

## Video IF IC with VTR Connection and Quasi-Parallel Sound

**TDA 5830-2**

**Bipolar IC**

### Video IF Section

Controlled AM broadband amplifier with synchronous demodulator, video amplifier, VTR input and output, and AGC voltage generation for the video IF amplifier and tuner.

### Quasi-Parallel Sound Section

Controlled AM broadband amplifier with quadrature demodulator, sound carrier output, and internal AGC voltage generation.

The TDA 5830-2 is especially suitable for application with black and white or color television receivers and/or VTR systems with PNP/MOS tuners for TV standards with negative video modulation and FM sound.

Type	Ordering Code	Package
TDA 5830-2	Q67000-A2504	P-DIP-22

### Circuit Description

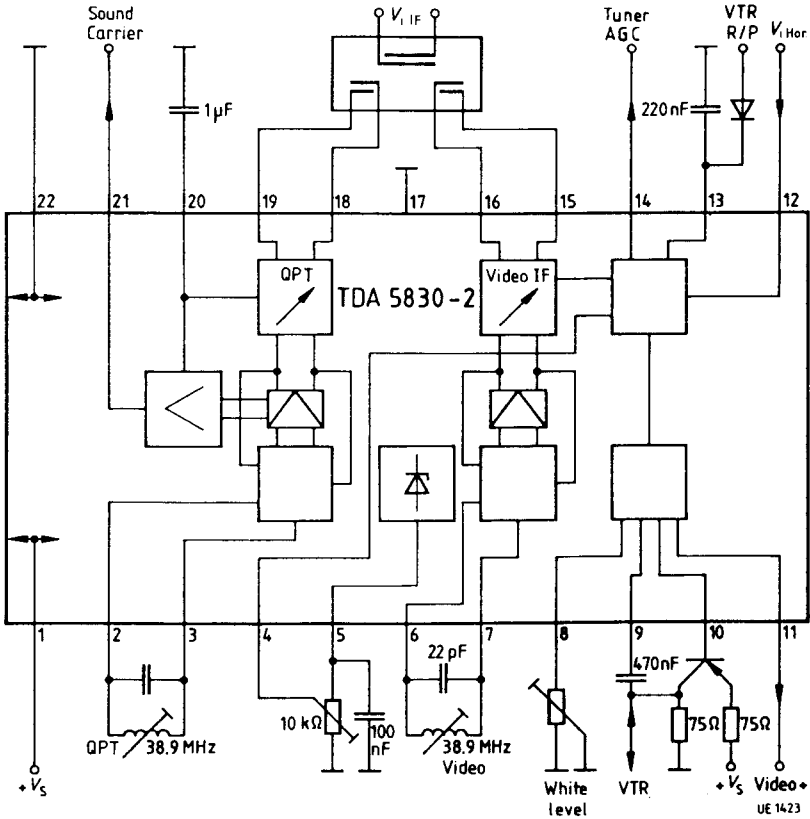
The video IF section is comprised of a 4-stage controllable AM amplifier, a limiter, and a mixer for the synchronous demodulation of video signals as well as an amplifier for the positive video output signal.

The positive video signal is used for gated control. In addition, the IC includes a standard VTR connection via an external transistor. The delayed tuner AGC is generated by a threshold amplifier driven by the control voltage.

The quasi-parallel sound section also includes a 4-stage AM amplifier, a limiter, and a mixer for the quadrature demodulation of the 1st sound IF with subsequent sound carrier output for the 2nd sound IF. The control voltage is generated by a peak value rectifier from the 1st sound IF signal.



Block Diagram



**Pin Functions**

<b>Pin No.</b>	<b>Function</b>
1	Supply voltage
2	Demodulator tank circuit QPS
3	Demodulator tank circuit QPS
4	Tuner AGC threshold
5	Reference voltage
6	Demodulator tank circuit video IF
7	Demodulator tank circuit video IF
8	White level setting
9	VTR input
10	VTR output
11	Video output
12	Gating pulse input
13	AGC time constant video IF
14	Delayed tuner AGC
15	Video IF input
16	Video IF input
17	GND
18	QPS IF input
19	QPS IF input
20	AGC time constant QPS
21	Sound carrier output
22	GND

