

## Multistandard quasi parallel-sound processor for Mono-TV-Sets

**Technology:** Bipolar

### Features

- High signal sensitivity
- High signal to noise ratio
- Easy alignment of the multistandard filters
- Converter for different intercarrier frequencies
- AF output level matched to SIMAVELEC condition
- Few external components
- Alignment free AM demodulator for standard L
- Standardized SCART interface
- Standard-, SCART- and Mute-switch TTL compatible
- AF attenuator
- ESD protected

**Case:** 20-pin dual inline plastic

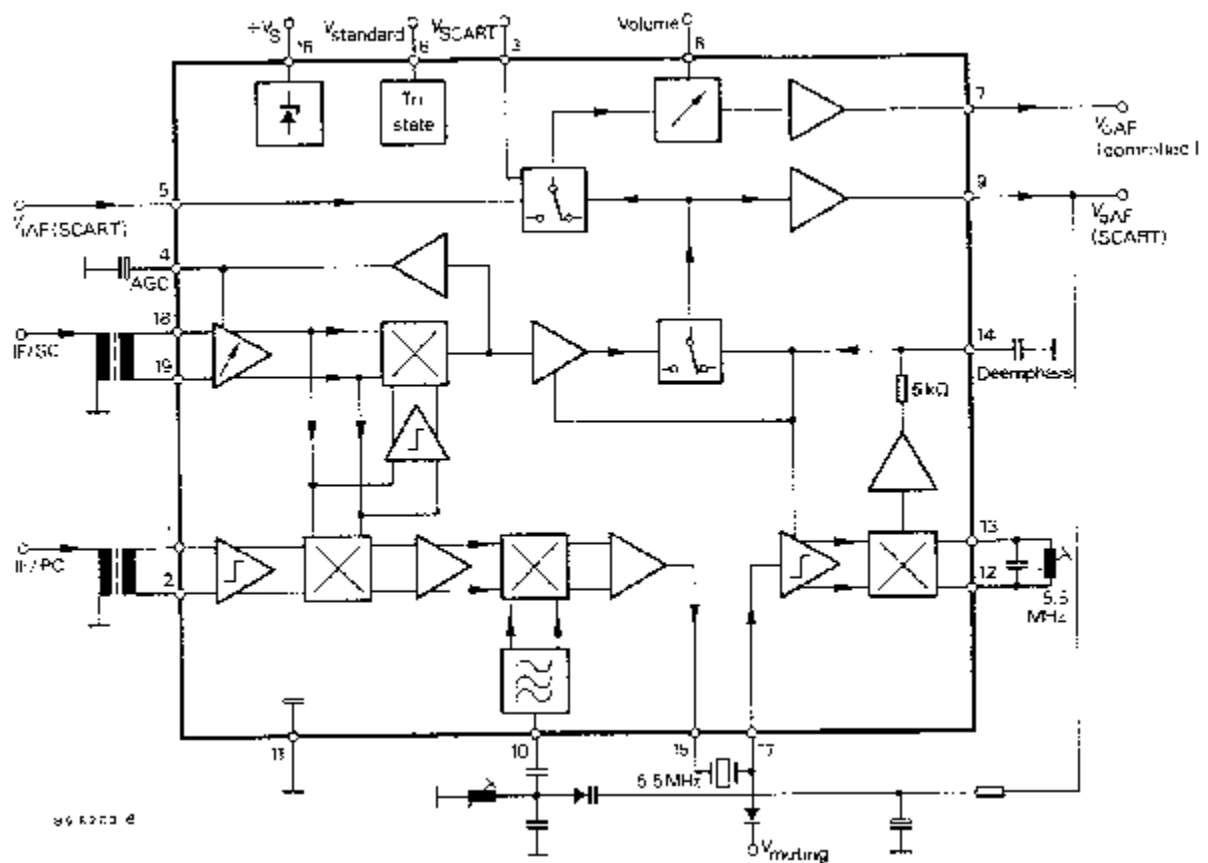


Figure 1 Block diagram

## TDA4481-D

### Pin Configuration

Pin	Function
1–2	Picture-IF-carrier input
3	SCART-switch
4	AGC storage capacitor
5	SCART-AF input
6	Standard switch
7	AF output (controlled)
8	Volume control voltage
9	SCART-AF output
10	VCO tank circuit

