

TCA640

CHROMINANCE AMPLIFIER FOR SECAM OR PAL/SECAM DECODERS

The TCA640 is an integrated chrominance amplifier for either a SECAM decoder or a double standard PAL/SECAM decoder. Switching of the standard is performed internally, controlled by an external applied d. c. signal. In addition to the chrominance amplifier the circuit also incorporates a 7,8 kHz flip-flop and an identification circuit for SECAM. For PAL identification the circuit included in the TBA540 should be used. Furthermore, the TCA640 incorporates a blanking circuit, a burst gating circuit and a colour killer detector.

QUICK REFERENCE DATA

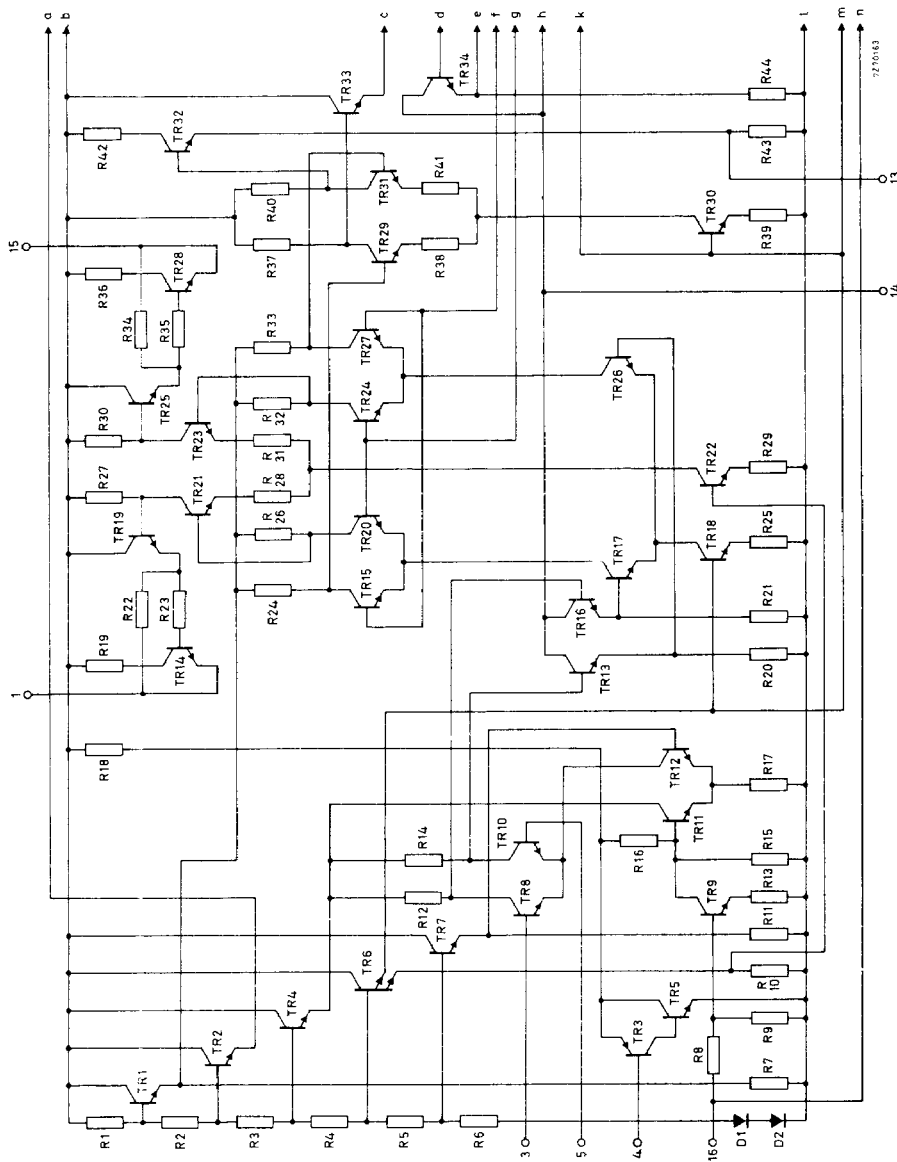
Supply voltage	V_{14-2}	nom.	12 V	
Supply current	I_{14}	nom.	37 mA	

			PAL	SECAM
Chrominance input signals (peak-to-peak value)	$V_{3-5(p-p)}$	>	4	7 mV
		<	80	400 mV
Chrominance output signals (peak-to-peak value)	$V_{15-2(p-p)}$ $V_{1-2(p-p)}$	typ.	500	2000 mV
Burst output (closed a. c. c. loop) (peak-to-peak value)	$V_{13-2(p-p)}$	typ.	1	- V
System switching signal	V_{4-2}	typ.	12	0 V
Burst blanking of chrominance signal		>	40	- dB
Chrominance blanking at field identification		>	-	40 dB
Square-wave output (7,8 kHz) (peak-to-peak value)	$V_{12-2(p-p)}$	typ.	3	3 V

PACKAGE OUTLINE

16-lead DIL; plastic (SOT-38).