**Absolute Maximum Ratings**

Parameter	Symbol	Limit Values		Unit
		min.	max.	
Supply voltage	$V_1$		13	V
Max. DC voltage	$V_{2,3}$	$V_5$	$V_1$	V
Max. DC voltage	$V_4$	0	$V_1$	V
Max. DC current	$I_5$	- 2	2	mA
Max. DC voltage	$V_{6,7}$	$V_5$	$V_1$	V
Max. DC voltage	$V_{8,9}$	0	$V_1$	V
Max. DC current	$I_{10}$	- 1	3	mA
Max. DC current	$- I_{11}$	- 1	3	mA
Max. DC voltage	$V_{12}$	- 10	$V_1$	V
Max. DC voltage	$V_{13,14}$	0	$V_1$	V
Max. DC voltage	$V_{15,16}$	0	$V_1$	V
Max. DC voltage	$V_{18,19,20}$	0	$V_1$	V
Max. DC current	$I_{21}$	- 1	2	mA
Junction temperature	$T_j$		150	°C
Storage temperature range	$T_{stg}$	- 40	125	°C
Thermal resistance (system-air)	$R_{th SA}$		55	K/W

**Operating Range**

Supply voltage	$V_S$	10.5	12.6	V
IF frequency	$f_{IF}$	15	75	MHz
Ambient temperature	$T_A$	0	70	°C

**Characteristics** $V_s = 12 \text{ V}$ ;  $T_A = 25 \text{ }^\circ\text{C}$ 

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Current consumption	$I_1$		95		mA	
Stab. reference voltage	$V_{5/22}$		6.7	7.0	V	

**Video IF**

Control current for tuner	$I_{14}$		4.5		mA	
Tuner AGC threshold	$V_{4/22}$	0		4.0	V	
Gating pulse voltage	$V_{12}$ $V_{12}$	4.0 - 10		$V_1$ - 4.0	V	pos. gating pulse neg. gate pulse
Input voltage at $G_{\max}$	$V_{15/16}$		30	60	$\mu\text{V}$	$V_{11 \text{ pp}} = 3 \text{ V}$
AGC range	$\Delta G$		60		dB	
IF control voltage	$V_{13/22}$ $V_{13/22}$	0		4.0	V V	$G_{\max}$ $G_{\min}$
Video output voltage	$V_{Q11 \text{ pp}}$		3.0		V	$R_L = \infty$
Sync pulse level	$V_{11/22}$		2.0		V	
DC voltage $V_{13} = 4 \text{ V}$ ; $V_{15/16} = 0 \text{ V}$	$V_{11/22}$		5.3		V	
Output current	$I_{O11}$ $I_{O11}$		- 5.0 2.0		mA mA	to ground via $R$ to plus $V_{11} = 7 \text{ V}$
VTR output voltage (neg.)	$V_{O10 \text{ pp}}$		2.0		V	VTR record. $R_L = \infty$
Sync pulse level	$V_{10/22}$		$V_1 - 1.6$		V	VTR record. $R_L = \infty$
DC voltage $V_{13} \leq 5 \text{ V}$ ; $V_{15/16} = 0 \text{ V}$	$V_{10/22}$		$V_1 - 3.8$		V	VTR recording
DC voltage $V_{13} = 8 \text{ V}$	$V_{10/22}$		$V_1 - 0.9$		V	VTR playback
Output current	$I_{O10}$ $I_{O10}$		-5.0 1.0		mA mA	to ground via $R$ to plus $V_{10} = V_1$
Video amplifier (VTR playback)	$V_{\text{video}}$		3.0			$V = V_{11}/V_9$ ; $V_{9 \text{ pp}} = 1 \text{ V}$

**Quasi-Parallel Sound**

Sound carrier output voltage	$V_{21}$	10			mV	$V_{1 \text{ VC}} = 1 \text{ mV}$ $V_{1 \text{ SC}} = 300 \mu\text{V}$
Input voltage at $G_{\max}$	$V_{18/19}$		50	100	$\mu\text{V}$	$V_{21} = V_{21} - 3 \text{ dB}$
AGC range	$\Delta G$		60		dB	$V_{21} = V_{21} \pm 3 \text{ dB}$
Signal-to-noise-ratio						IEC 468
White/staircase signal			61		dB	Peak weighting
Black picture			66		dB	

**Characteristics (cont,d)** $V_S = 12 \text{ V}$ ;  $T_A = 25 \text{ }^\circ\text{C}$ 

Parameter	Symbol	Limit Values			Unit	Test Conditions
		min.	typ.	max.		

