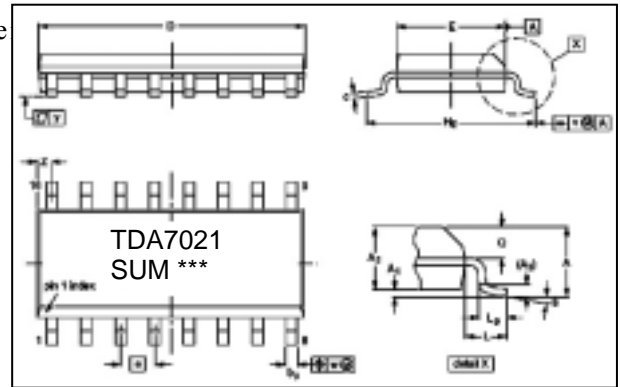


FM RADIO CIRCUIT FOR MTS TDA7021

GENERAL DESCRIPTION

The TDA7021 integrated radio receiver circuit is for portable radios, stereo as well as mono, where a minimum of periphery is important in terms of small dimensions and low cost. It is fully compatible for application using the low-voltage micro tuning system (MTS). The IC has a frequency locked loop (FLL) system with an intermediate frequency of 76kHz.



Outline drawing

The selectivity is obtained by active RC filters. The only function to be tuned is the resonant frequency of the oscillator. Inter-station noise as well as noise from receiving weak signals is reduced by a correlation mute system.

Special precautions have been taken to meet local oscillator radiation requirements. Because of the low intermediate frequency, low pass filtering of the MUX signal is required to avoid noise when receiving stereo. 50kHz roll-off compensation, needed because of the low pass characteristic of the FLL, is performed by the integrated LF amplifier. For mono application this amplifier can be used to directly drive an earphone. The field-strength detector enables field-strength dependent channel separation control.

FEATURES

- RF input stage
- Mixer
- Local oscillator
- IF amplifier/limiter
- Frequency detector
- Mute circuit
- MTS compatible
- Package SOP16
- Loop amplifier
- Internal reference circuit
 - mono earphone amplifier or
 - MUX filter
- Field-strength dependent channel separation control facility