Pin	Function
11	Ground
12–13	FM demod. circuit 5.5 MHz
14	FM deemphasis capacitor
15	Intercarrier output 5.5 MHz
16	Supply voltage
17	Intercarrier input 5.5 MHz and muting
18–19	Sound-IF-carrier input
20	not connected

### Description

This circuit configuration permits high-quality processing of audio carriers for all standards, providing separate inputs for the video and audio carriers. The audio carrier signal (FM or AM) is passed to two multiplying mixer arrangements via a 3-stage variable wide-band amplifier with levelled output signals. One mixer demodulates AM and generates the gain control signal. The second mixer operates as an intercarrier demodulator and supplies the intermediate AF carrier.

The video carrier signal required to form the intercarrier is decoupled in a prelimited and selected form from the demodulator tank of the intermediate video frequency circuit (TDA 4453 or TDA 4439) and led to the intercarrier mixer via a limiting amplifier. By virtue of the system, the Nyquist range of the IF input filter in the video channel affects the attainable AF signal-to-noise ratio.

The audio FM IF carrier reaches a quadrature demodulator via an interconnected IF-filter and subsequent limiting amplifier. The resulting AF signal is led via a low-pass

amplifier with increased level and the AF standard switch to the SCART switch. It is available at both AF outputs, regulated (pin 7) and unregulated (pin 9).

Pin 14 is provided to connect a de-emphasis capacitor (10 nF for 50  $\mu$ s). The de-emphasis is effective for both AF outputs during FM operation, but deactivated for AM operation.

A frequency converter is inserted to mix the different possible sound frequency standards (4.5, 6.0, 6.5 MHz) into a uniform intermediate audio frequency, e.g. 5.5 MHz. The VCO frequency (pin 10) can be controlled from the unlevelled AF output at pin 9 or the de-emphasis connection at pin 14.

The intercarrier and converter circuits as well as the FM demodulator are deactivated during AM modulation. FM muting is also possible if a switching voltage is applied to pin 17.

All switching functions (standard, SCART, mute) can take place with TTL-equivalent level.

## Absolute Maximum Ratings

Reference point Pin 11, unless otherwise specified

Parameters	Symbol	Value	Unit
Supply voltage Pin 16	$V_S$	10 ... 13.5	V
Supply current Pin 16	$I_S$	80	mA
External voltages Pin 3,6 Pin 1,2,4,5,7,8,9,12, 13,14,15,16,17,18,19,	$V_{ext}$	$V_5$	V
	$V_{ext}$	6	V
Power dissipation (in soldered position)	$P_{tot}$	1	W
Junction temperature	$T_j$	125	°C
Ambient temperature range	$T_{amb}$	-25 to + 70	°C
Storage temperature range	$T_{stg}$	-25 to +125	°C

## Thermal Resistance

Parameters	Symbol	Value	Unit
Junction ambient	$R_{thJA}$	60	K/W

## Electrical Characteristics

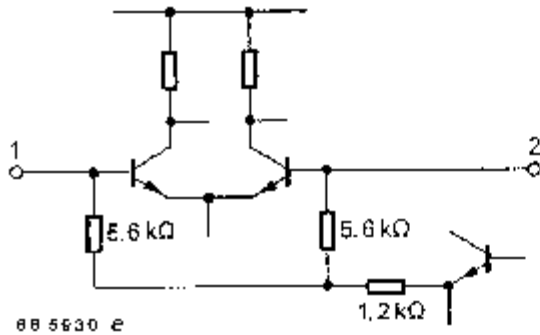
$V_S = 12$  V,  $T_{amb} = 25$ °C, reference point Pin 20 (11), unless otherwise specified

Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Supply voltage range	Pin 16	$V_S$	10		13.5	V
Supply current						
FM-operation	Pin 16	$I_S$	65			mA
AM-operation	Pin 16		55			
Input DC voltage	Pin 5	$V_o$		4.4		V
Output DC voltage	Pin 7,9	$V_o$		3.7		
Standard switching voltage, Pin 6						
	Standard B/G Standard L converter operation	V	1.9 0 3.5	2.3	2.7 1.5 $V_S$	V
Standard switching current	$V_6 \leq 5$ V	I			20	µA
AGC range				65		dB
<b>AM-operation</b>						
Min. sound carrier input voltage	(AF-output voltage Pin 7, 9 -3 dB) Pin 18-19	v		50		µV
Audio output voltage	m = 54 % Pin 7, 9	v		500		mV
Harmonic distortion	f = 32.4 MHz, f <sub>mod</sub> = 1 kHz m = 30 % m = 80 % Pin 7, 9	THD		0.3 1.0	1.0 2.5	%