**Test Conditions**

Video carrier/sound carrier			10		dB	
Modulation frequency			1		kHz	
Frequency deviation			50		kHz	
IF input voltage			20		mV	

**Design-Related Characteristics**

Input impedance	$Z_{I\ 15/16}$		1.8/2		$k\Omega/pF$	
	$Z_{I\ 18/19}$		1.8/2		$k\Omega/pF$	
Output impedance	$Z_{O\ 2/3}$		6.6/2		$k\Omega/pF$	
	$Z_{O\ 6/7}$		6.6/2		$k\Omega/pF$	
Output resistance	$R_{11}$		150		$\Omega$	
Residual IF (fundamental wave)	$V_{11}$		10		mV	
Video bandwidth (– 3 dB)	$B_{\text{video}}$		6.0		MHz	
Intermodulation ratio with reference to $f_{cc}$	$\alpha_{IM}$		50		dB	sound color interference
Output resistance	$R_{O\ 21}$		200		$\Omega$	
IF control voltage	$V_{20/22}$	0			V	$G_{\text{max}}$
	$V_{20/22}$			4	V	$G_{\text{min}}$

**Alignment Procedures**

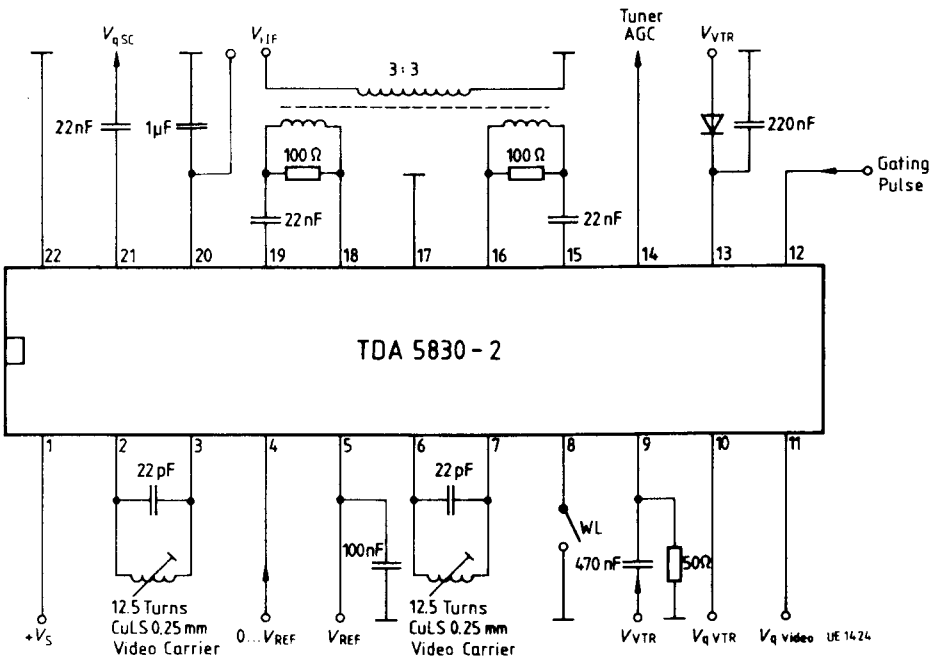
## a) Video IF

At a video carrier input level of  $V_{15/16\text{ rms}} = 10 \text{ mV}$  and a superimposed AGC voltage of  $V_{13} = 3 \text{ V}$ , the demodulator tank circuit is preliminary aligned so that the demodulated video signal  $V_{11\text{ pp}}$  reaches its maximum output level at the positive video output. Any suitable video test signal can be used for modulation. Subsequently, the AGC voltage  $V_{13}$  is reduced until the video signal equals approx. 3 V (peak-to-peak). By fine-aligning the demodulator tank circuit, the maximum output level of the video signal is reached. The flat response characteristic of the demodulator ensures a non-critical alignment procedure.

