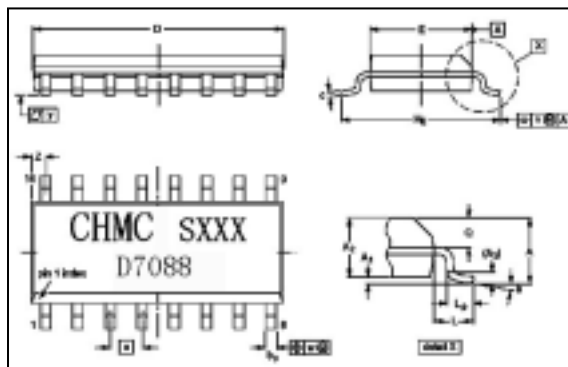




FM receiver circuit for battery supply D7088

GENERAL DESCRIPTION

The D7088 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.



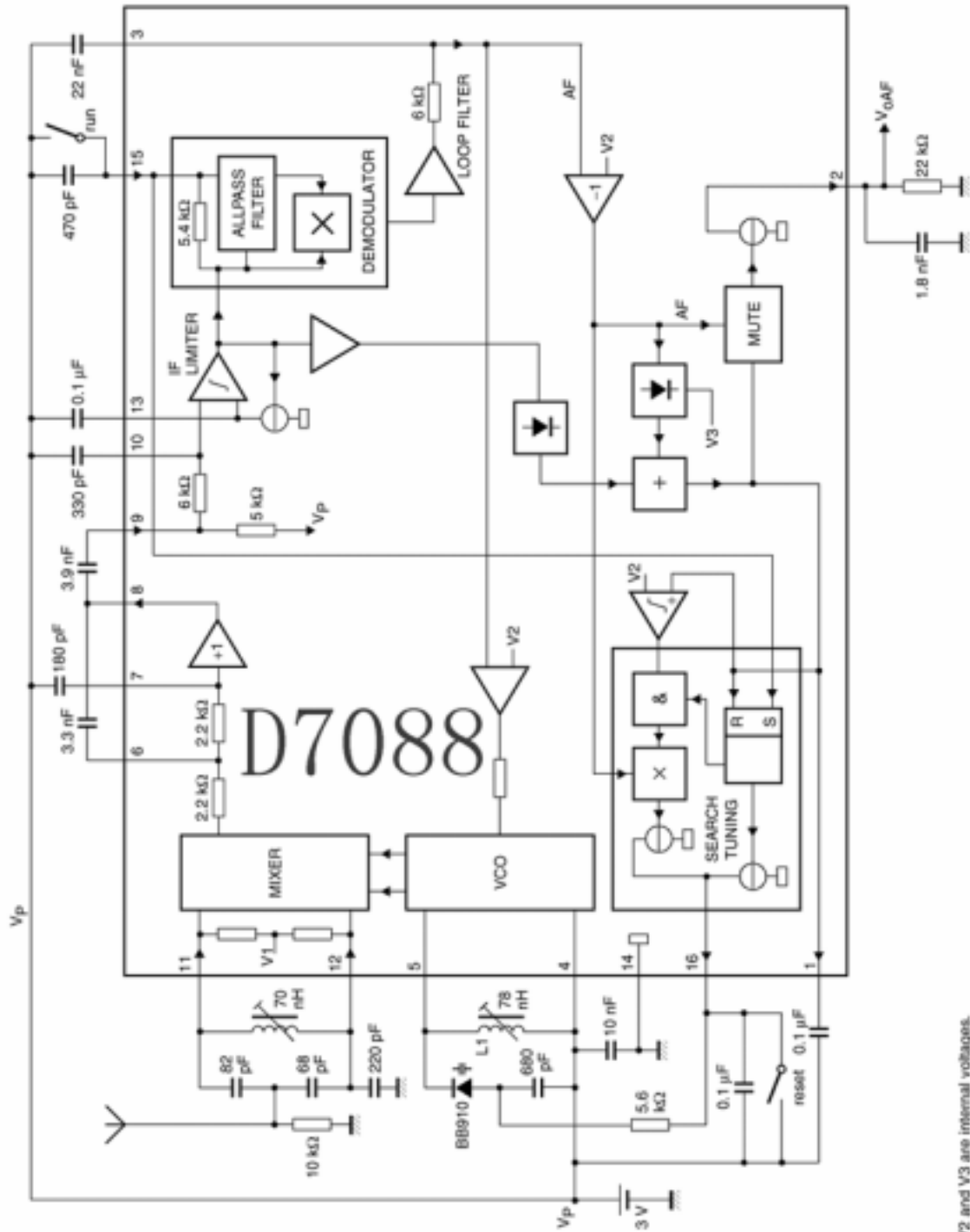
FEATURES

- 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.
- Package: SOP16
- 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.

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.

BLOCK DIAGRAM AND APPLICATION CIRCUIT

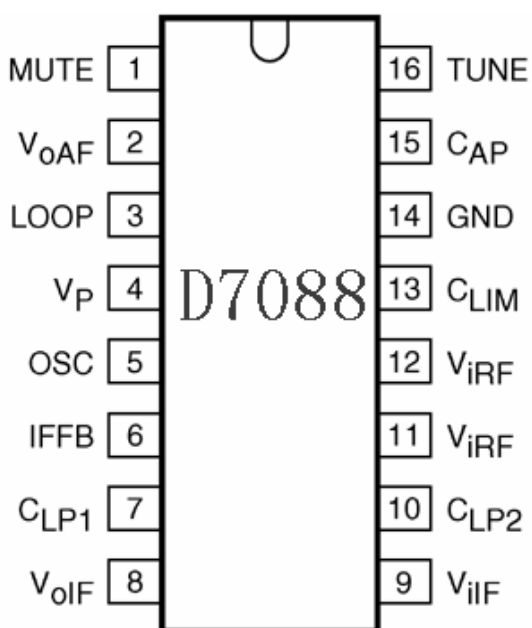


V1, V2 and V3 are internal voltages.

QUICK REFERENCE DATA

CHARACTERISTIC	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	FIRF		0.5	-	110	MHz
RF sensitivity input voltage (RMS value)	$V_{i(rms)}$	$V_{OAF}=-3dB$; $V_{OAF}=0dB$ at $V_i=1mV$; mute off	-	3	6	μV
Signal handing		$f= \pm 75kHz$; 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	$^{\circ}C$

PIN CONNECTION



PINNING

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

LIMITING VALUES

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V _p	Supply voltage	-	5	V
T _{stg}	Storage temperature	-55	+150	°C
T _{amb}	Operating ambient temperature	-10	+70	°C

ELECTRIC CHARACTERISTICS

DC CHARACTERISTICS unless otherwise specified: V_p=3V;T_{amb}=25°C.

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V _p	Supply voltage (pin4)	1.8	3.0	5.0	V
I _p	Supply current (pin4)	4.2	5.2	6.6	mA
V ₁	DC voltage on pin 1	2.5	2.55	2.6	V
V ₃	DC voltage on pin 3	2.64	2.69	2.74	V
V _{6,7}	DC voltage on pin 6 and 7	2.38	2.44	2.5	V
V ₈	DC voltage on pin 8	1.6	1.67	1.74	V
V _{9,10,13}	DC voltage on pin 9,10 and 13	2.42	2.47	2.52	V
V _{11,12}	DC voltage on pin 11 and 12	0.91	0.94	0.98	V
V ₁₅	DC voltage on pin 15	2.06	2.12	2.18	V
I ₂	AF output current on pin 2	45	60	80	μA
I ₅	Oscillator current on pin 5	275	375	500	μA

