The TDA2540 is an i.f. amplifier and demodulator circuit for colour and black and white television receivers using n-p-n tuners.
It incorporates the following functions:

- gain-controlled wide-band amplifier, providing complete i.f. gain
- synchronous demodulator
- white spot inverter
- video preamplifier with noise protection
- a.f.c. circuit which can be switched on/off by a d.c. level, e.g. during tuning
- a.g.c. circuit with noise gating
- tuner a.g.c. output (n-p-n tuners)
- VCR switch, which switches off the video output; e.g. for insertion of a VCR playback signal

QUICK REFERENCE DATA

Supply voltage	V_{11-13}	typ.	12 V
Supply current	I_{11}	typ.	50 mA
I.F. input voltage at f = 38.9 MHz (r.m.s. value)	$V_{1-16\ (rms)}$	typ.	100 μV
Video output voltage (white at 10% of top sync)	$V_{12(p-p)}$	typ.	2.7 V
I.F. voltage gain control range	G_v	typ.	64 dB
Signal-to-noise ratio at V_i = 10 mV	S/N	typ.	58 dB
A.F.C. output voltage swing for Δf = 100 kHz	ΔV_{5-13}	typ.	10 V

PACKAGE OUTLINES

TDA2540 : 16-lead DIL; plastic (SOT-38).
TDA2540Q: 16-lead QIL; plastic (SOT-58).