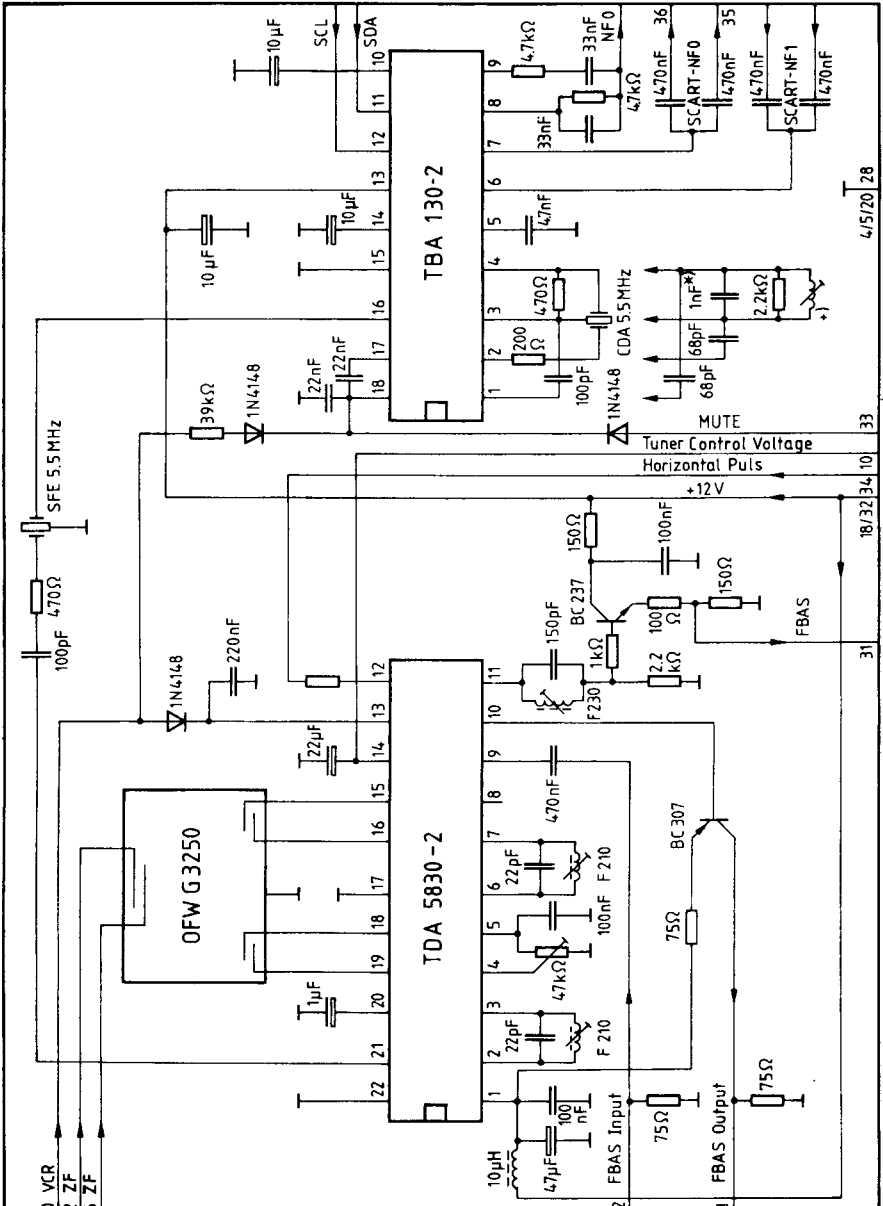
## b) QPS

At an input signal of  $V_{18/19\text{ rms}} = 10 \text{ mV}$ , the demodulator tank circuit is preliminarily aligned until a max. AM suppression of the demodulated video signal  $V_{21}$  is reached at the sound carrier output. A video signal critical for the sound-interference ratio should be used for modulation (white/staircase, FuBK). Subsequent fine-aligning is performed by measuring the sound-interference ratio at the output of a FM demodulator and fine-aligning the demodulator tank circuit for a max. interference ratio. If several sound carriers are used in a device, the sound carrier with the lowest level should be used for alignment purposes.