BLOCK DIAGRAM

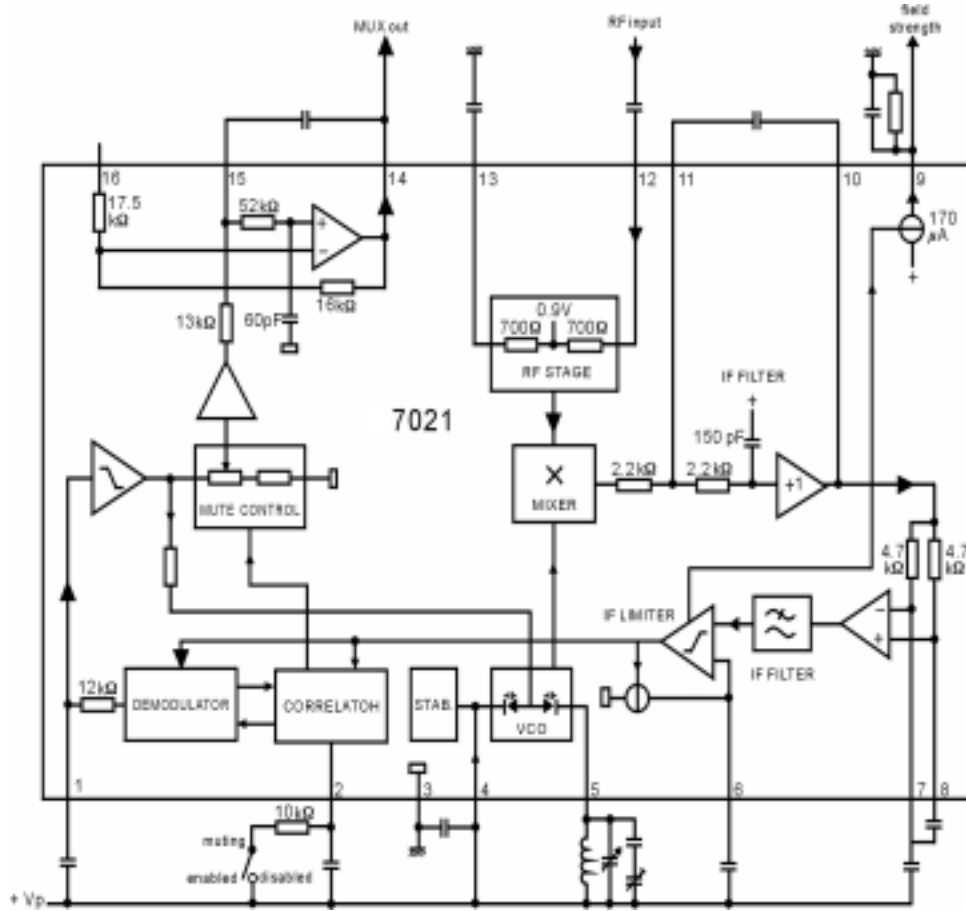
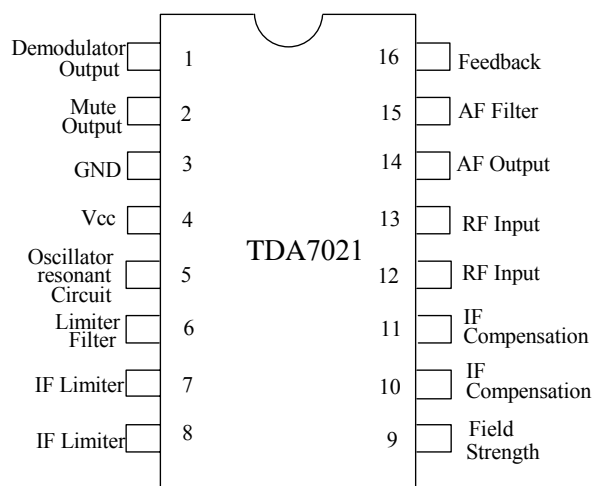


Fig.1

PIN CONNECTION



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System

PARAMETER	SYMBOL	MIN	MAX	UNIT
Supply voltage (pin4)	Vp		7.0	V
Oscillator voltage	V5-4	Vp-0.5	Vp+0.5	V
Storage temperature range	Tstg	-55	+150	°C
Operating ambient temperature range	Tamb	-10	+70	°C

ELECTRIC CHARACTERISTICS

AC CHARACTERISTICS (MONO OPERATION)