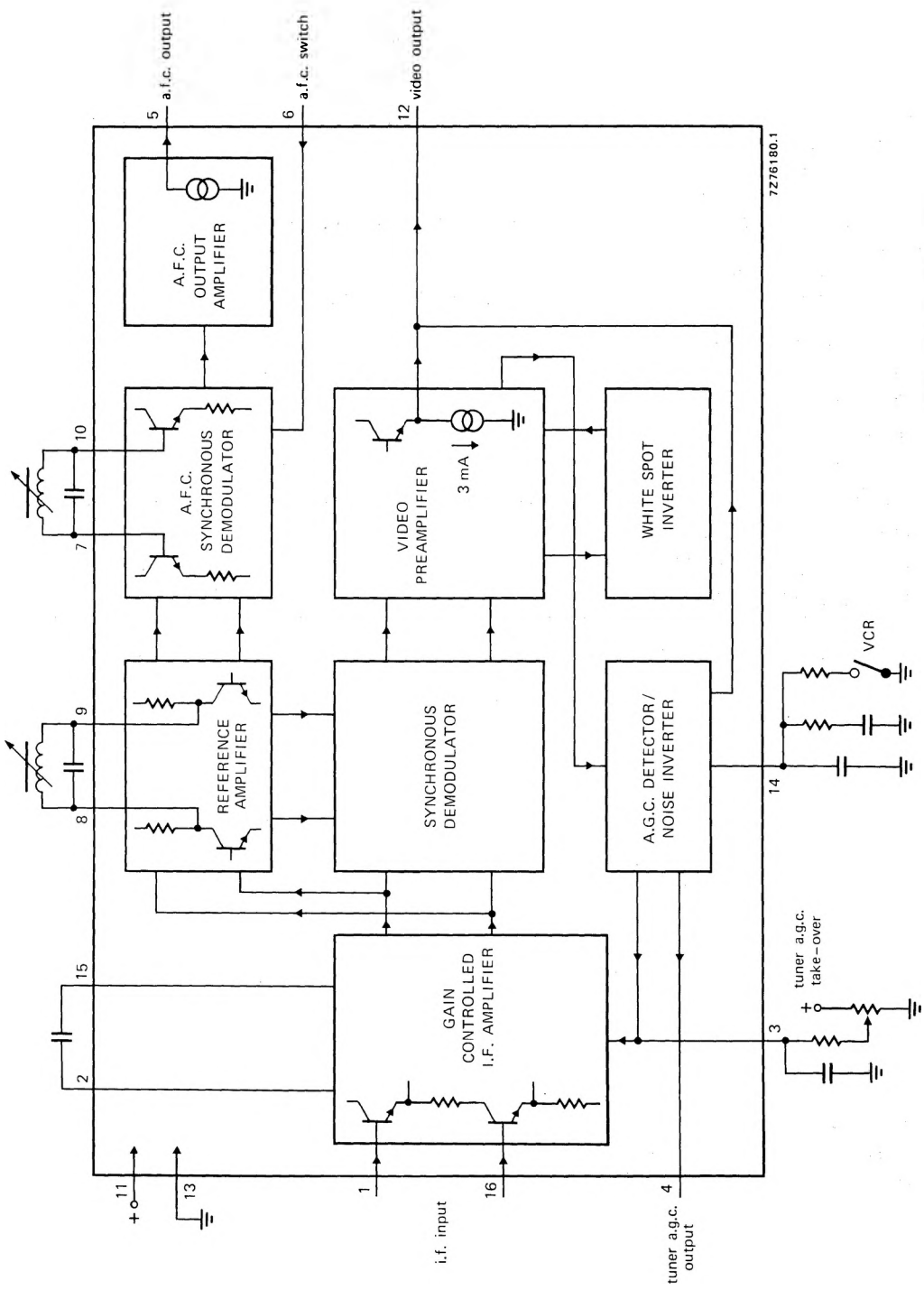


Fig. 1 Block diagram.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Supply voltage	V_{11-13}	max.	13.2 V
Tuner a.g.c. voltage	V_{4-13}	max.	12 V
Total power dissipation	P_{tot}	max.	900 mW
Storage temperature	T_{stg}		−55 to + 125 °C
Operating ambient temperature	T_{amb}		−25 to + 60 °C

CHARACTERISTICS (measured in Fig. 5)

Supply voltage range	V_{11-13}	typ.	12 V
			10.2 to 13.2 V

The following characteristics are measured at T_{amb} = 25 °C; V_{11-13} = 12 V; f = 38.9 MHz

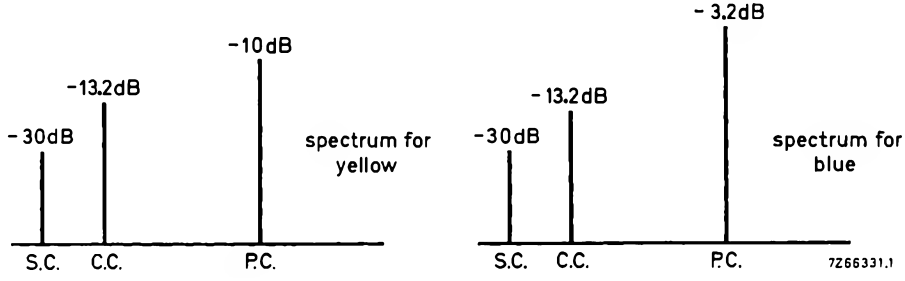
I.F. input voltage for onset of a.g.c. (r.m.s. value)	$V_{1-16(rms)}$	typ.	100 μV
		<	150 μV
Differential input impedance	$\lvert Z_{1-16} \rvert$	typ.	2 kΩ in parallel with 2 pF
Zero-signal output level	V_{12-13}	typ.	6 ± 0.3 V*
Top sync output level	V_{12-13}	typ.	3.07 V
			2.9 to 3.2 V
I.F. voltage gain control range	G_v	typ.	64 dB
Bandwidth of video amplifier (3 dB)	B	typ.	6 MHz
Signal-to-noise ratio at V_i = 10 mV	S/N	typ.	58 dB**
Differential gain	dG	typ.	4 %
		<	10 %
Differential phase	dφ	typ.	2°
		<	10°

* So-called 'projected zero point', e.g. with switched demodulator.