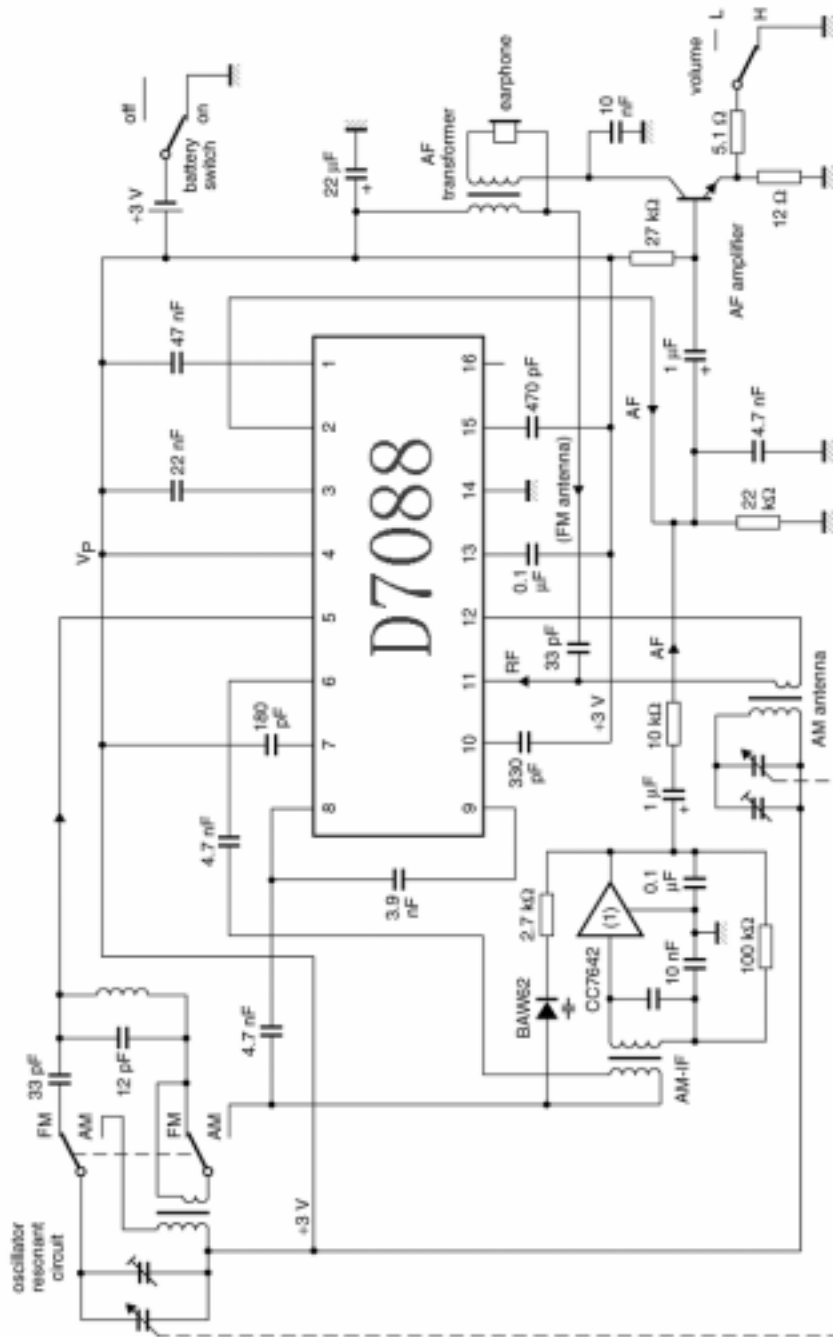
AC CHARACTERISTICS

Unless otherwise specified: $V_p=3V$; $T_{amb}=25^{\circ}C$; $f_{IRF}=96MHz$ modulated with $f_{mod}=1kHz$ and $\pm 22.5kHz$ deviation; $V_i=400\mu V$ (measured as EMF; $R_s=75\Omega$)