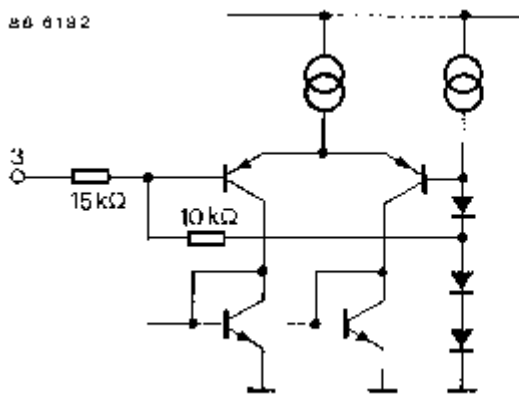
Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
<b>FM-operation</b>						
Min. sound carrier input voltage	(intercarrier voltage -3 dB) Pin 18, 19	v		50		$\mu\text{V}$
Picture carrier input voltage	Pin 1-2	v	10	20	30	mV
Audio output voltage	$f_{\text{PC}} = 38.9 \text{ MHz}$ , Pin 7, 9 $v_{1-2} = 20 \text{ mV}$ , $f_{\text{SC}} = 33.4 \text{ MHz}$ , $v_{18-19} = 10 \text{ mV}$ , FM-deviation = 27 kHz, $f_{\text{mod}} = 1 \text{ kHz}$ , $Q_{\text{B}} = 22$	v		500		mV
Harmonic distortion	$f_{\text{mod}} = 1 \text{ kHz}$ , Pin 7, 9 $Q_{\text{B}} = 22$ FM-deviation = 30 kHz	d		0.5		%
Signal to noise ratio Standard B/G according to CCIR 468 specification	FM-deviation 30 kHz, $f_{\text{mod}} = 1 \text{ kHz}$ Pin 7, 9 Black burst Grid test signal	$\frac{(S+N)}{N}$		62 50		dB <sup>1)</sup>
<b>AF amplifier – SCART-operation</b>						
Volume control range	Pin 7			80		dB
$V_8$ for $V_{\text{AFmin}}$ at Pin 7	Pin 8	$V_8$	0		0.5	V
$V_8$ for $V_{\text{AFmax}}$ at Pin 7	Pin 8	$V_8$	4.5			V
SCART control voltage	Pin 3					
	recording	$V_3$	0		2	V
	playback	$V_3$	4			
SCART input resistance	Pin 5	$R_{\text{S}}$		55		k $\Omega$
AF input voltage	THD $\leq 3\%$ Pin 5	v			2	V
SCART-amplification		G	-1	0	+1	dB
Attenuation	$v_5 = 500 \text{ mV}$ , Pin 7, 9 $V_3 = 0 \text{ V}$	$\alpha_{7,9}$	60	75		dB
Muting on (AF off)	Pin 17	$V_{17}$	0		1	V
Switching current	Pin 17	$I_{17}$		600		$\mu\text{A}$
Muting off	voltage to diode Pin 17	$V_{17}$	4		$V_{\text{S}}$	V
<b>Converter operation</b>						
	Pin 10					
DC at oscillator pin	$V_6 \geq 3.5 \text{ V}$	$V_{10}$		2.7		V
Oscillator frequency range		f	9		13	MHz <sup>2)</sup>
Oscillator amplitude		v		400		mV <sup>2)</sup>
Operation quality factor of external oscillator stage		$Q_{\text{B}}$	70			