** $S/N = \frac{V_o \text{ black-to-white}}{V_{n(rms)} \text{ at } B = 5 \text{ MHz}}$.

CHARACTERISTICS (continued)

Intermodulation at 1.1 MHz: blue*	>	46 dB
	typ.	60 dB
yellow*	>	46 dB
	typ.	50 dB
at 3.3 MHz**	>	46 dB
	typ.	54 dB



S.C.: sound carrier level
C.C.: chrominance carrier level
P.C.: picture carrier level
} with respect to top sync level

Fig. 2 Input conditions for intermodulation measurements; standard colour bar with 75% contrast.

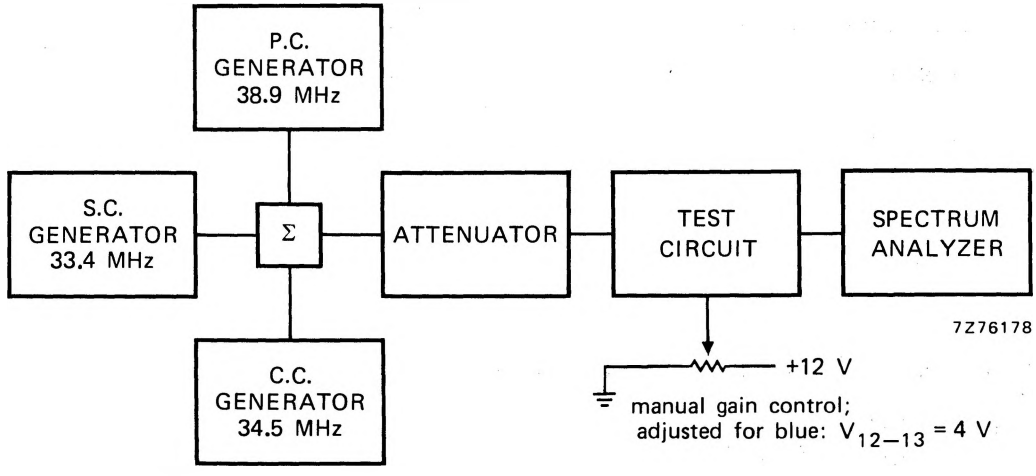


Fig. 3 Test set-up for intermodulation.

* $20 \log \frac{V_o \text{ at } 4.4 \text{ MHz}}{V_o \text{ at } 1.1 \text{ MHz}} + 3.6$ dB. ** $20 \log \frac{V_o \text{ at } 4.4 \text{ MHz}}{V_o \text{ at } 3.3 \text{ MHz}}$.

Carrier signal at video output		typ. <	4 mV 30 mV
2nd harmonic of carrier at video output		typ. <	20 mV 30 mV
White spot inverter threshold level (Fig. 4)		typ.	6.6 V
White spot insertion level (Fig. 4)		typ.	4.7 V
Noise inverter threshold level (Fig. 4)		typ.	1.8 V
Noise insertion level (Fig. 4)		typ.	3.8 V
External video switch (VCR) switches off the output at:	V_{14-13}	<	1.1 V

