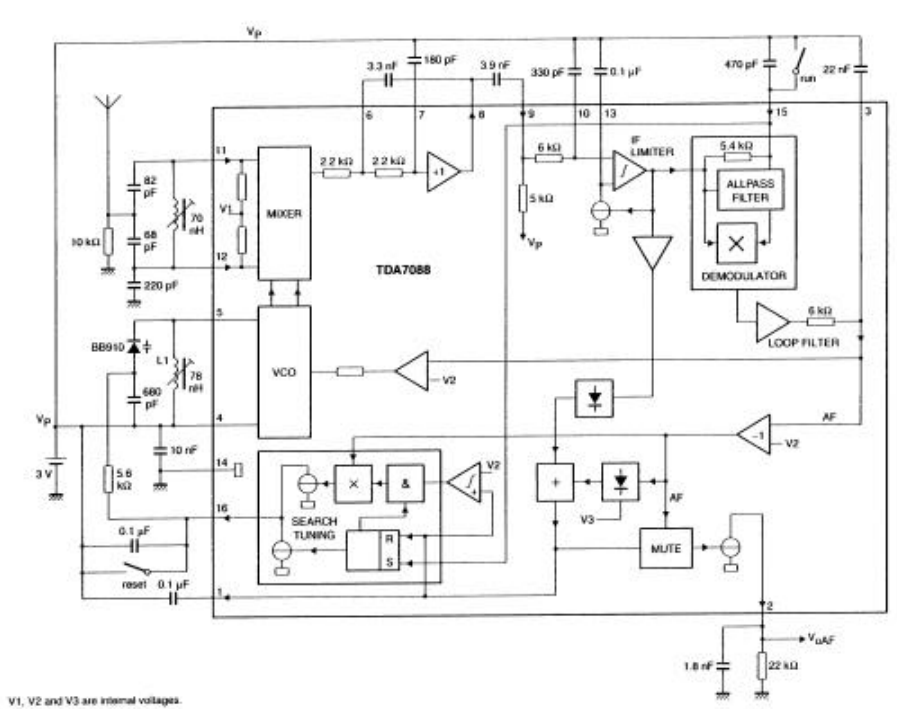


Fig.1 Block diagram and application circuit for search tuning.

# 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	CIRF	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

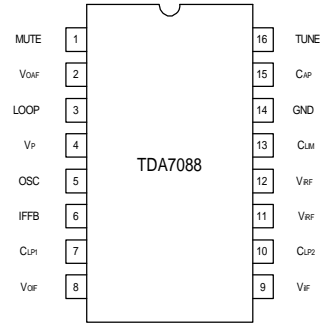


Fig.2

## DC CHARACTERISTICS

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

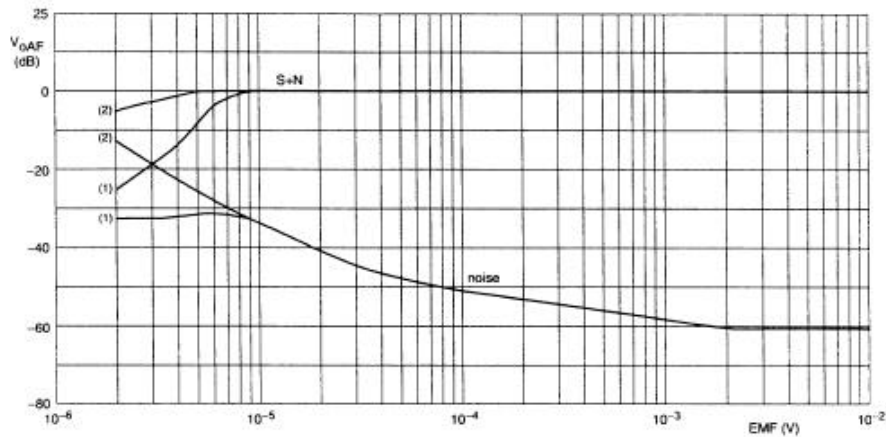
PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage (pin4)	Vp	1.8	3	5	V
Supply Current (pin4)	Ip	4.2	5.2	6.6	mA
DC voltage on pin1	V1	2.5	2.55	2.6	V
DC voltage on pin3	V3	2.64	2.69	2.74	V
DC voltage on pins 6 and 7	V6,7	2.38	2.44	2.5	V
DC voltage on pin 8	V8	1.6	1.67	1.74	V
DC voltage on pin 9,10 and 13	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

# UTC TDA7088 LINEAR INTEGRATED CIRCUIT

## 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)	$V_i(rms)$	$VOAF=-3dB$ ; $VOAF=0dB$ at $V_i=1mV$ ; see Fig.3		3	6	$\mu V$
		Mute off	3	6	12	$\mu V$
		Mute on		5	10	$\mu V$
		$(S+N)/N = 26dB$				
Signal handling	$V_i(rms)$	$\Delta f = \pm 75kHz$ , $THD < 10\%$	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	$\alpha_{AM}$	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)	$V_o(rms)$	$RL=22k\Omega$	60	85	120	mV
Search Tuning (with BB910 and C16=0.1 $\mu F$ ) 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	$\mu S$