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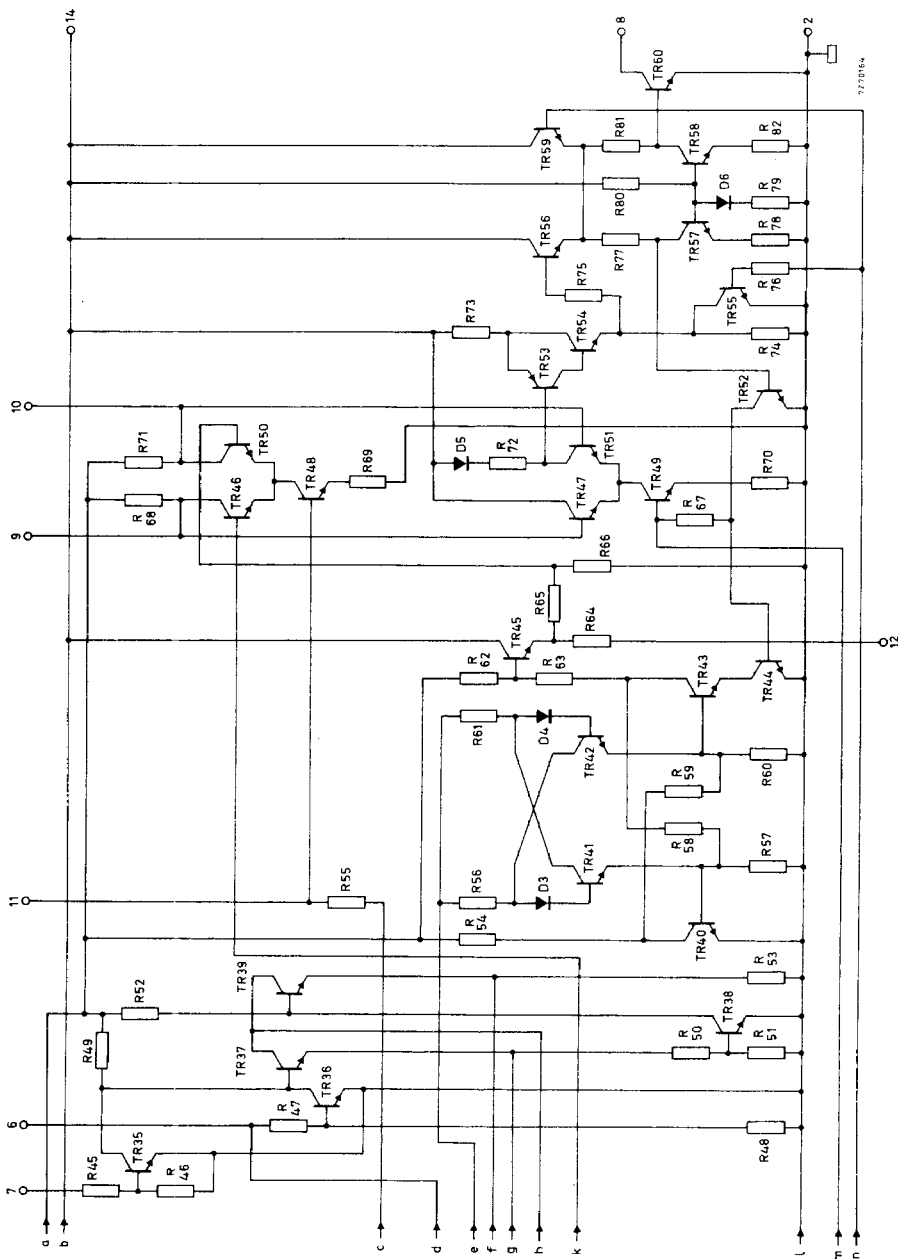


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777014
TCA640 (2N) (REV. 12/74)

