

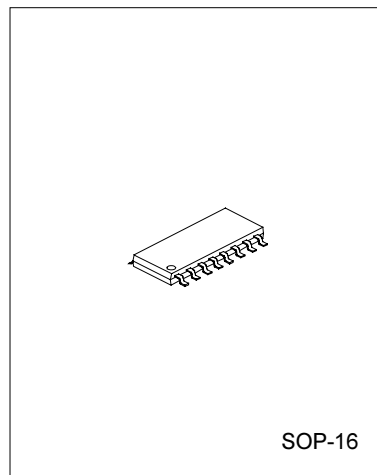
FM RECEIVER CIRCUIT FOR BATTERY SUPPLY

DESCRIPTION

The SA1088 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 signal is suppressed by the mute circuit.

FEATURES

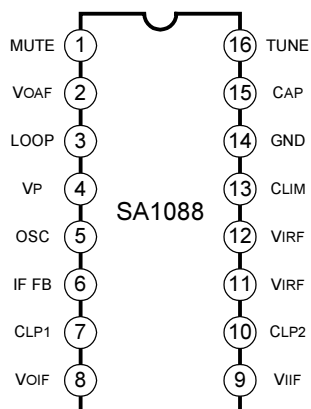
- * Equipped with all stages of a mono receiver from antenna to audio output.
- * Mute Circuit
- * Search tuning with a single varicap diode
- * Mechanical tuning with integrating AFC
- * AM application supported
- * Power supply polarity protection
- * Power supply voltage down to 1.8V



APPLICATION

1. Mechanical tuning: This is possible with or without integrated AFC circuit
2. Electrical tuning: This is realized by one directional(band-up) search tuning facility, including RESET to the lower-band limit.