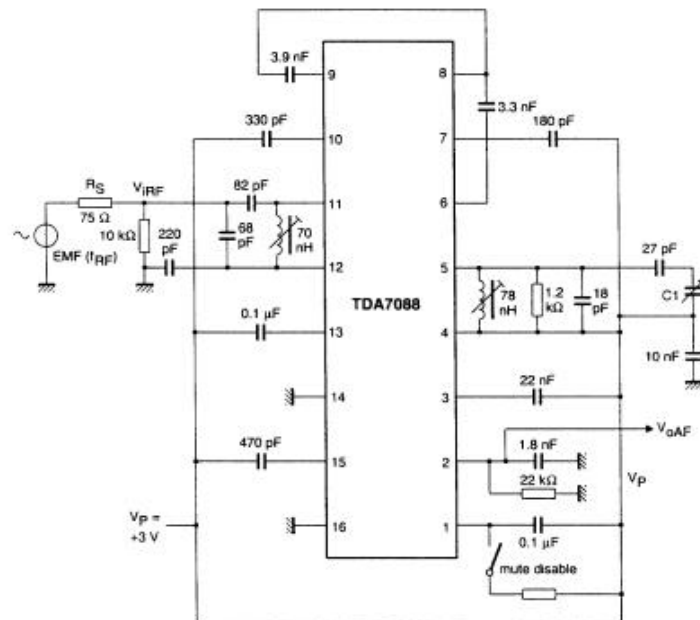


(1) Mute on.  
(2) Mute off.

Fig.3 Input sensitivity.

# UTC TDA7088 LINEAR INTEGRATED CIRCUIT

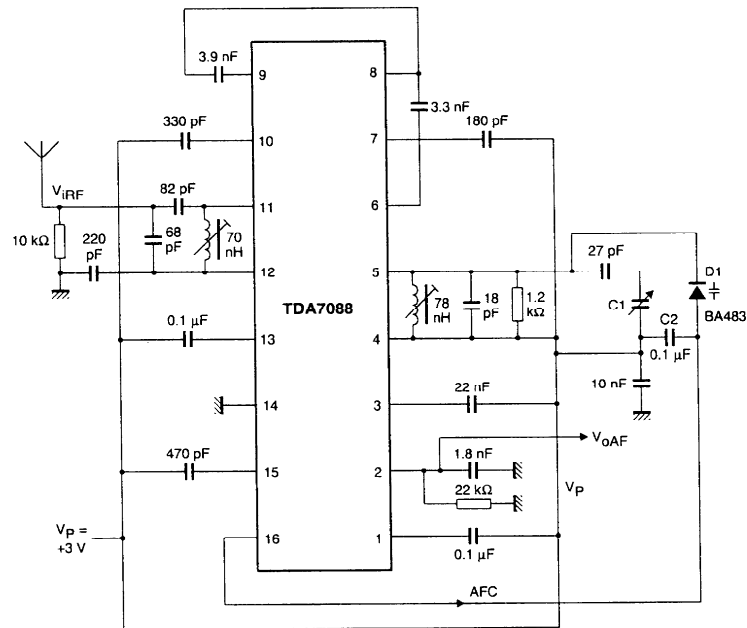
## TEST CIRCUIT



C1 = Toko 2A-15BT-R01.

Fig.4 Test circuit and application for mechanical tuning.

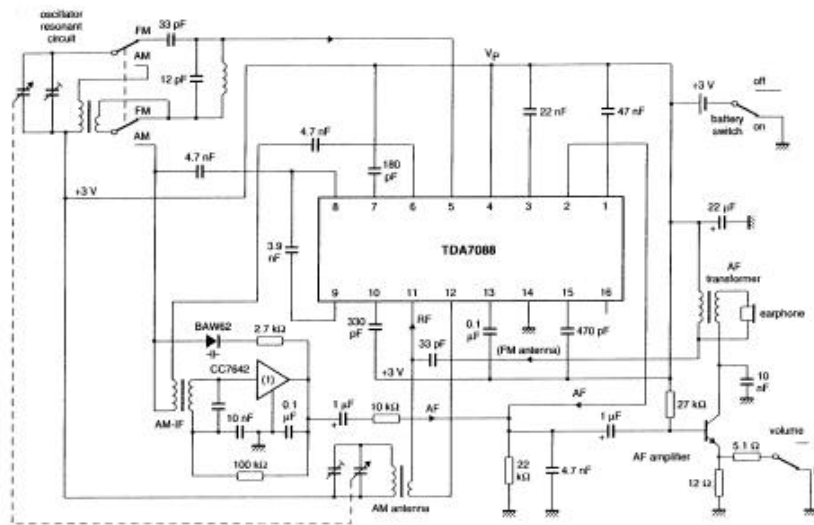
# UTC TDA7088 LINEAR INTEGRATED CIRCUIT



C1 = Toko 2A-15BT-R01.

Fig.5 Application circuit with AFC for mechanical tuning.

# UTC TDA7088 LINEAR INTEGRATED CIRCUIT



(1) CC7842: AM-IF amplifier/demodulator type number WU-1742 Fly.

Fig 6 AM application circuit.