SIEMENS

Multistandard AM FM Sound IF IC

TDA 2460-2

Preliminary Data

Bipolar IC

Controlled AM IF amplifier including a quasi-synchronous demodulator and integral mean value control for French sound IF, limiter amplifier with FM demodulator, AF part with SCART input and output, volume control and AF output.

Features

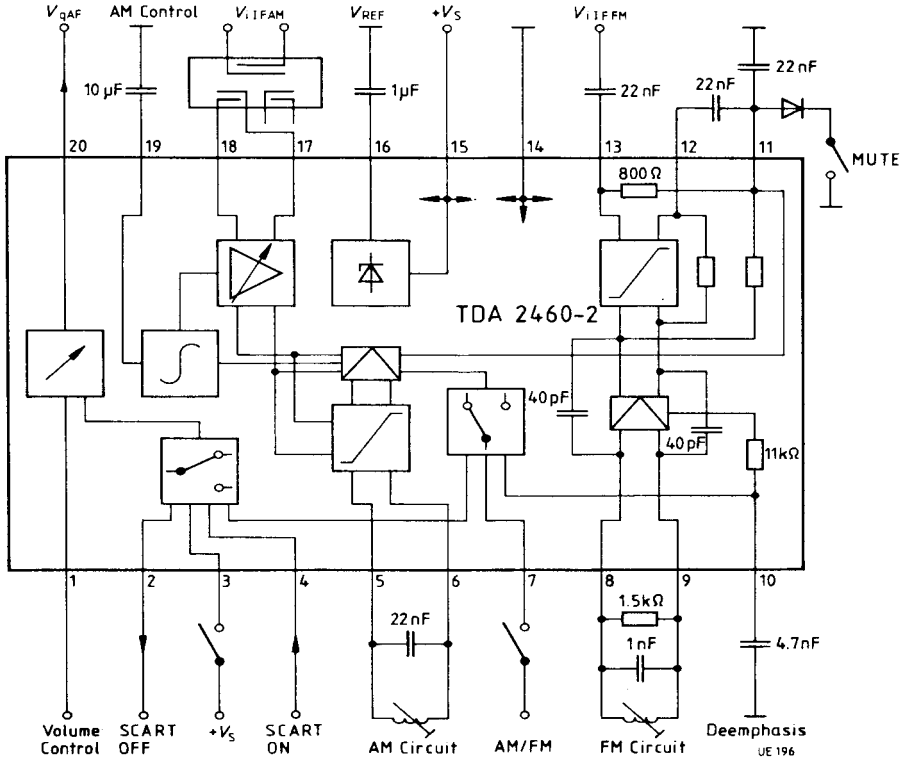
- Switch-over mode to CCIR standard for B/G and L systems
- Integral control for AF sound
- Standardized SCART interface
- High AM and FM sensitivity
- Low distortion factor

Type	Ordering Code	Package
TDA 2460-2	Q67000-A8200	P-DIP-20

Circuit Description

The component contains a four-stage, capacitatively coupled control amplifier, a quasi-synchronous demodulator, an integral mean value control voltage generator and an AF pre-amplifier according to the French sound IF standard. The FM section contains an eight-stage symmetrical limiter amplifier with a coincidence modulator and an AF pre-amplifier with connection for the deemphasis capacitor. The two AF sources are routed to the volume control via an analog switch of the SCART socket and a record/playback switch.

Block Diagram



Pin Definitions and Functions

Pin No.	Function
1	Volume control adjustment voltage for AF output
2	SCART AF output
3	SCART recording/playback switch
4	SCART AF input
5	Demodulator circuit AM
6	Demodulator circuit AM
7	AM/FM bidirectional switch
8	Demodulator circuit FM
9	Demodulator circuit FM
10	Deemphasis FM
11	Operation point feedback input FM and muting
12	Operation point feedback FM
13	AF input FM
14	GND
15	Supply voltage
16	Reference voltage
17	IF input AM
18	IF input AM
19	Control time constant AM amplifier
20	AF output

Maximum Ratings

Parameter	Symbol	Limit Values	Unit
Supply voltage	V_S	16	V
Control voltage	V_{19}	4	V
Reference current	I_{REF}	2	mA
DC voltages	$V_{3,4,7,10}$ $V_{17,18,1}$ $V_{11,12,13}$ $V_{5,6}$	V_S V_S V_{REF} V_{REF} to V_S	V V V V
DC currents	$I_{2,20}$ $I_{8,9}$	– 1 to 2 2	mA mA
IF input voltage AM m = 80%	$V_{I\,17/18\,rms}$	300	mV
IF input voltage FM	$V_{I\,13\,rms}$	600	mV
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	– 55 to 125	°C
Thermal resistance (system-air)	$R_{th\,SA}$	58	K/W