PIN CONFIGURATIONS



BLOCK DIAGRAM

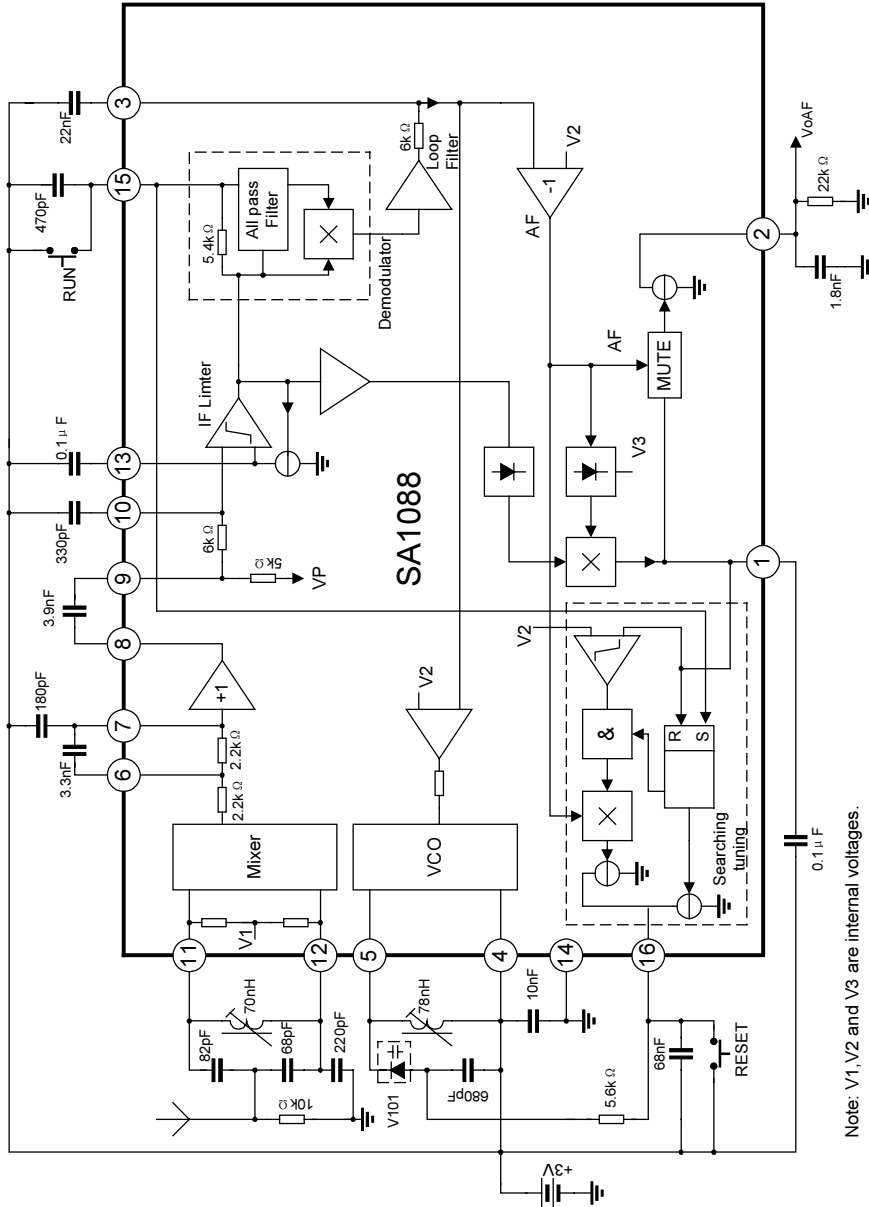


Fig. 1 Block Diagram and Application Circuit for Search Tuning.

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Supply Voltage	V_p	5	V
Operating Temperature	T_{amb}	-10 ~ +70	°C
Storage Temperature	T_{stg}	-55 ~ +150	°C

DC ELECTRICAL CHARACTERISTICS

($T_{amb}=25^{\circ}\text{C}$, $V_p=3\text{V}$, Unless otherwise specified)

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Supply Voltage(pin 4)	V_p		1.8	3.0	5.0	V
Supply Current(Pin 4)	I_p		4.2	5.2	6.6	mA
DC voltage of pin 1	V1		2.50	2.55	2.60	V
DC voltage of pin 3	V3		2.64	2.69	2.74	V
DC voltage of pin 6 and 7	V6,7		2.38	2.44	2.50	V
DC voltage of pin 8	V8		1.60	1.67	1.74	V
DC voltage of pin 9,10 and 13	V9,10,13		2.42	2.47	2.52	V
DC voltage of pin 11 and 12	V11,12		0.91	0.94	0.98	V
DC voltage of pin 15	V15		2.06	2.12	2.18	V
AF output current on pin 2	I_2		45	60	80	μA
Oscillator current on pin 5	I_5		275	375	500	μA

AC ELECTRICAL CHARACTERISTICS

$T_{amb}=25^{\circ}\text{C}$, $V_p=3\text{V}$, $f_{irf}=96\text{MHz}$ modulated with $\Delta f=\pm 22.5\text{kHz}$ and $f_m=1\text{kHz}$ deviation; $EMF=0.3\text{mV}$ (e.m.f. at a source impedance of 75Ω), and measurement taken in fig.3 Unless otherwise specified

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
RF Sensitivity input voltage	$V_i(\text{rms})$	$V_{oAF}=-3\text{dB}$; $V_{oAF}=0\text{dB}$ at $V_i=1\text{mV}$; see Fig. 2				
		Mute OFF		3	6	μV
		Mute ON	3	6	12	μV
		(S+N)/N=26dB		5	10	μV
Signal handling		THD<10%, $\Delta f=\pm 75\text{kHz}$	100	200	—	mV
Signal-to -noise ratio	(S+N)/N	See fig.2	52	56	—	dB
Total Harmonic distortion	THD	$\Delta f=\pm 22.5\text{kHz}$	—	1	1.4	%
		$\Delta f=\pm 75\text{kHz}$		2.4	3.3	%
AM suppression of output voltage	AMS	FM: 1kHz; $\pm 75\text{kHz}$ AM: 1kHz; MOD=80%	47	52		dB
Ripple rejection	RR	$\Delta V_p=100\text{mVrms}$, $f=1\text{kHz}$	7	10		dB
Audio output signal	$V_o(\text{rms})$	$R_L=22\text{k}\Omega$	60	85	120	mV
Search Tuning(with V101 and C16=0.1μF) See Fig.1						
Minimum output voltage on pin 16	V16	Limiting point		Vp-1.85		V
Tuning steepness	$\Delta V/\Delta t$	Voltage at pin 16	95	210	420	mV/sec
Oscillator steepness	$\Delta f_{osc}/\Delta t$		1.25	2.83	5.6	MHz/sec
AFC steepness	$\Delta I_{AFC}/\Delta V_3$	Voltage at pin 3	4.75	9.5	19	μs