Measurement Circuit



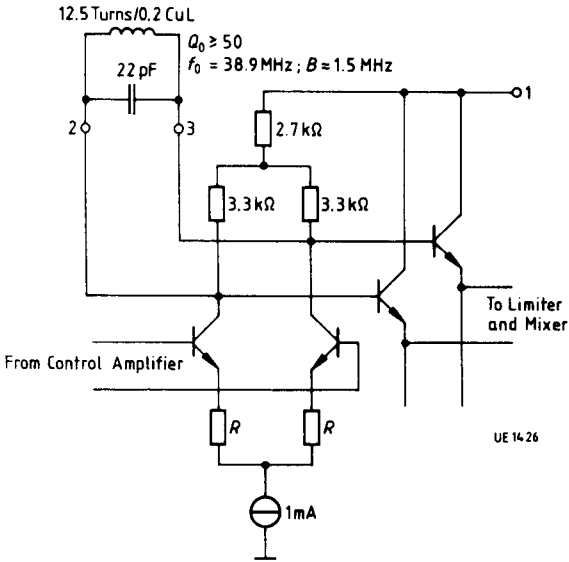
Application Circuit



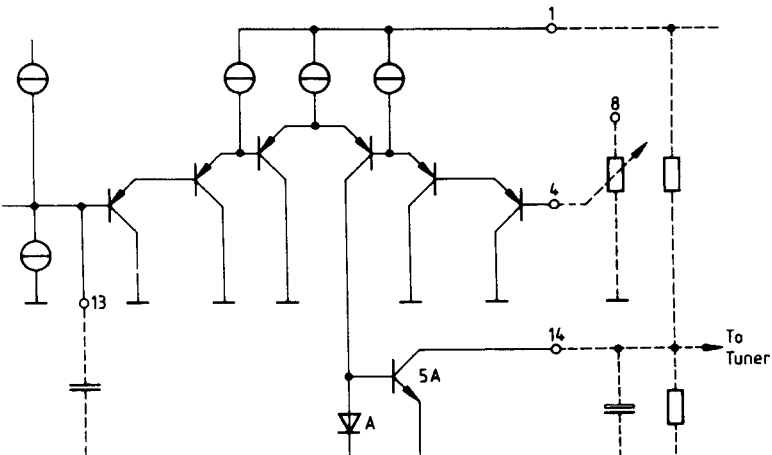
\*) STYROFLEX Capacitors  
 e.g. Vogt Coil Assembly 517/200000  
 \*) L-Turns, 0.2 CuL.; Q<sub>B</sub> approx. 25  
 UE 1344  
 47/520 28