Vp=3V; Tamb=25°C; f=96MHz, f= ± 22.5kHz; fm=1kHz

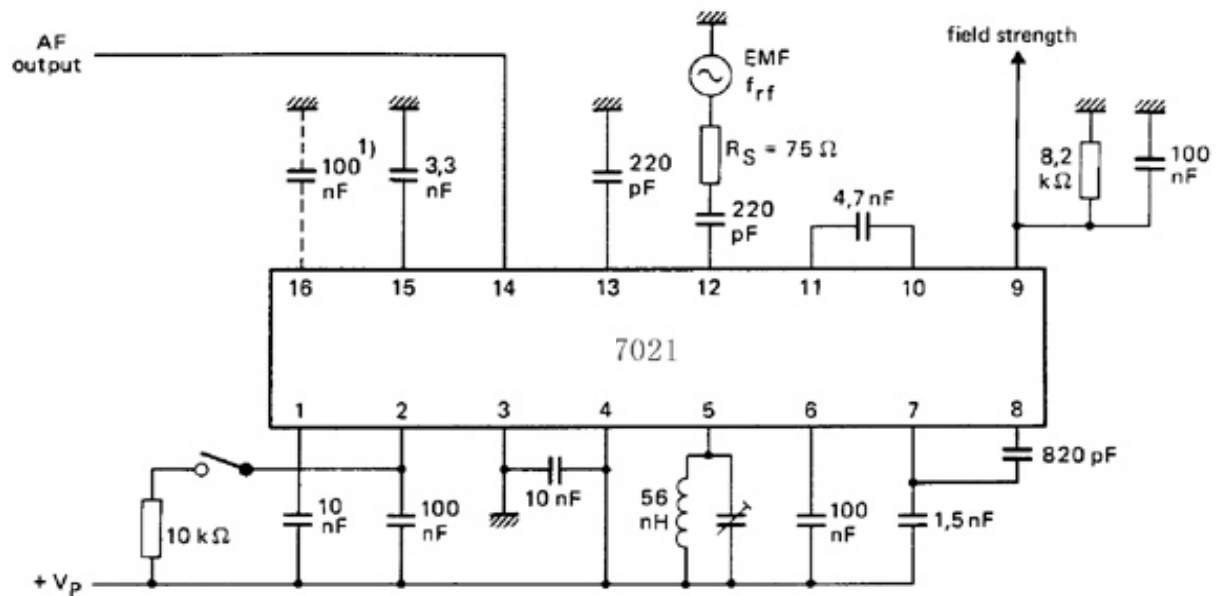
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Sensitivity	Vi	-3dB limiting muting disabled	-	4.0	-	µV
		-3dB muting	-	5.0	-	
		(S+N)/N=26dB	-	7.0	-	
Signal-to-noise ratio	(S+N)/N	-	-	60	-	dB
Total harmonic distortion	THD	f= ± 22.5kHz	-	0.7	-	%
		f= ± 75kHz	-	2.3	-	
AM suppression of output voltage	AMR	AM: fm=1kHz, m=80% FM: fm=1kHz; f= ± 75kHz	-	50	-	dB
Ripple rejection	R.R	Vp=100mV	-	30	-	dB
Oscillator voltage	V5~4	-	-	250	-	mVrms
Variation of oscillator frequency with temperature	fosc/ T	Vp=1V	-	5	-	kHz/°C
Selectivity	S+300	-	-	46	-	dB
	S-300	-	-	30	-	
AFC range	± frf	-	-	160	-	kHz
Mute range	± frf	-	-	120	-	kHz
Audio bandwidth	B	Vo=3dB	-	10	-	kHz
AF output voltage	Vo	RL(pin 14)=100Ω	-	90	-	mVrms
AF output current	Io(dc)	Max. d.c.load	-100	-	100	µA
	Io(ac)	Max. d.c.load THD=10%	-	3	-	mA

DC CHARACTERISTICS

$V_p=3V, T_{amb}=25^{\circ}C$, unless otherwise specified

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
Supply voltage (pin4)	-	$V_p=V_{4-3}$	1.8	3.0	6.0	V
Supply current	$V_p=3V$	I_4	-	6.3	-	mA
Oscillator current	-	I_5	-	250	-	μA
Voltage at pin 13	-	V_{13-3}	-	0.9	-	V
Output voltage (pin 14)	-	V_{14-3}	-	1.3	-	V

TEST CIRCUIT



1) The AF output can be decreased by disconnecting the 100 nF capacitor from pin 16.