PIN DESCRIPTIONS

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	MUTE	Mute output	9	V _{iIF}	IF input to limiter amplifier
2	V _{OAF}	Audio frequency output signal	10	CLP2	Low-pass capacitor of IF limiter amplifier
3	LOOP	AF loop filter	11	V _{IRF}	Radio frequency input
4	V _p	Supply voltage	12	V _{IRF}	Radio frequency input
5	OSC	Oscillator resonat circuit	13	CLIM	Limiter offset voltage capacitor
6	IF FB	IF feedback	14	GND	Ground
7	CLP1	Low-pass capacitor of 1dB amplifier	15	CAP	All-pass filter capacitor.input for search tuning
8	V _{OIF}	IF output to external coupling capacitor(high-pass)	16	TUNE	Electrical tuning/AFC output

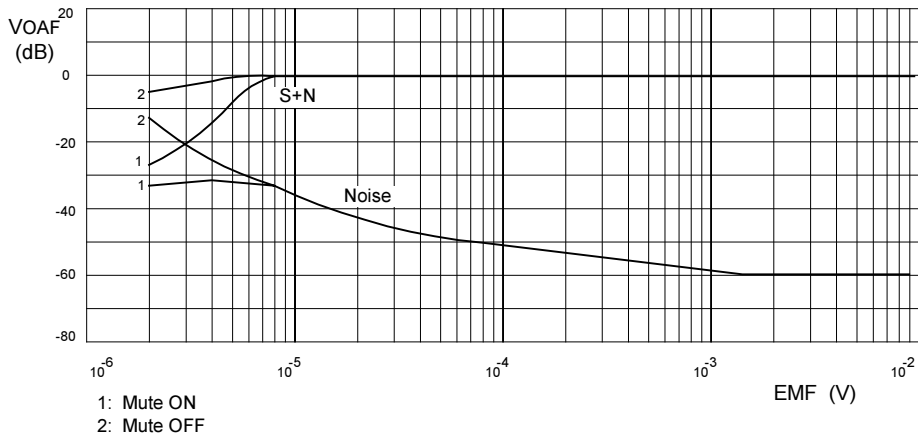


Fig. 2 Input sensitivity

TEST AND APPLICATION CIRCUIT

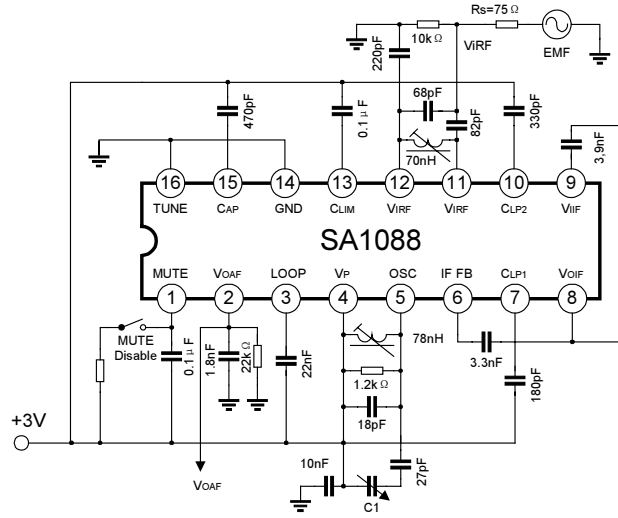


Fig. 3 Test circuit and application for mechanical tuning

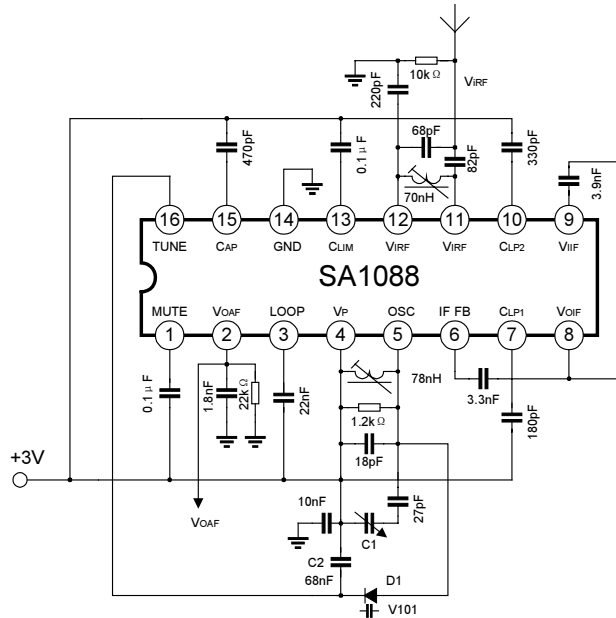


Fig. 4 Application circuit with AFC for mechanical tuning

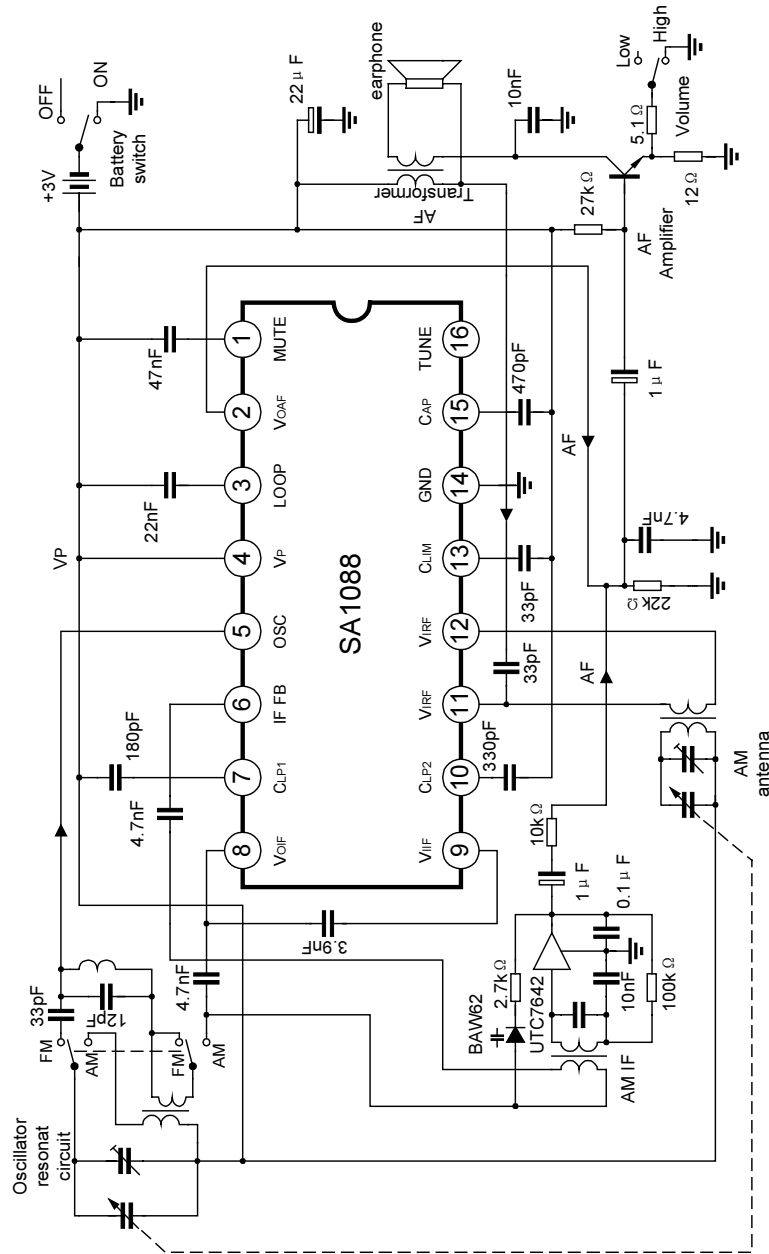


Fig.5 AM application circuit

PACKAGE OUTLINE