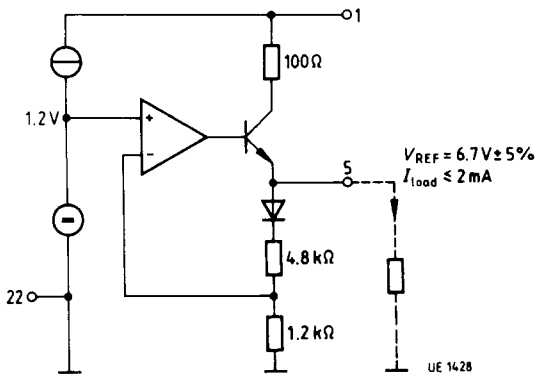
Demodulator Tank Circuit QPS



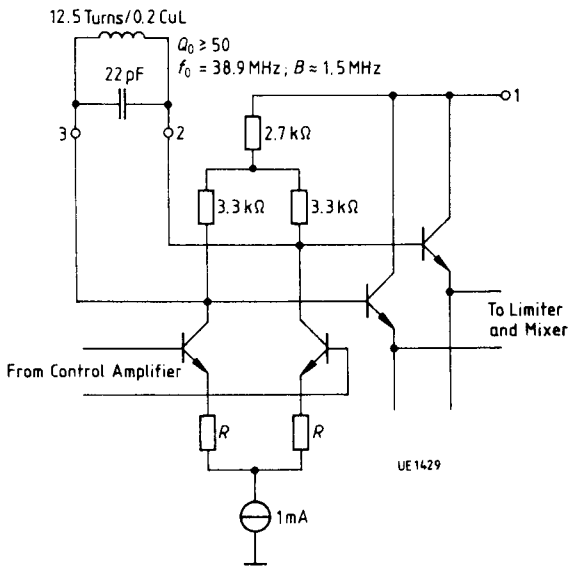
Tuner AGC Threshold and Output



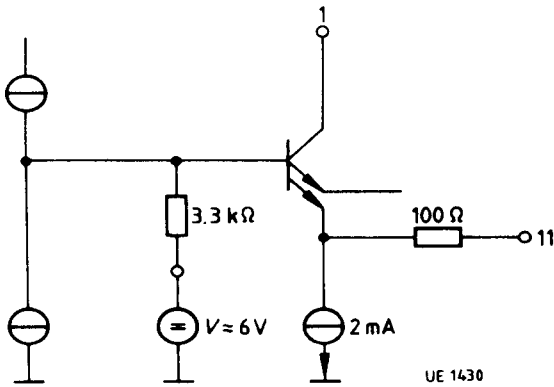
Reference Voltage



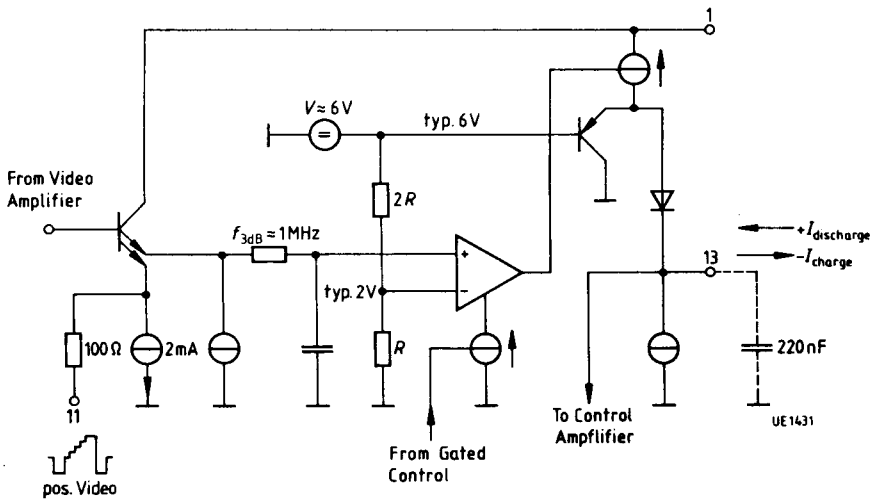
Demodulator Tank Circuit Video IF



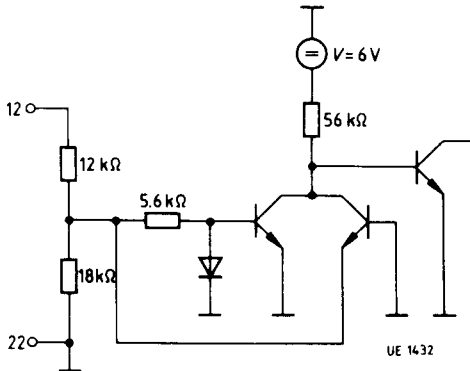
Positive Video Output



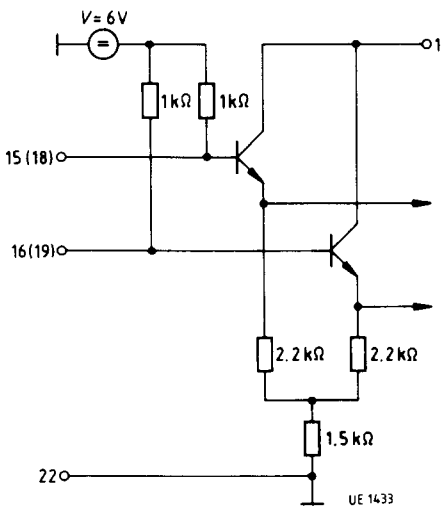
AGC Time Constant Video IF



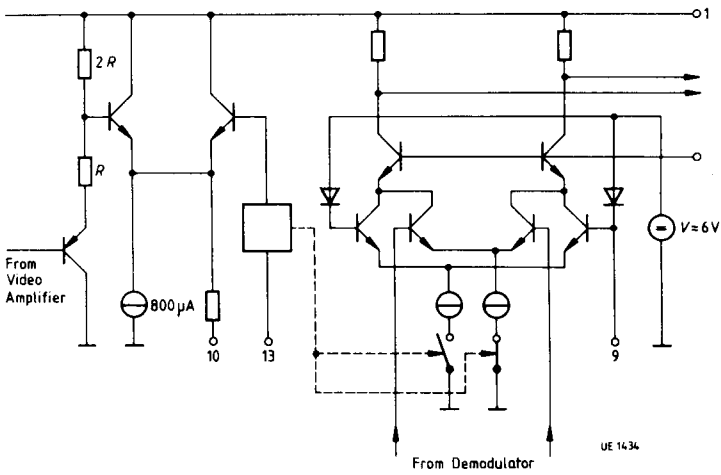
Gating Pulse Input



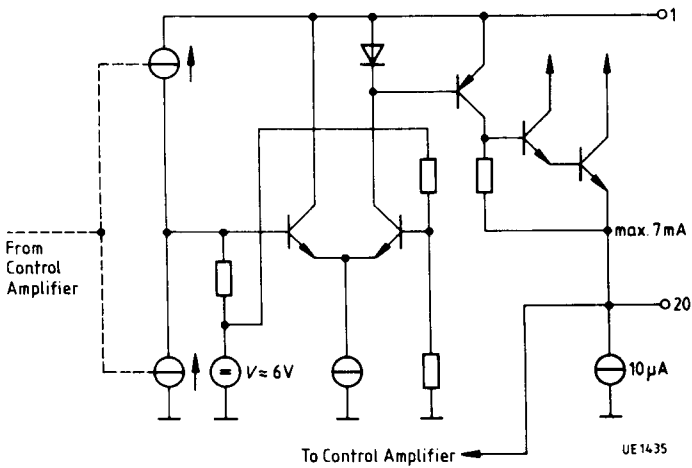
IF Input Video IF  
IF Input QPS



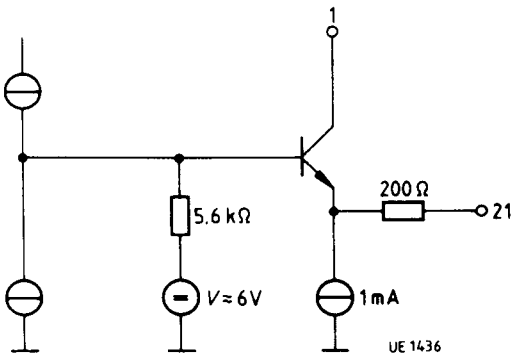
VTR Interface



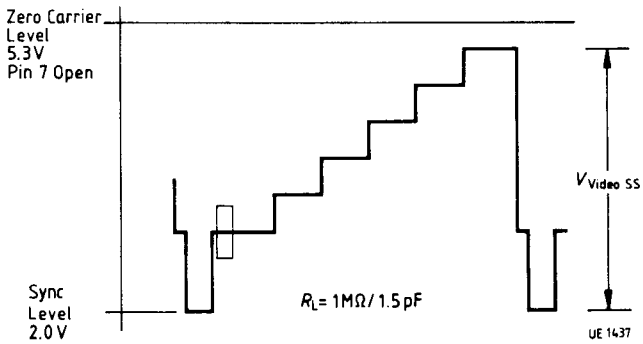