1) Standard B/G IF-modulated-FBAS-signal

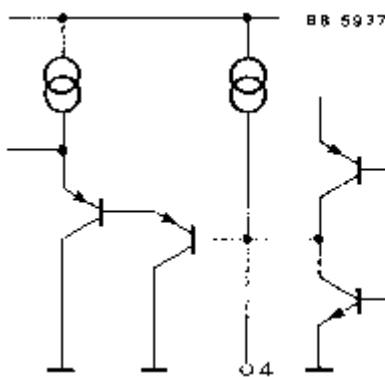
2) See application circuit



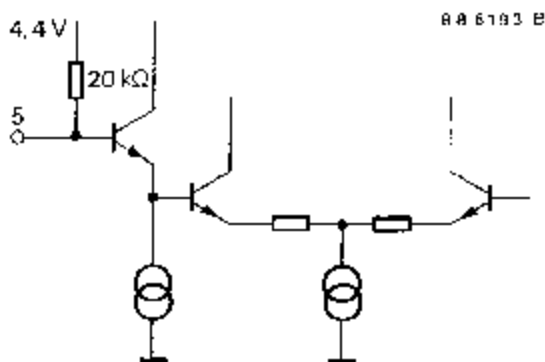
Pin 1,2  
IF-input  
vision carrier



Pin 3  
SCAR1 switch



Pin 4  
AGC storage capacitor



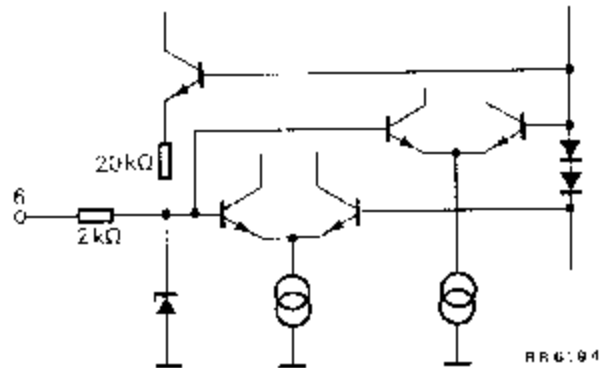
Pin 5  
AI-input (SCAR1)

# TDA4481-D

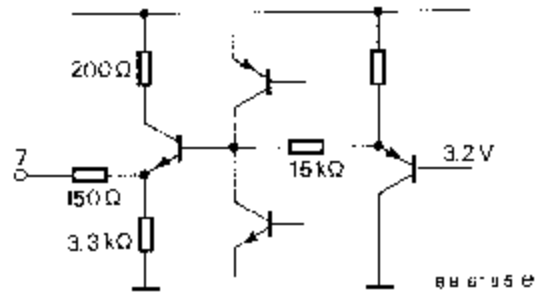
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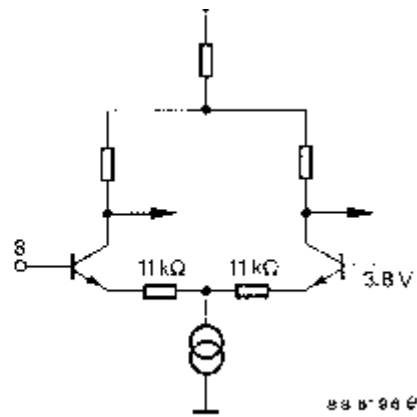
Pin 6  
Standard switch



