SIEMENS

FM-Tuner IC

TUA 1574-X6

Preliminary Data

Bipolar IC

Features

- Double-balanced mixer
- AGC generation
- Strictly symmetrical RF parts
- Decoupled counter outputs
- IF-driver

Type	Ordering Code	Package
TUA 1574-X6	Q67000-A5009	P-DSO-16 (SMD)

The TUA 1574-X6 has been designed as monolithic integrated tuner with strictly symmetrical RF parts. In addition the IC provides a pre-stage control and an IF post amplification.

The integrated circuit includes an oscillator with symmetrical input, buffered output and a double balanced mixer for frequency conversion. The resulting IF is amplified in a linear IF driver. The AGC stage integrated for pre-stage control generates wide band information. The IC also includes a reference voltage source.

The TUA 1574-X6 is especially suitable for use in car radios and home receivers with pre-stage control and distributed IF selection.

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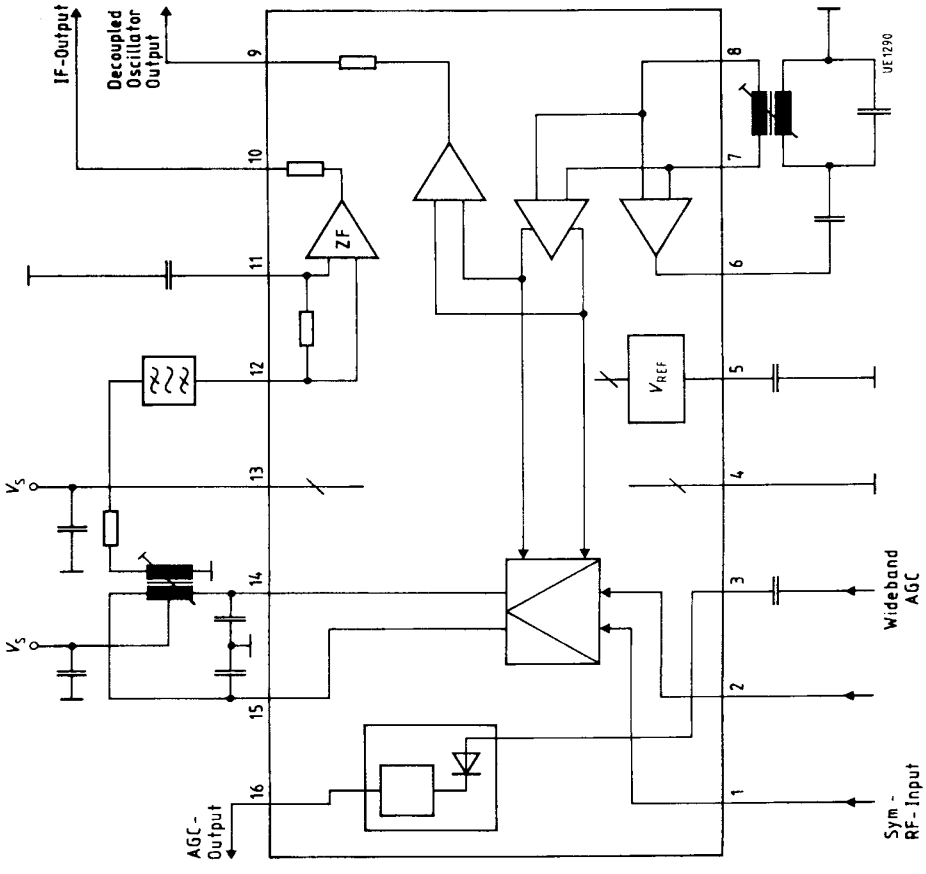
Block Diagram



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Pin Functions

Pin No.	Function
1, 2	**RF Mixer input** Low-impedance (basic circuitry) input directly to the mixer pair.
3	**Input for the wide band information** RF signal is present after pre-stage selection. Strong adjacent channel transmitter activates control.
4	**Ground** Decoupling should be referenced to this pin.
5	**Reference voltage** To be decoupled to pin 4.
6, 7, 8	**Oscillator** 3 point oscillator with low levels especially for tuning vector diodes.
9	**Decoupled oscillator output** The oscillator does not affect this output.
10	**Output IF driver input** Output with 300 Ω corresponding to impedance of conventional IF ceramic filters.
11	**IF driver input** Input for the IF amplifier. This input must be blocked.
12	**IF driver input** 300 Ω input for amplifier.
13	**Supply voltage** Pin should be RF decoupled against pin 4
14, 15	**Mixer output** Symmetrical open collector output.
16	**AGC output** Output can be used as current output (pin diodes) or as voltage output (for bipolar and/or field effect transistors).

