

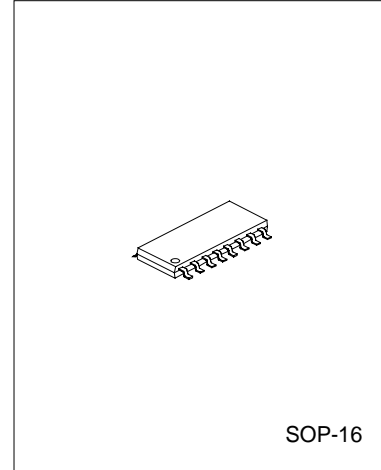
FM RECEIVER CIRCUIT FOR BATTERY SUPPLY

DESCRIPTION

The SC1088 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

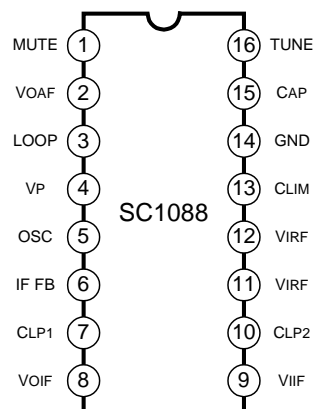
- * Equipped with all stages of a mono receiver from antenna to audio output.
- * Mute Circuit
- * Search tuning with a single varicap diode
- * Mechanical tuning with integrating AFC
- * AM application supported
- * Power supply polarity protection
- * Power supply voltage down to 1.8V



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

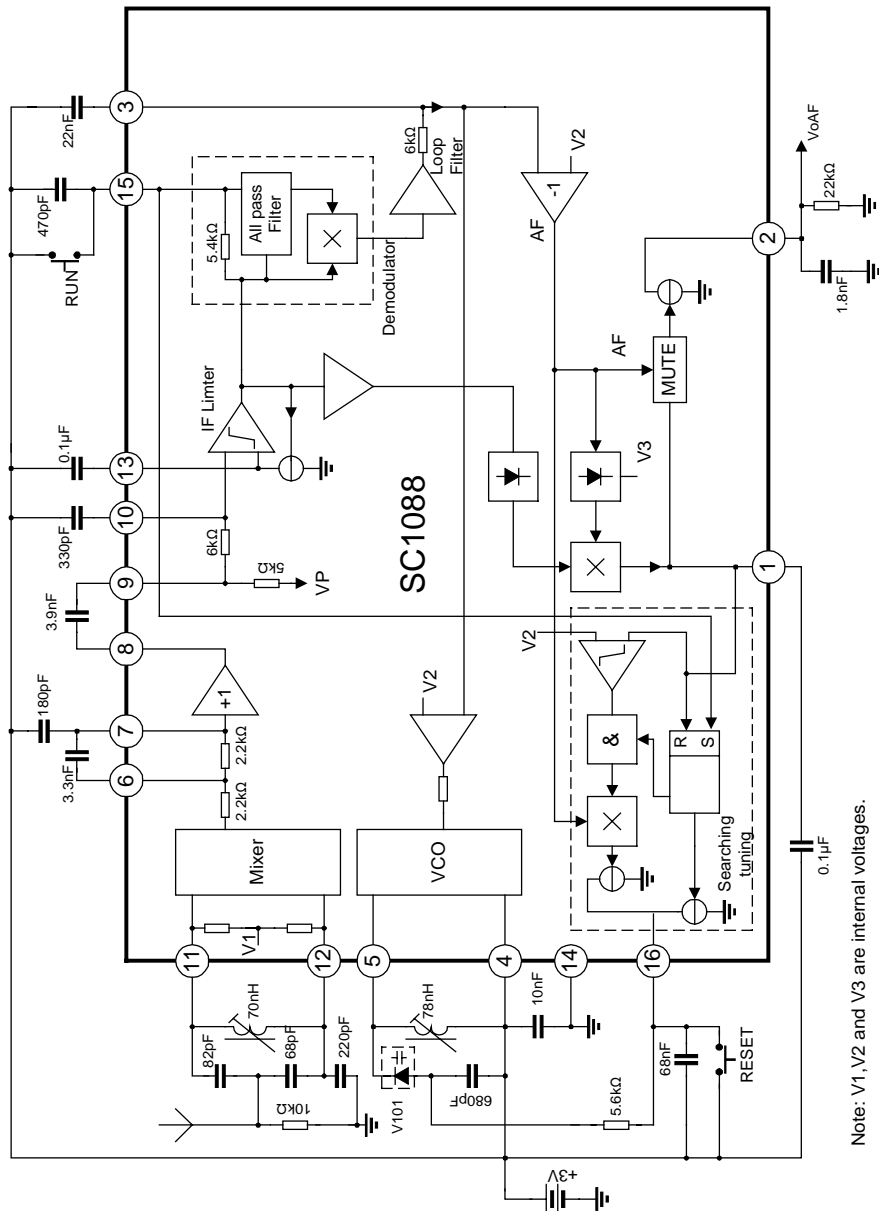


Fig.1 Block Diagram and Application Circuit for Search Tuning.