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

Voltage

Supply voltage V_{14-2} max. 13,2 V

Power dissipation

Total power dissipation P_{tot} max. 625 mW

Temperatures

Storage temperature T_{stg} -25 to +125 °C

Operating ambient temperature T_{amb} -25 to +65 °C ¹⁾
75 °C

CHARACTERISTICS measured in the circuit on page 6

Supply voltage V_{14-2} typ. 12 V
 10,2 to 13,2 V

Required input signals at $V_{14-2} = 12$ V and $T_{amb} = 25$ °C

Chrominance input signal

peak-to-peak value $V_{3-5(p-p)}$ { PAL 4 to 80 mV
 SECAM 7 ²⁾ to 400 mV

Automatic chrominance control starting V_{16-2} PAL typ. 1,2 V ³⁾

Flyback pulses for blanking and

burst/identification lines-keying See note 4

Line flyback pulses (positive)

peak-to-peak value $V_{6-2(p-p)}$ 4,5 to 12 V

Field identification pulses (positive)

peak-to-peak value $V_{7-2(p-p)}$ 4 to 12 V

System switch signal

V_{4-2} { PAL 7 to V_{14-2} V
 SECAM 0 to 1 V

Colour killer threshold

V_{16-2} PAL typ. 2,5 V ⁵⁾

¹⁾ When a stabilized power supply of ≤ 12 V is applied, T_{amb} is max. 75 °C.

²⁾ Start of limiting.

³⁾ A negative-going potential provides a 26 dB a. c. c. range.

⁴⁾ The line flyback pulses also provide the clock pulses for the flip-flop.

⁵⁾ The colour killer is operative above the quoted input voltage.

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CHARACTERISTICS (continued)

Obtainable output signals

Chrominance output signals

peak-to-peak value	$V_{15-2(p-p)}$	PAL	425 to 575	mV
	$V_{1-2(p-p)}$			

<u>Phase difference between output pins</u>	$\Delta\phi_{15-1}$	PAL	170° to 190°	1)
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<u>Burst signal</u> (peak-to-peak value)	$V_{13-2(p-p)}$	PAL	typ. 1	2)
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Identification signal

peak-to-peak value	$I_{11(p-p)}$	SECAM	1,4 to 2,4	mA
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<u>Output resistance</u>	R_{11-2}		2 to 2,9	k Ω
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Flip-flop signal

peak-to-peak value	$V_{12-2(p-p)}$		2,5 to 3,5	V
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<u>Colour killer</u>	killed	$\left\{ \begin{array}{l} V_{8-2} \\ I_8 \end{array} \right.$	<	0,5	V
			<	10	mA
unkilled	$\left\{ \begin{array}{l} V_{8-2} \\ I_8 \end{array} \right.$	<	V_{14-2}	V	
		<	10	μ A	

Bandwidth of chrominance amplifier (-1 dB)

at a carrier frequency of 4,2 MHz	>	± 1	MHz
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Blanking

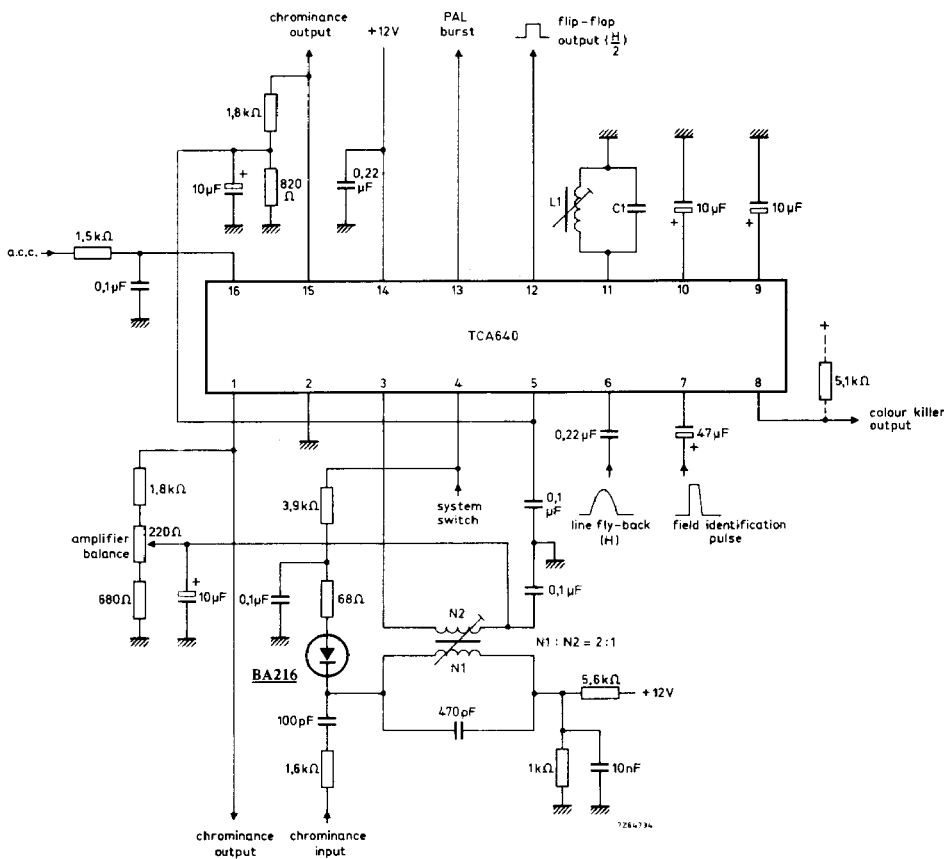
burst rejection	PAL	>	40	dB
rejection identification lines with field identification	SECAM	>	40	dB