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Absolute Maximum Ratings
$T_A = 25$ °C

Parameter	Symbol	Limit Values		Unit
	V_{13}	min.	max.	
Supply voltage		– 0.3	13.5	V
Mixer	V_{14}, V_{15}	– 0.3	13.5	V
Reference voltage	V_5	– 0.3	7	V

Currents: all pins are short-circuit protected against ground

Operating Range

Supply voltage	V_{13}	7	12	V
Ambient temperature	T_A	– 25	85	°C

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Characteristics

V_{13} = 8.5 V; T_A = 25 °C

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Current consumption (without mixer)	I_{13}	19	27	33	mA	$I_{13}+I_{14}+I_{15}$
Reference voltage	V_{REF}	3.9	4.1	4.4	V	1
Total gain	Vo	37	39	41	dB	Vo=20log(V_{IF}/EMF1)

Mixer

Intercept point third order	I_{P3}		115		dB/µV	Random sample test
Noise figure	F		11	14	dB	
Mixer gain	V		10		dB	

Oscillator

DC characteristics	V_7, V_8	1.0	1.3	1.5	V	
DC characteristics	V_6	2.4	2.8	3.3	V	
Interference modulation	Δf		2.2		Hz	Random sample test
Output signal 50 Ω	V_9	33	45	78	mV_{rms}	
Output impedance (resistive)	R_9	2.0	2.5	3.0	kΩ	

Control Voltage Generation

Control voltage for pre-stage	V_{16}	0.7		V_{13}–0.3	V	
Output current V_3 = 0 and V_{16} = $V_{12/13}$	$-I_{16}$	25	90	150	µA	
Output current V_3 = 2 V	I_{16}	2	3	5	mA	

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Characteristics (cont'd)
T_A = 25 °C

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Wideband control threshold	$V_{I\,HF\,EMF2}$	8	17	20	mV	$V_{16}=V_{12/13}$

Linear IF Amplifier

Input DC voltage	V_{11}; V_{12}	1	1.2	1.5	V	
Output DC resistance	V_{10}	1.2	4.8	6.0	V	
Input resistance	$R_{11/12}$	240	300	360	Ω	
Input capacitance	$C_{11/12}$		13		pF	Random sample test
Output resistance	R_{10}	240	300	360	Ω	" " "
Output capacitance	C_{10}		3		pF	" " "
Voltage gain	G_V		30		dB	*)
Noise figure with R_G = 300 Ω	F		6.5		dB	