Operating Range

Supply voltage	V_S	10.5 to 15.75	V
Frequency range AM	f_{AM}	15 to 45	MHz
Frequency range FM	f_{FM}	0.1 to 12	MHz
Ambient temperature	T_A	0 to 70	°C

Characteristics

V_S = 12 V; T_A = 25 °C

Parameter	Symbol	Limit Values			Unit
		min.	typ.	max.	
Current consumption	I_S	48	61	75	mA
Supply voltage	V_{15}	10.5		15.5	V

AM Section

f_{IF} = 39.2 MHz; f_{mod} = 1 kHz

Input voltage for AGC threshold m = 80%; V_2 (at $V_{17/18}$ = 1mV) – 3 dB	$V_{I\,17/18}$		40	80	µV
AGC range m = 80%; V_2 (at $V_{17/18}$ = 1 mV) ± 3 dB	ΔG	60	66		dB
Output voltage (SCART) V_{IIF} = 1 mV; m = 80%	$V_{Q\,2\,rms}$	700	800	900	mV
Controlled AF output voltage V_1 = 0.8 V_{REF}; V_{IIF} = 1 mV; m = 80%	$V_{Q\,20\,rms}$	650	800	950	mV
DC voltage V_{IIF} = 1 mV; m = 0	$V_{Q\,2}$ $V_{Q\,20}$	3.5 5	4.0 6	4.5 7	V V
Total harmonic distortion V_{IIF} = 1 mV; V_1 = 0.8 V_{REF}; m = 30% m = 80%	 THD_2 THD_{20} THD_2 THD_{20}		 0.3 0.3 1 1	 1 1 2.5 2.5	 % % % %

Characteristics (cont,d)
V_S = 12 V; T_A = 25 °C

Parameter	Symbol	Limit Values			Unit
		min.	typ.	max.	
FM Section f_{IIF} = 5.5 MHz; f_{mod} = 1 kHz					
Input voltage for limiter threshold (V_{Q2} = – 3 dB) Δf = ± 50 kHz	$V_{I13\,rms}$		40	80	µV
Output voltage (SCART) Δf = ± 50 kHz; V_{IIF} = 10 mV	$V_{Q2\,rms}$	850	1200		mV
Controlled AF output voltage V_I = 0.8 V_{REF}	$V_{Q20\,rms}$	850	1200		mV
DC voltage portion V_{IIF} = 10 MV; Δf = 0; THD_{min}	V_{Q2} V_{Q20}	3.6 5	4.1 6	4.6 7	V V
Total harmonic distortion Δf = ±12.5 kHz; V_{IIF} = 10 mV	THD_2		0.2	0.3	%
Total harmonic distortion controlled AF output V_I = 0.8 V_{REF}	THD_{20}		0.2	0.3	%
AM suppression V_{IIF} = 500 µV; m = 30%	α_{AM}	60	70		dB