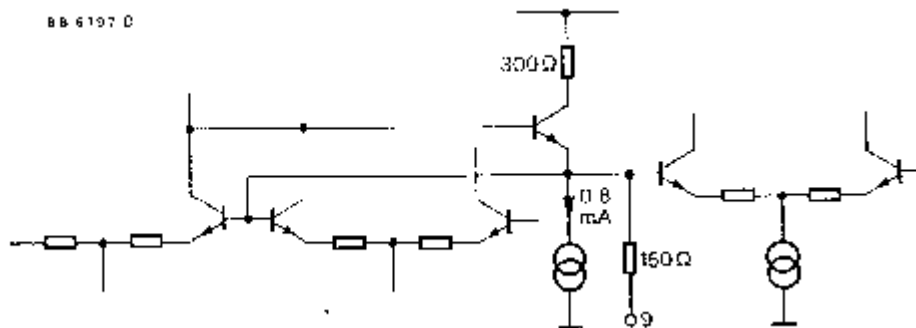
Pin 7  
AF-input  
controlled



Pin 8  
Volume control



Pin 9  
AF-output  
uncontrolled



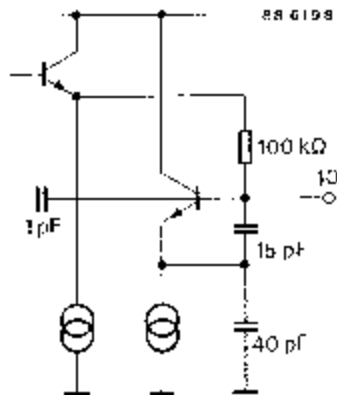


Fig. 10  
VCO tank circuit

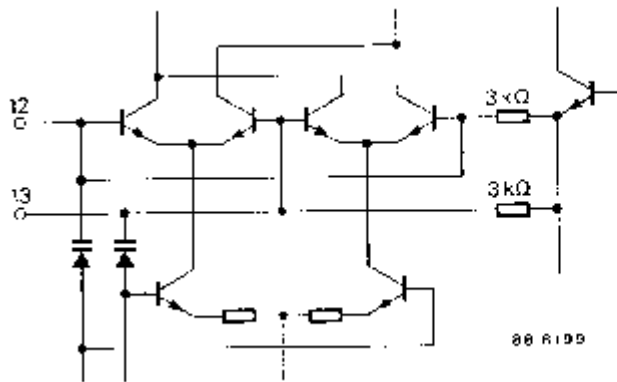


Fig. 12, 13  
Demodulator tank circuit

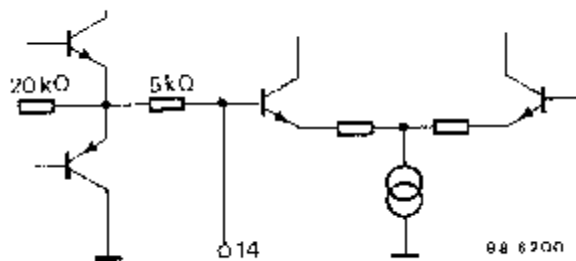


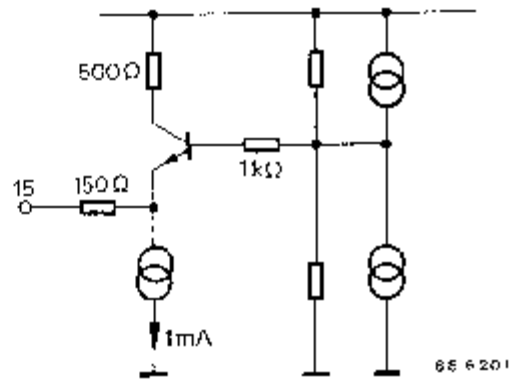
Fig. 14  
Geomphasis capacitor

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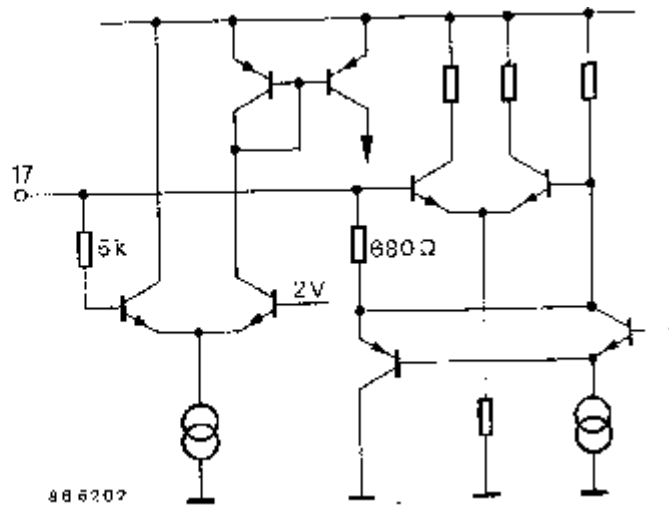
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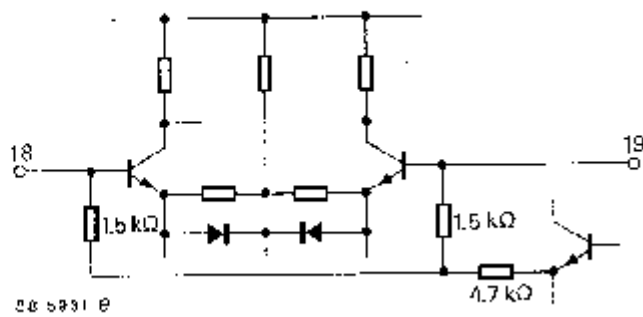
Pin 15  
Intercarrier output  
5.5 MHz