Fig.2

APPLICATION CIRCUIT

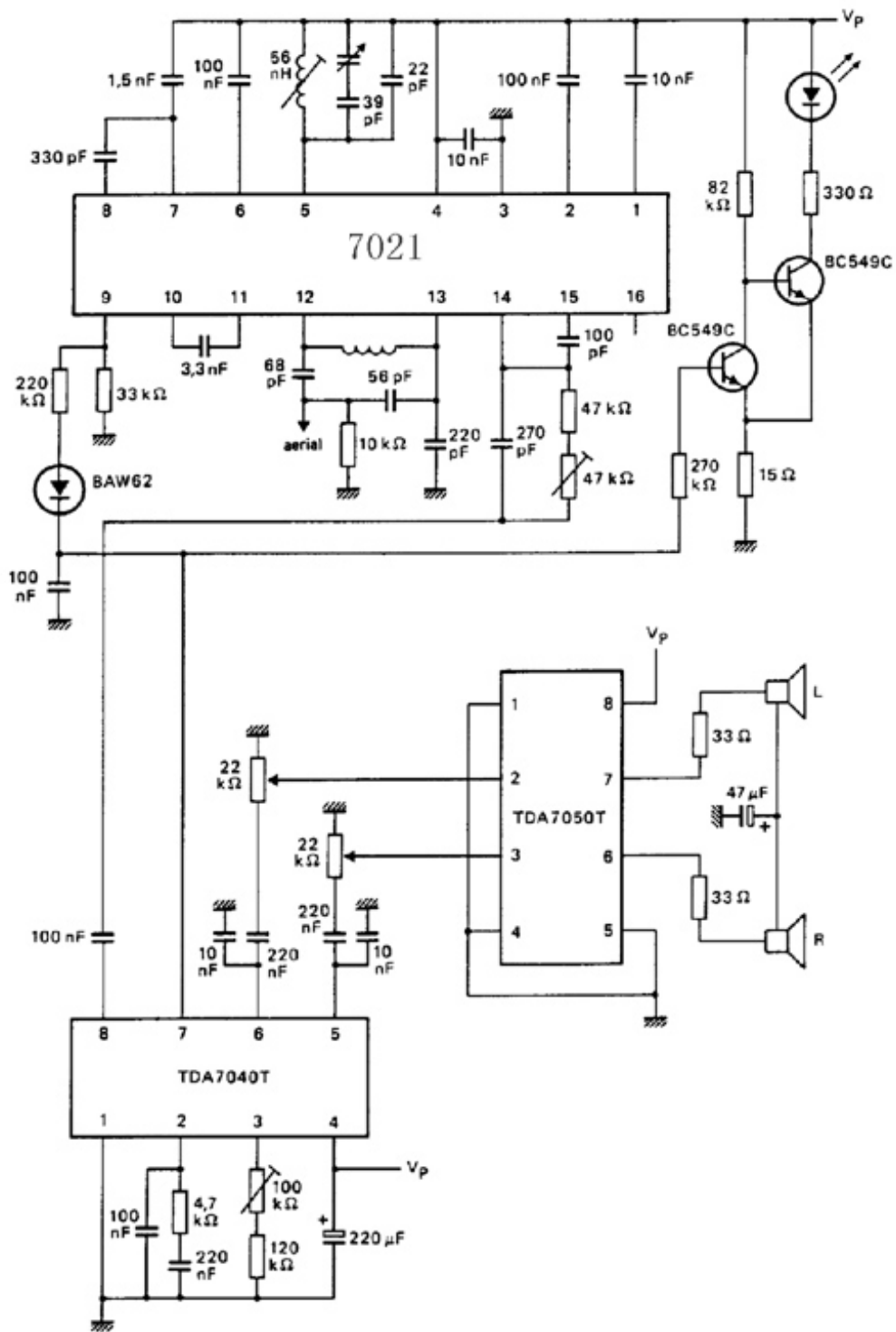
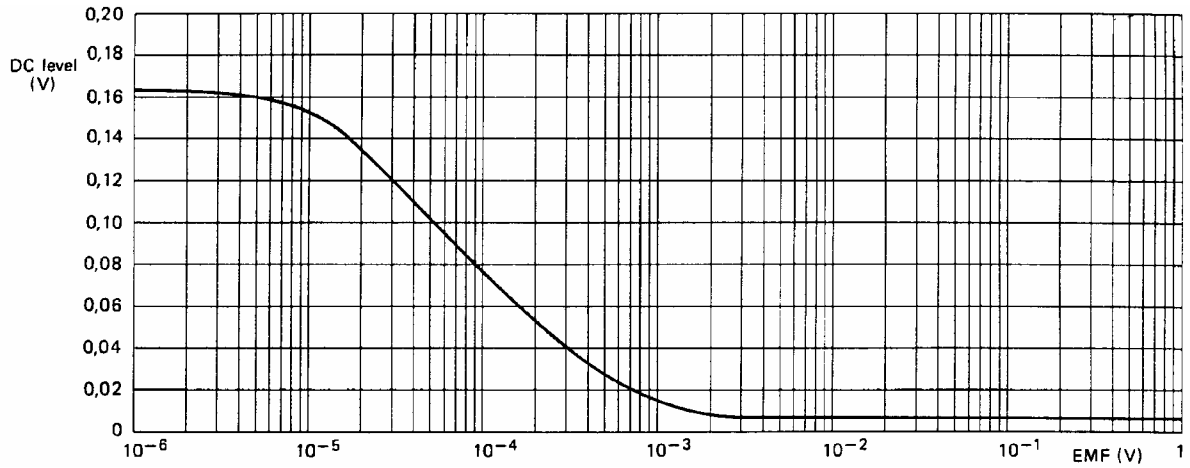