*) $G_V=20\lg \frac{V_{10}}{(V_{11}-V_{12})}$

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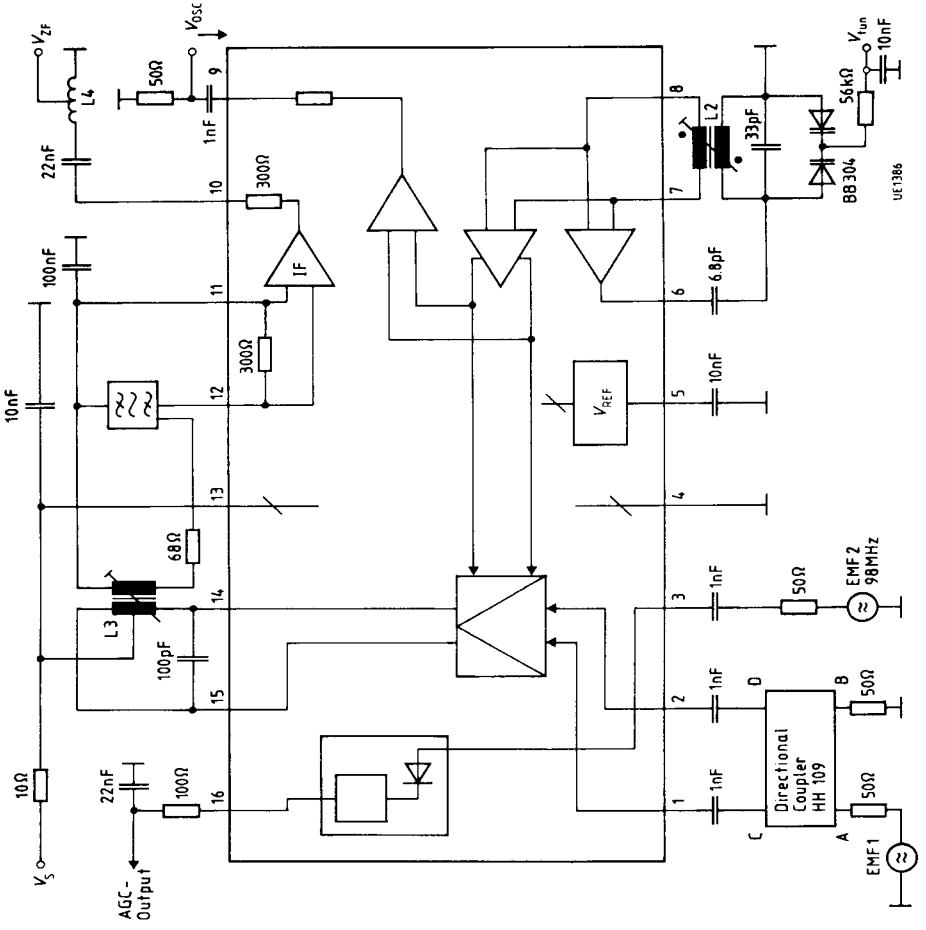
Test Circuit



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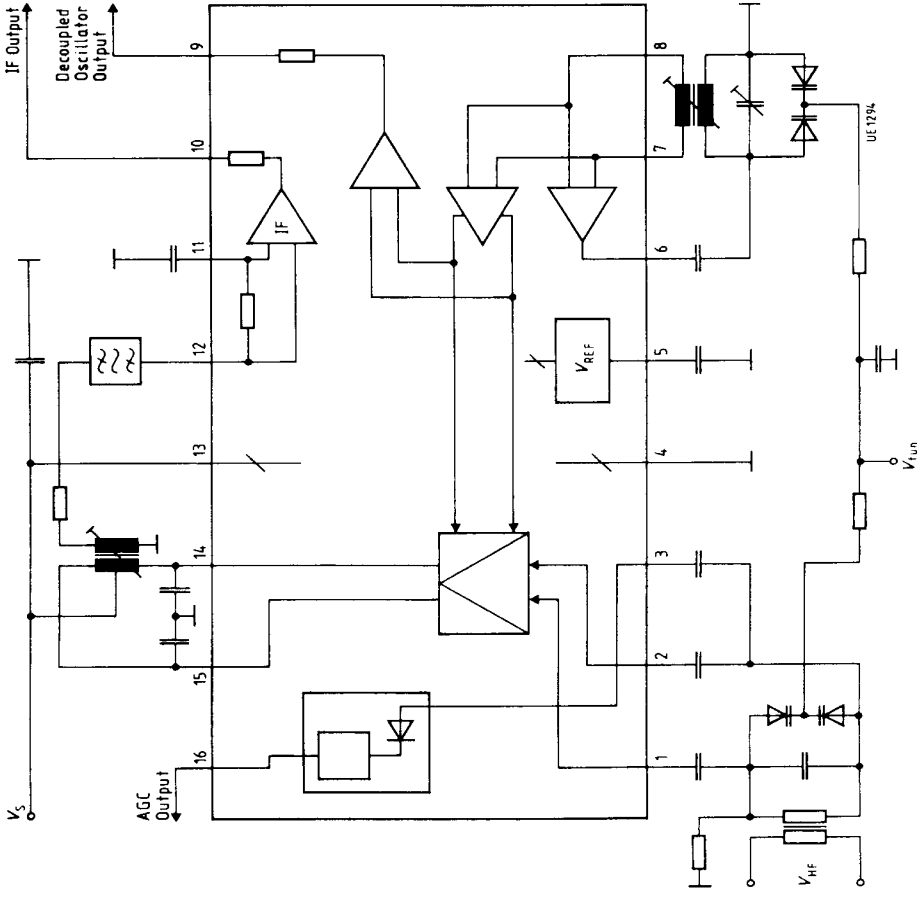
Application Circuit



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