AGC Time Constant QPS



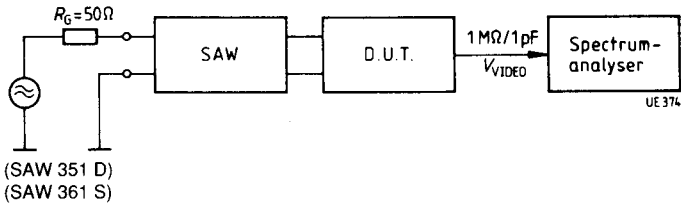
Sound Carrier Output QPS



AGC Time Constant QPS

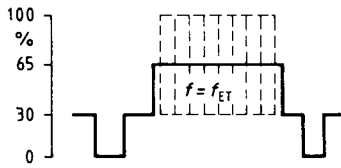


**Measurement Configuration**

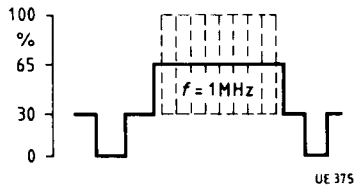


Test signal:  $f_{\text{vc}} = 38.9\text{ MHz}$  with test signal modulated with 10% residual carrier;  
 sound carrier – 13 dB (transmitter side)

Intermodulation



Reference



Intermodulation ratio 
$$a_{\text{IM}} = 20 \log \frac{V_{\text{video}}(f = 1\text{ MHz})}{V_{\text{video}}(f = f_{\text{SC}} - f_{\text{CC}})}$$

The 50% IRE signal with  $\pm 50\%$  IRE color carrier corresponds to Cyan with 75% color saturation.