Fig.3

CHARACTERISTICS CURVE



Field strength voltage (V₉₋₃) at R_{source}=1kΩ; f=96.75MHz; V_p=3V

Fig.3

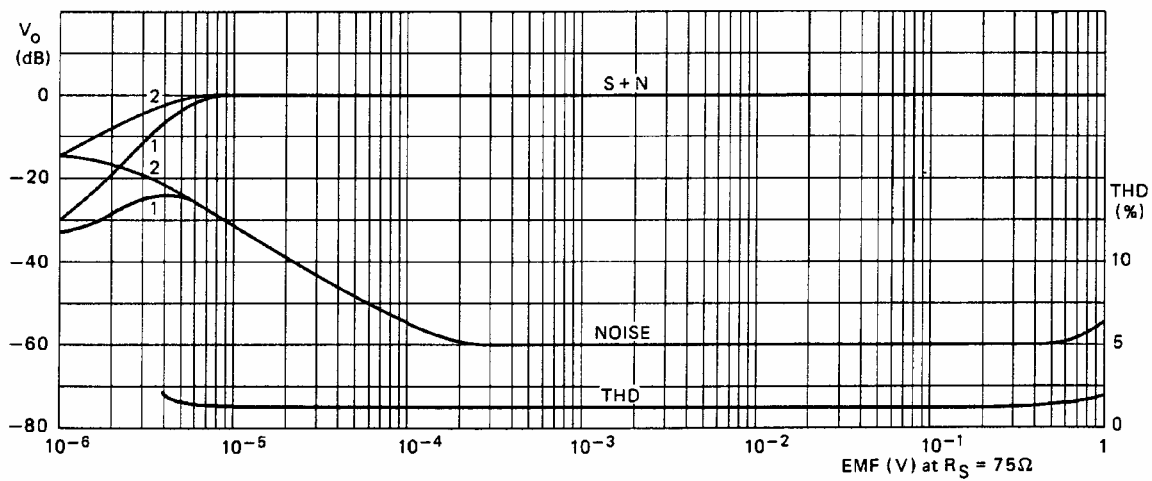


Fig.4

Mono operation: AF output voltage (V_o) and total harmonic distortion (THD) as function of input e.m.f. (EMF); R_{source}=75Ω; f=96MHz; 0dB=90mV. For S+N and noise curves (1) is with muting enabled and (2) is with muting disabled; signal f=±22.5kHz and f_m=1kHz. For THD curve, f=±75kHz and f_m=1kHz.