Characteristics
V_S = 12 V; T_A = 25 °C

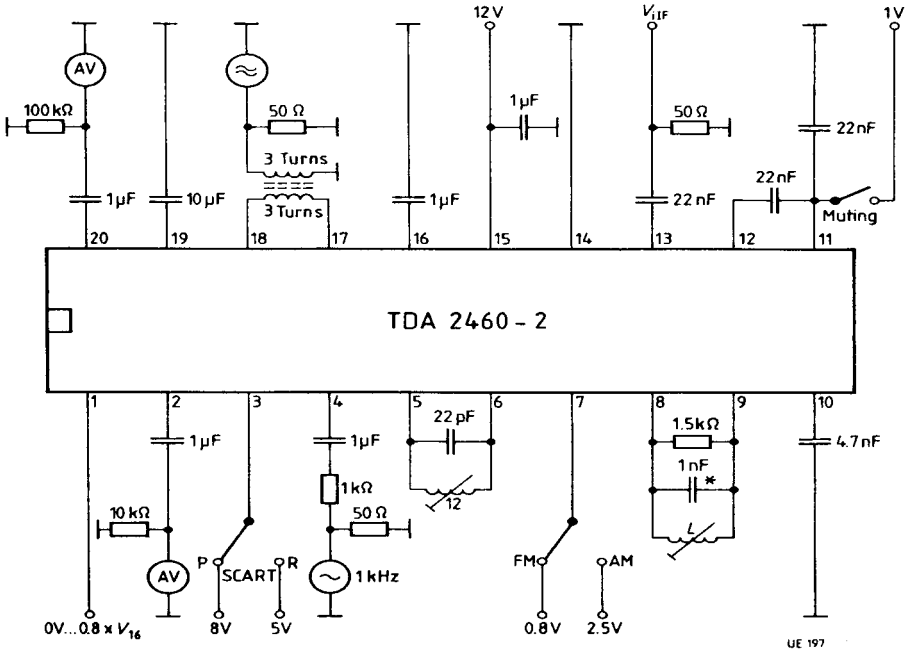
Parameter	Symbol	Limit Values			Unit
		min.	typ.	max.	
AF Section					
AGC range for volume control V_1 = 0 V. . .0.8 V_{REF}	ΔG	80	85		dB
Gain SCART input/AF output V_1 = 0.8 V_{REF}	$V_{4\text{-}20}$	– 1	0	1.5	dB
Input voltage SCART	$V_{I\,14\,rms}$	2			V
Switching voltage SCART Playback Record	 V_3 V_3	 8 0		 V_S 5	 V V
Switching voltage muting ON (AF off) OFF	 V_{11} V_{11}	 0 5		 1 V_S	 V V
Switching voltage FM AM	V_7 V_7	0 2.5		0.8 6	V V

Characteristics

V_S = 12 V; T_A = 25 °C

Parameter	Symbol	Limit Values			Unit
		min.	typ.	max.	
Design-Related Values					
Input resistance	$R_{I\,8,9}$	22			kΩ
Output resistance	$R_{O\,2,20}$			200	Ω
Input impedance	$Z_{11,13}$		800		Ω
Frequency deviation AM$_{min}$ / THD_{min} f_{FM} section			± 10		kHz
Input resistance	$R_{17/18}$		1.8		kΩ
Output resistance	$R_{5/6}$		6.6		kΩ
Input resistance	R_4	20			kΩ
Input current	I_1			15	µA
Cross-talk rejection V_3 = 5 V; $V_{4\,rms}$ = 2 V	$\alpha_{4\text{-}20}$	60			dB
Control current ratio for high speed load circuit/integral	Δi_{19}		140		
Switching Currents					
SCART record	I_{3L}	– 1		0	µA
SCART playback V_3 = 8 V	I_{3H}	30		150	µA
MUTE OFF ON	I_{11H} I_{11L}	– 1 3		0 50	µA
AF/FM switch FM AM (V_7 = 5 V)	I_{7L} I_{7H}	– 1 80		0 250	µA