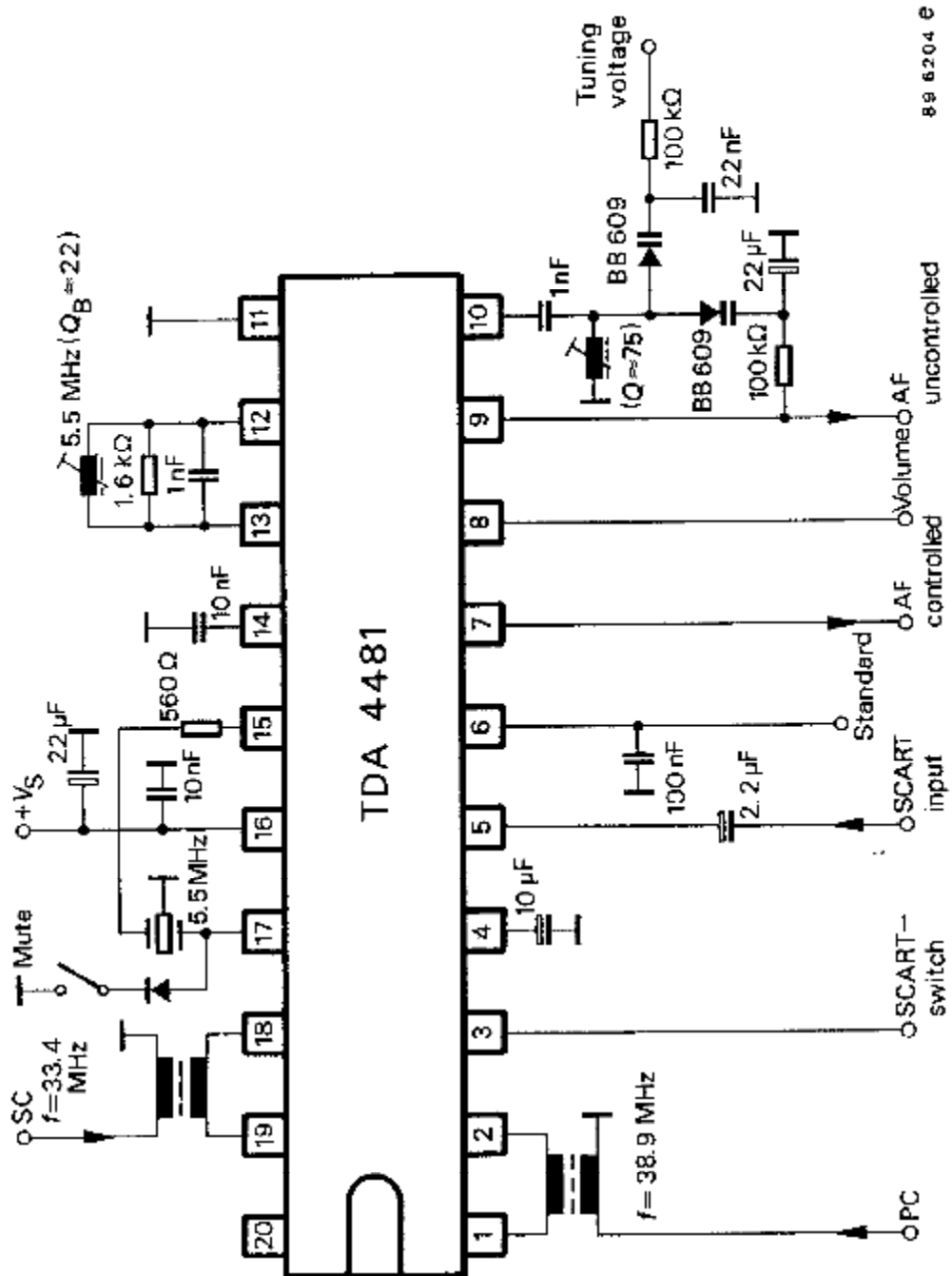
Pin 17  
Intercarrier input  
5.5 MHz



Pin 18,19  
IF-input  
sound carrier







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Figure 2 Test circuit

## TDA4481-D

### Dimensions in mm

Package: DIP 20