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 | V_1 | | 2.50 | 2.55 | 2.60 | V |
| DC voltage of pin 3 | V_3 | | 2.64 | 2.69 | 2.74 | V |
| DC voltage of pin 6 and 7 | $V_{6,7}$ | | 2.38 | 2.44 | 2.50 | V |
| DC voltage of pin 8 | V_8 | | 1.60 | 1.67 | 1.74 | V |
| DC voltage of pin 9,10 and 13 | $V_{9,10,13}$ | | 2.42 | 2.47 | 2.52 | V |
| DC voltage of pin 11 and 12 | $V_{11,12}$ | | 0.91 | 0.94 | 0.98 | V |
| DC voltage of pin 15 | V_{15} | | 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; $\text{EMF}=0.3\text{mV}$ (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 Sensitivityinput 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 |
| | | $(S+N)/N=26\text{dB}$ | | 5 | 10 | μV |
| Signal handling | | $\text{THD}<10\%$, $\Delta f=\pm 75\text{kHz}$ | 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; $\text{MOD}=80\%$ | 47 | 52 | | dB |
| Ripple rejection | RR | $\Delta V_p=100\text{mV}_{\text{rms}}$, $f=1\text{kHz}$ | 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 | | $V_p-1.85$ | | 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 | VOAF | 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 resonant 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 | VOIF | IF output to external coupling capacitor(high-pass) | 16 | TUNE | Electrical tuning/AFC output |

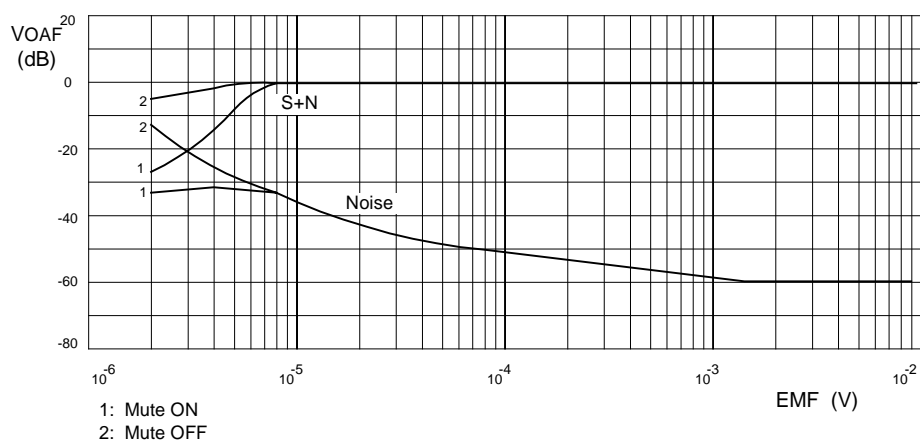


Fig. 2 Input sensitivity

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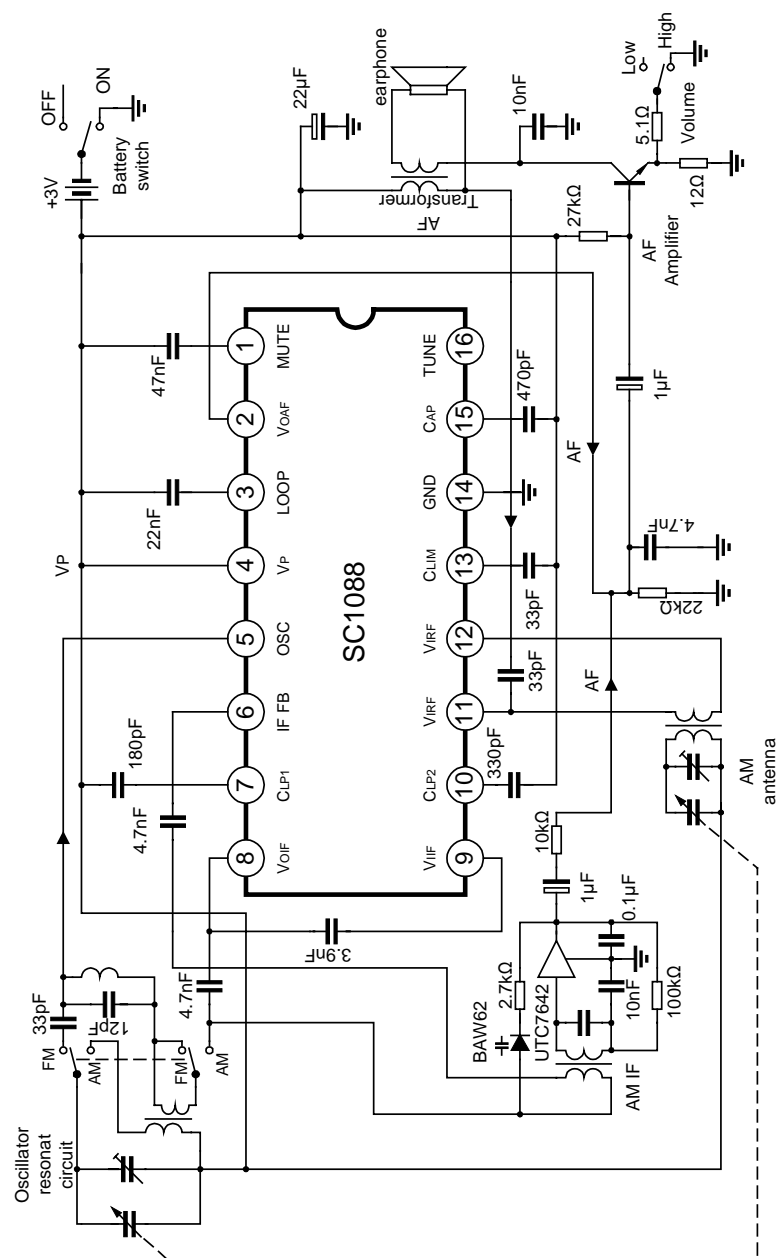


Fig.5 AM application circuit

PACKAGE OUTLINE

SOP-16-225-1.27

UNIT:mm