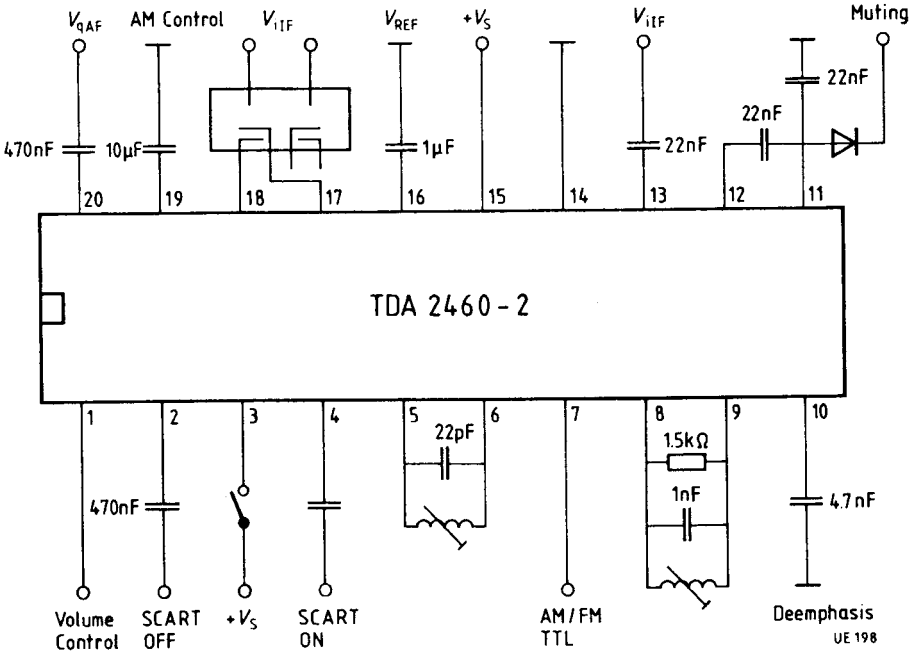
Test and Measurement Circuit



L = 10 Turns 0.2 CuL; Q_B approx. 25
e.g. Coil Assembly Vogt 5171200000

* STYROFLEX Capacitor
AV = Audio Voltmeter

Application Circuit



Simplified External Circuitry for the TDA 2460 Demodulator Circuit

The TDA 2460 AM (double side-band) demodulator circuit allows simplified external circuitry.

The new sound demodulator circuit, developed for application in television L standard and multistandard sets, provides the user with the following advantages:

Cost savings by not requiring the carrier select circuit (L, C) and the necessary tuning (time).

The circuit that is part of the carrier generation circuit becomes unnecessary because of the excellent capture ratio features of the limiter.

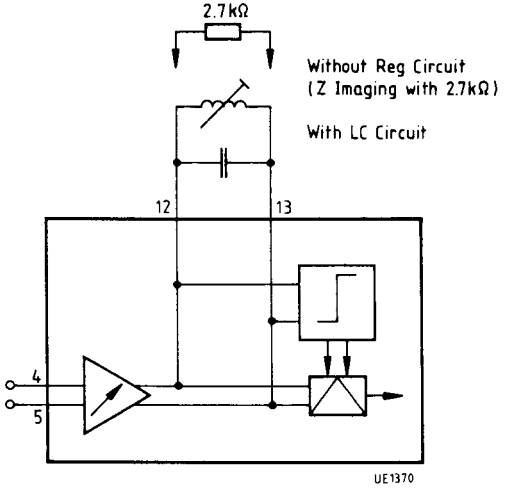
Capture ratio defines the ability of a limiter amplifier to distinguish a useable signal from an interference signal with a lower amplitude.

In this specific section, the modulation side-bands represent the interference signal and the carrier the useable signal (desired switching carrier).

Even with a 100% modulation (France 80%) the distance from the side-bands to the carrier is 6 dB.

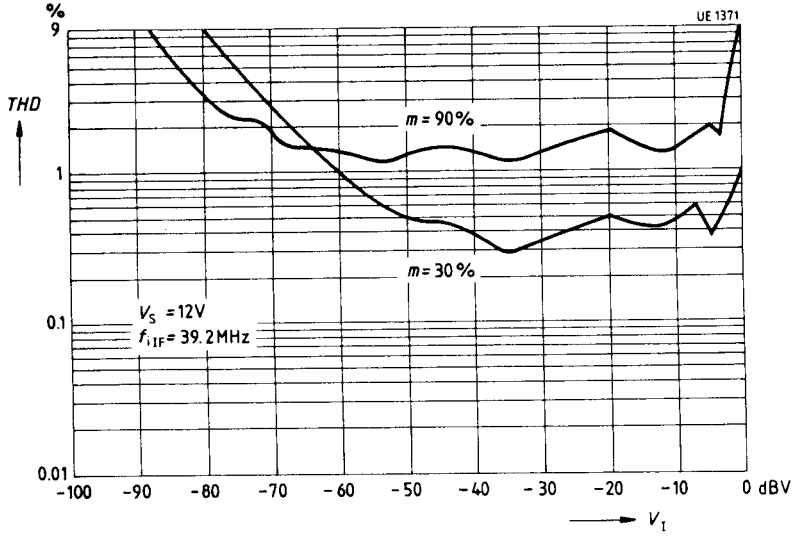
The system guarantees secure function. This is also shown by measurements with respect to:
harmonic distortion
noise
signal/noise ratio
in a comparison with/without regenerative circuit. Only the control threshold shifts by 2 dB.