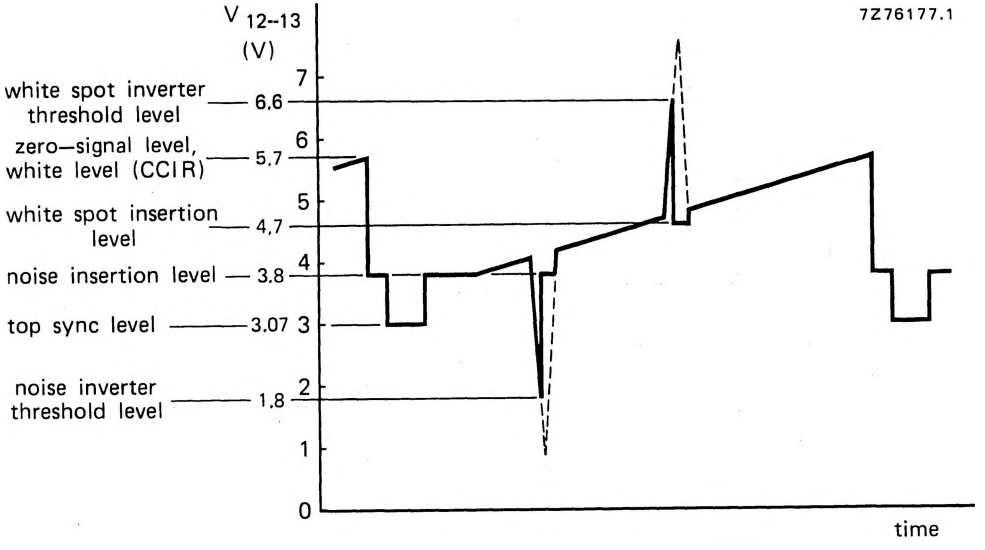


Fig. 4 Video output waveform showing white spot and noise inverter threshold levels.

Tuner a.g.c. output current range	I_4		10 to 0 mA
Tuner a.g.c. output voltage at I_4 = 10 mA	V_{4-13}	<	0.3 V
Tuner a.g.c. output leakage current V_{14-13} = 5 V; V_{4-13} = 12 V	I_4	<	15 μA
Maximum a.f.c. output voltage swing	ΔV_{5-13}	> typ.	10 V 11 V
Detuning for a.f.c. output voltage swing of 10 V	Δf	typ. <	100 kHz 200 kHz
A.F.C. zero-signal output voltage (minimum gain)	V_{5-13}	typ.	6 V 4 to 8 V
A.F.C. switches on at:	V_{6-13}	>	3.2 V
A.F.C. switches off at:	V_{6-13}	<	1.5 V