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
RF sensitivity input voltage (RMS value)	V_i	$V_{OAF}=-3dB$; $V_{OAF}=0dB$ at $V_i=1mV$; mute off	-	3	6	μV_{rms}
		$V_{OAF}=-3dB$; $V_{OAF}=0dB$ at $V_i=1mV$; mute on	3	6	12	
		$(S+N)/N=26dB$	-	5	10	
Signal plus noise-to-noise ratio	$N+S/N$		52	56	-	dB
Total harmonic distortion	THD	$f= \pm 22.5kHz$	-	1.0	1.4	%
		$f= \pm 75kHz$	-	2.4	3.3	
AM suppression	AMR	FM: $1kHz$; $f= \pm 75kHz$; AM: $1kHz, mod=80\%$	47	52	-	dB
Ripple rejection	R.R	100mV Rms ripple on V_p , $f=1kHz$	7	10	-	dB
Audio output signal (RMS value)	V_o	$R_L=22k\Omega$	60	85	120	mVrms
Search tuning (with BB910 and $C_{16}=0.1\mu F$)						
Minimum output voltage on pin 16	V_{16}	Limiting point	-	$V_p-1.85$	-	V
Tuning steepness	V/t	Voltage at pin 16	95	210	420	mV/s
Oscillator steepness	f_{osc}/t		1.25	2.83	5.6	MHz/s
AFC steepness	I_{AFC}/V_3	Voltage at pin 3	4.75	9.5	19	μs