AM Demodulator Circuit



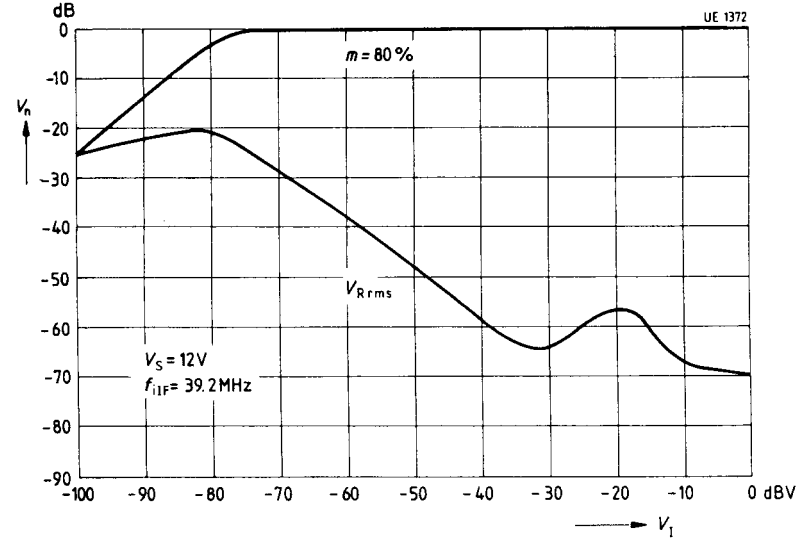
Circuit with LC Circuit

Total harmonic Distortion versus Input voltage
Standard Circuit



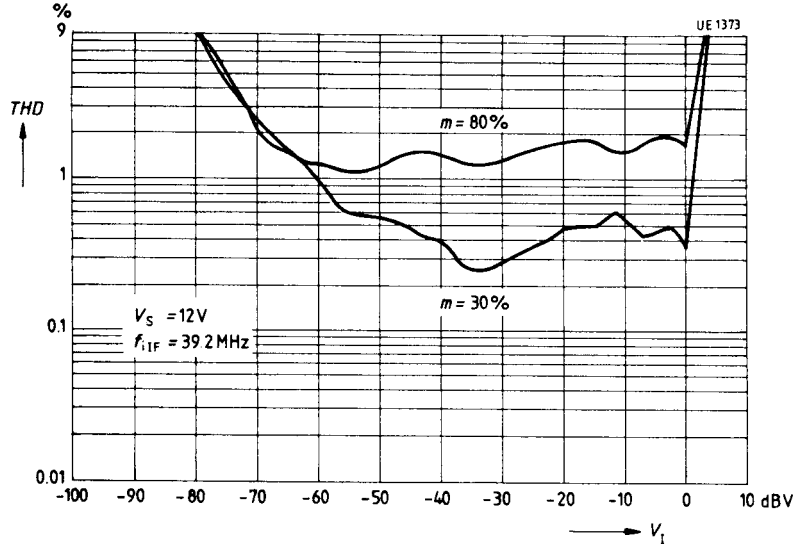
Sensitivity

Noise voltage versus input voltage
Standard circuit



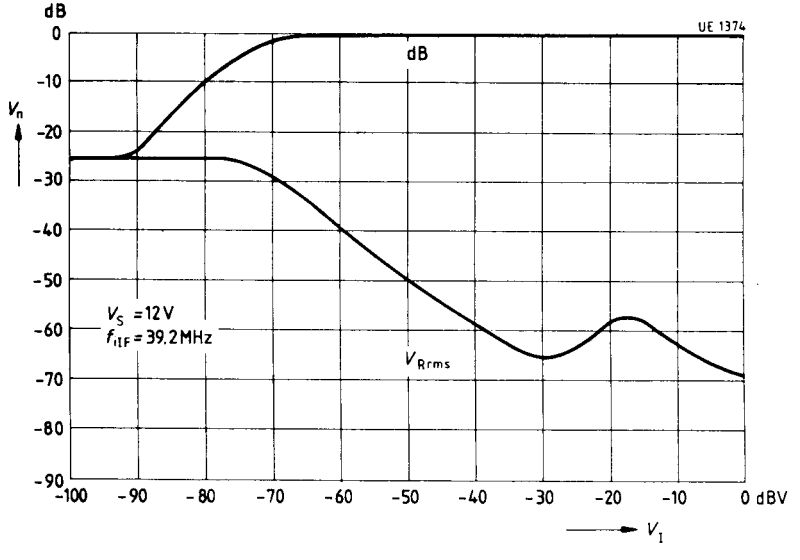
Circuit with R = 2.7 kΩ

Total harmonic distortion versus input voltage
Standard circuit



Sensitivity

Noise voltage versus input voltage
Standard circuit



Circuit with R = 2.7 kΩ

Total harmonic distortion versus input voltage