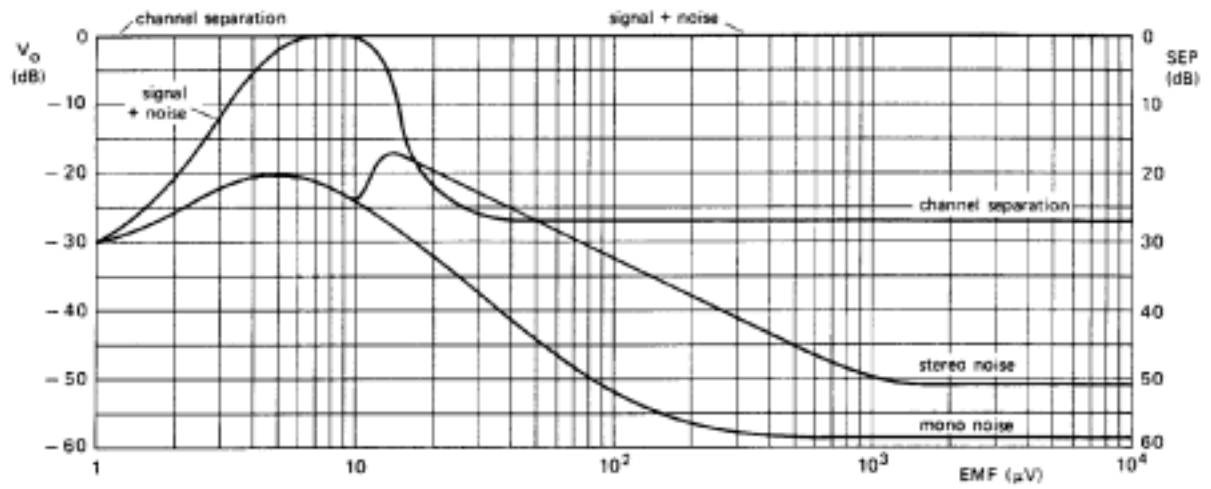


Fig.5

Stereo operation: signal/noise and channel separation of TDA7021 when used in the circuit of Fig.3.

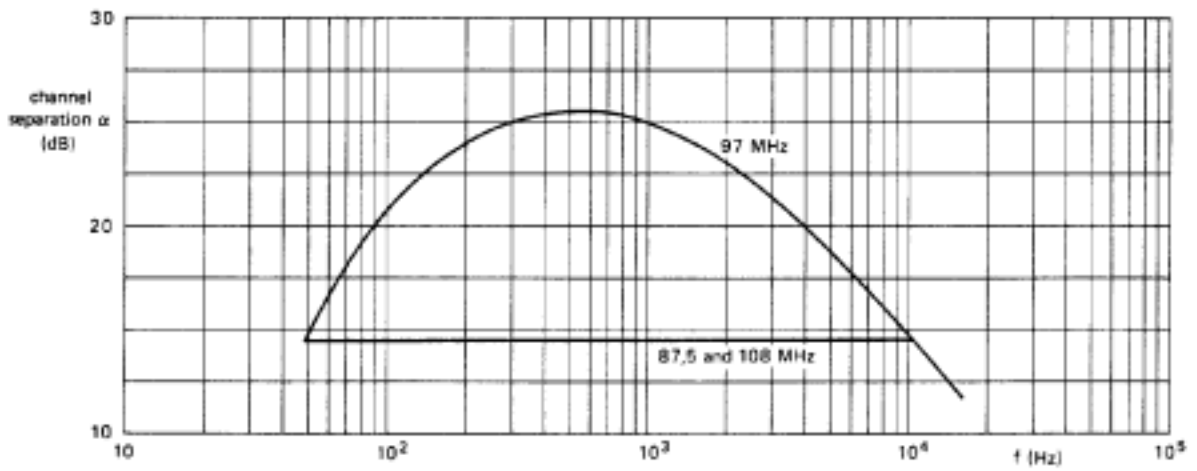


Fig.6

Stereo operation: signal/noise and channel separation
 Stereo operation : channel separation as a function of audio frequency .

QUICK REFERENCE DATA

PARAMETER	CONDITION	SYMBOL	MIN	TYP	MAX	UNIT
Supply voltage (pin4)		Vp=V4-3	1.8		6.0	V
Supply current	Vp=3V	I4		6.3		mA
RF input frequency		frf	1.5		110	MHz
Sensitivity(e.m.f.)for	Source imoedance=75Ω					
-3dB limiting	Mute disabled	EMF		4		μV
Signal handling(e.m.f.)	Source imoedance=75Ω	EMF		200		mV
AF output voltage		Vo		90		mV