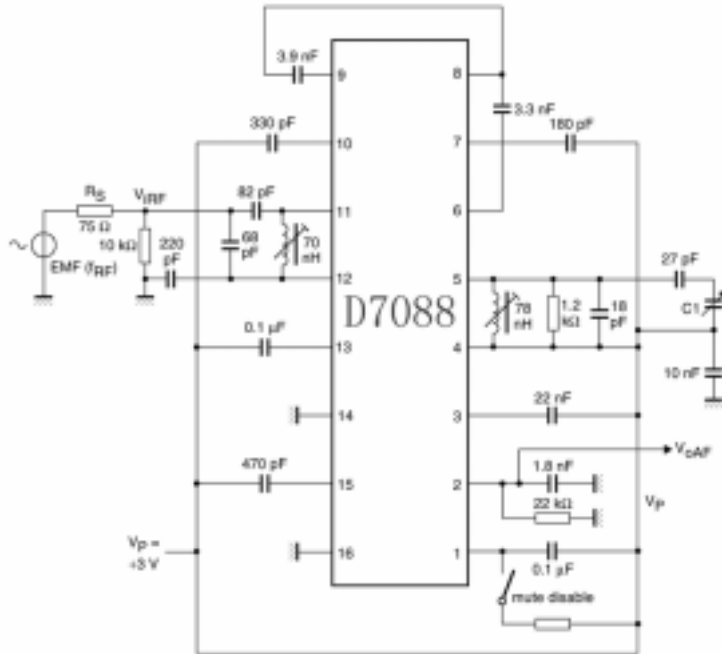
TEST AND APPLICATION INFORMATION

1. AM APPLICATION CIRCUIT

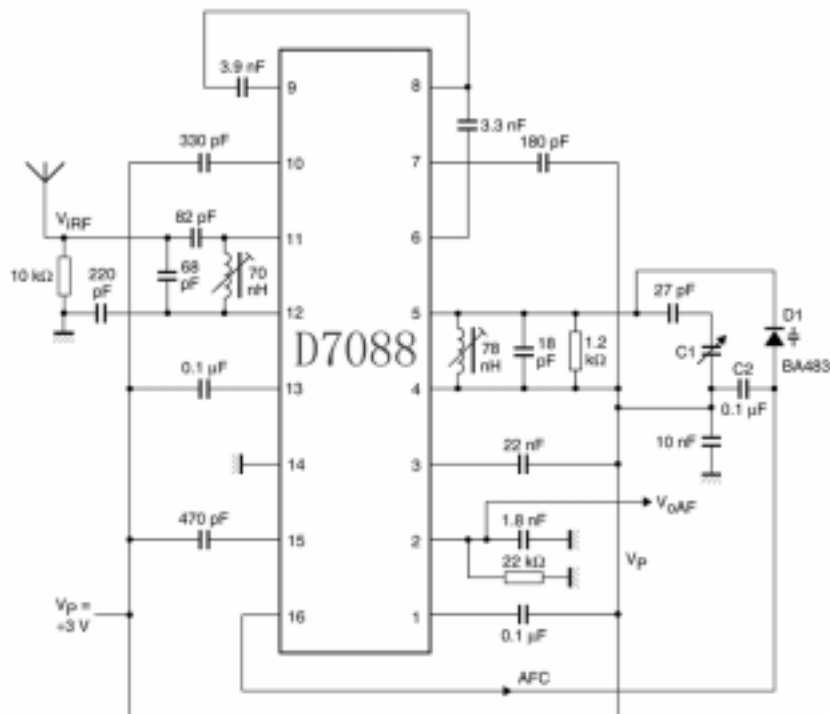


(1) CC7B42: AM-IF amplifier/modulator type number WU-si 742 Fly.

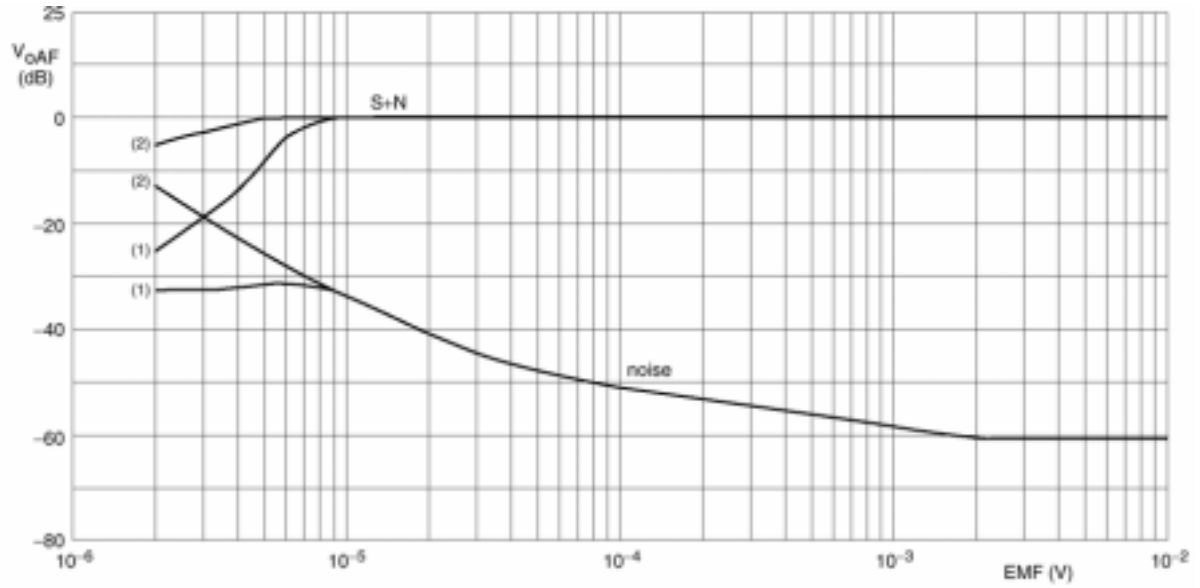
2. TEST CIRCUIT AND APPLICATION FOR MECHANICAL TUNING



3. APPLICATION CIRCUIT WITH AFC FOR MECHANICAL TUNING



CHARACTERISTICS CURVES



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

Input sensitivity