APPLICATION INFORMATION

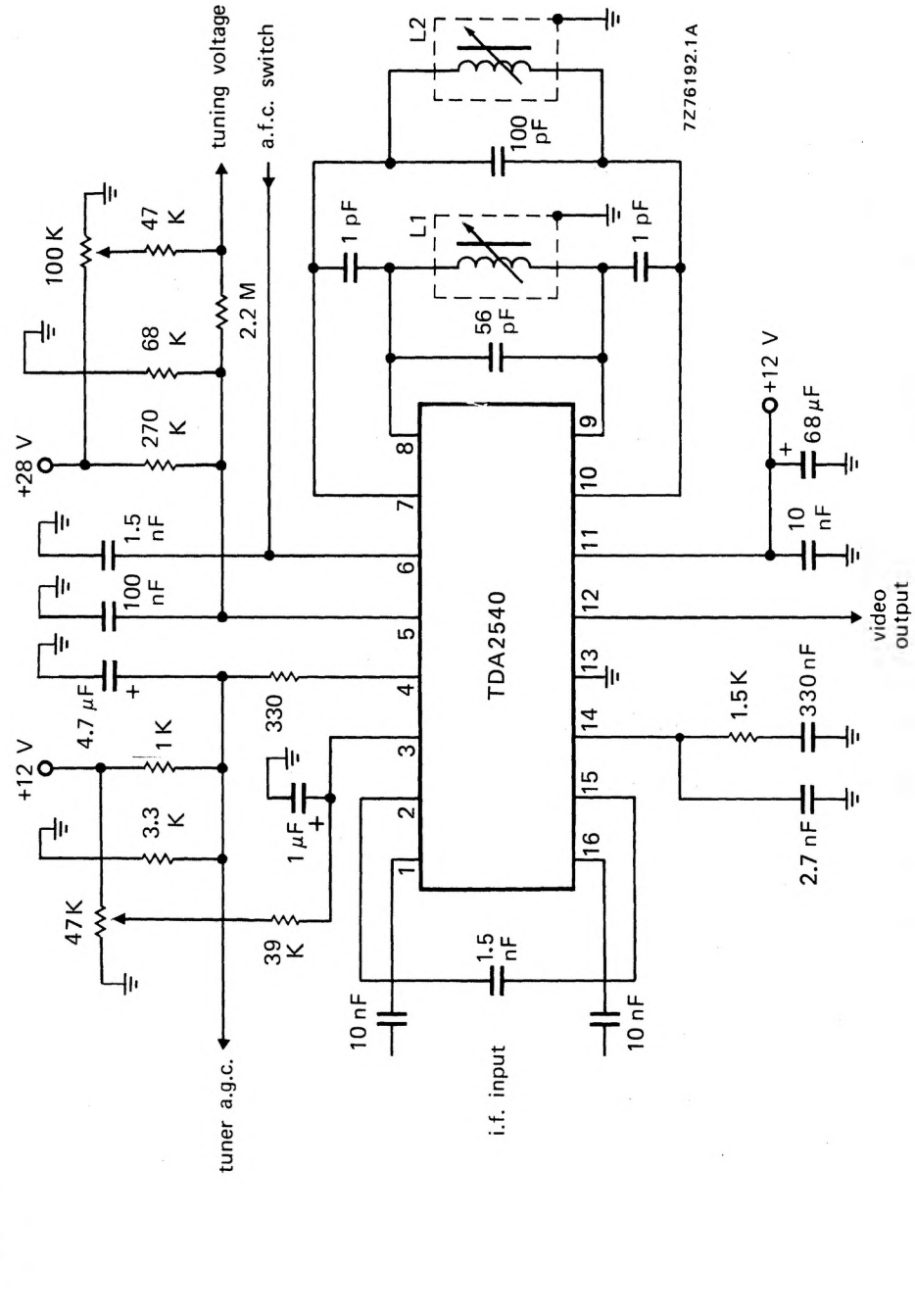
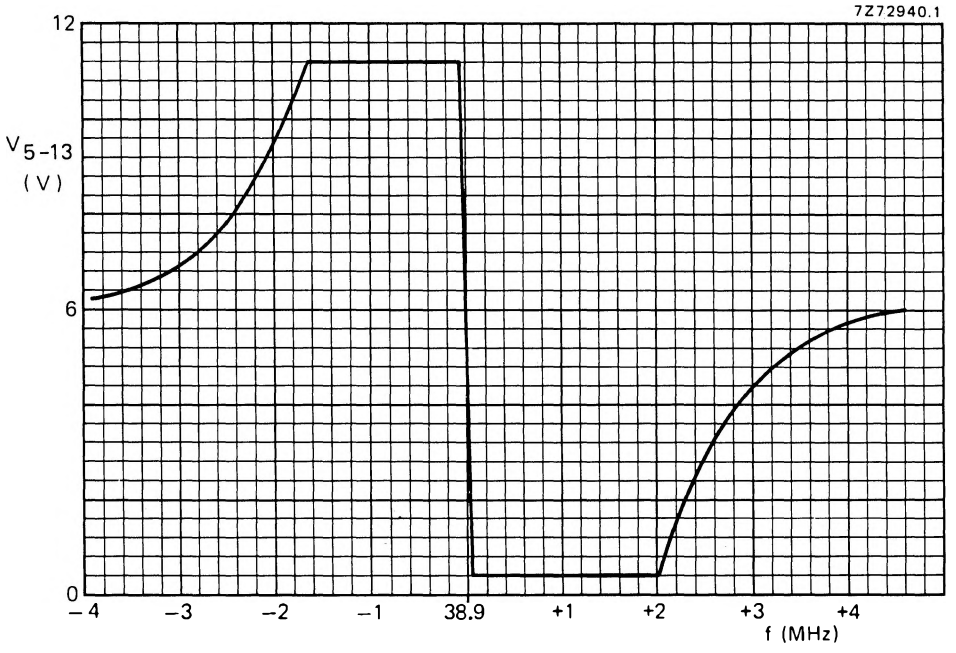


Fig. 5 Typical application circuit diagram; Q of L1 and L2 ≈ 80; f = 38,9 MHz.



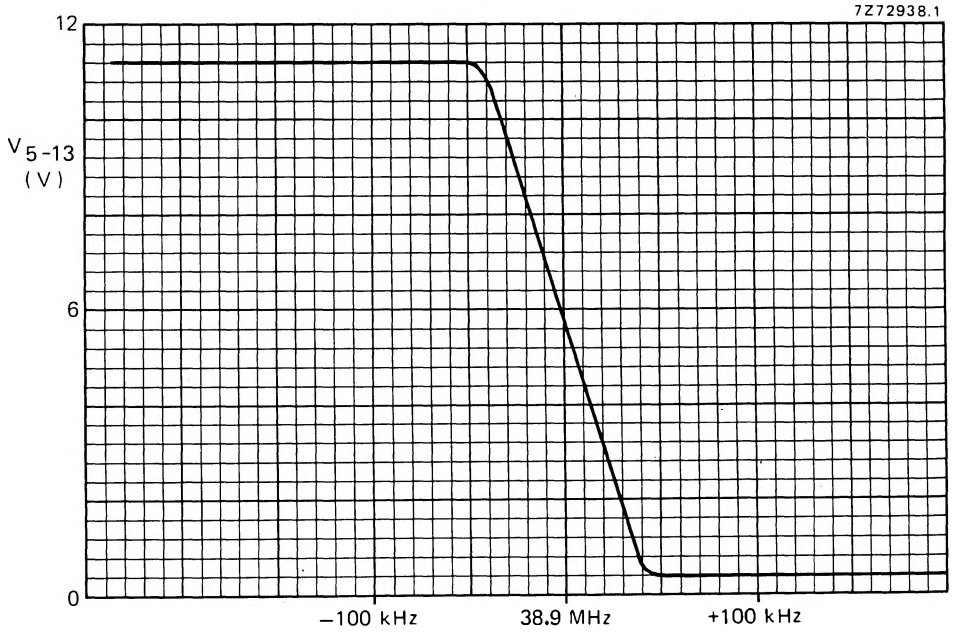


Fig. 6 A.F.C. output voltage (V_{5-13}) as a function of the frequency.

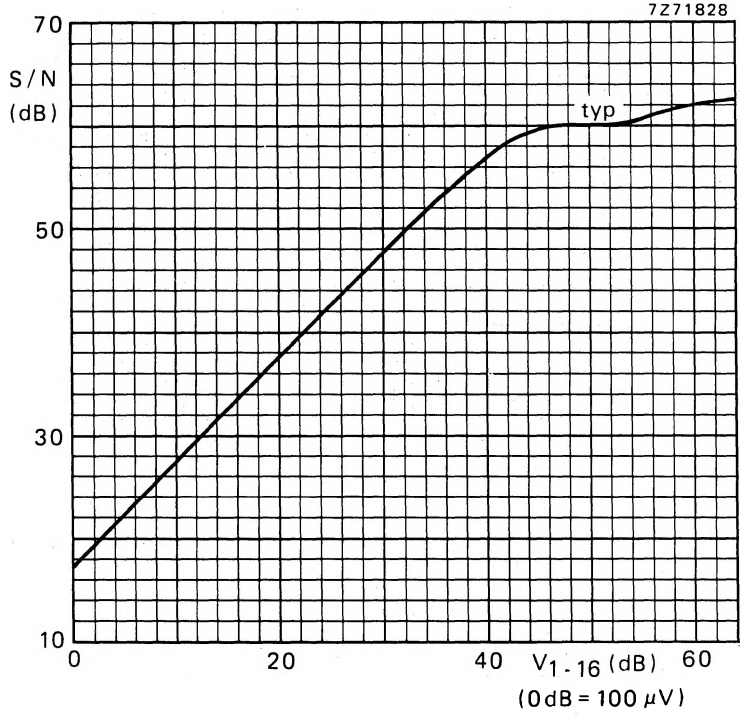


Fig. 7 Signal-to-noise ratio as a function of the input voltage (V_{1-16}).