1) Over the a. c. c. control range the phase difference varies less than 2,5°.

2) The burst is kept constant at 1 V peak-to-peak by automatic gain control.

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APPLICATION INFORMATION



Pinning

- | | |
|-------------------------------------|---|
| 1. Chrominance output | 9. Identification integrating |
| 2. Earth (negative supply) | 10. capacitor (SECAM) |
| 3. Chrominance input | 11. Identification tank circuit (SECAM) |
| 4. System switch input | 12. Flip-flop output |
| 5. Chrominance input | 13. Burst output (PAL) |
| 6. Line fly-back pulse input | 14. Supply voltage (12 V) |
| 7. Field identification pulse input | 15. Chrominance output |
| 8. Colour killer output | 16. A.C.C. input |

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APPLICATION INFORMATION (continued)

The function is quoted against the corresponding pin number

1. Chrominance output (in conjunction with pin 15)

A balanced output is available at pins 1 and 15.

At SECAM reception a limited signal of 2 V peak-to-peak is available, starting from an input voltage of 15 mV peak-to-peak.

At PAL reception the output signal is 500 mV peak-to-peak for a burst signal of 1 V peak-to-peak.

An external d.c. network is required which provides negative feedback to pin 3. The same holds for the feedback from pin 15 to pin 5.

The figures for input and output signals are based on a 100% saturated colour bar signal.

2. Negative supply (earth)

3. Chrominance input (in conjunction with pin 5)

The input signal is derived from a bandpass filter which provides the required "bell" shape bandpass for the SECAM signal and a flat bandpass for the PAL signal.

The input signal can be supplied either in a balanced mode or single ended. Both inputs (pins 3 and 5) require a d.c. potential of about 2.5 V obtained from a resistive divider connected to output pins 1 and 15. The figures for the input signals are based on a 100% saturated colour bar signal and a burst-to-chrominance ratio of 1:3 of the input signal (PAL).

4. System switch input

Between 7 V and the supply voltage, the gain of the chrominance amplifier is controlled by the a.c.c. voltage at pin 16.

The chrominance amplifier then provides linear amplification required for the PAL signal. Between 0 V and 1 V the chrominance amplifier operates as a limiter for the SECAM signal.

5. Chrominance input (see pin 3)

6. Line fly-back pulse input (in conjunction with pin 11)

Positive going pulses provide

- blanking of the chrominance signal at the outputs (pins 1 and 15).

- burst gating for both PAL and SECAM.

The carrier signal present during the second half of the back porch of the SECAM signal is gated. It provides line identification when the circuit L_1C_1 (see circuit on page 6) is tuned to 4.25 MHz (at $C_1 = 470$ pF).

- trigger signal for the flip-flop.

7. Field identification pulse input (in conjunction with pin 11)

Like the line fly-back pulses, positive going identification pulses provide blanking and burst gating.

To operate the TCA640 on the identification lines (SECAM) in the field blanking period the circuit L_1C_1 (see circuit on page 6) should be tuned to 3.9 MHz and the capacitor C_1 should be increased to 1 nF. The field fly-back pulse should be shaped so that its amplitude exceeds 4 V during the identification lines.

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APPLICATION INFORMATION (continued)

8. Colour killer output

This pin is driven from the collector of an internal switching transistor and requires an external load resistor connected to the supply voltage. The killer is operative when the a.c.c. voltage exceeds the threshold. when the SECAM chrominance signal at the input is below the limiting level or when the flip-flop operates in the wrong phase.

9. Identification integrating capacitor (SECAM)

10. Identification integrating capacitor (SECAM)

11. Identification detector tank circuit (see pins 6 and 7)

12. Flip-flop output

A square wave of 7,8 kHz with an amplitude of 3 V is available at this pin.
An external load resistor is not required.

13. Burst output (PAL)

A 1 V peak-to-peak burst (kept constant by the a.c.c. system) is produced here.

14. Supply voltage (12 V)

Correct operation occurs within the range 10,2 to 13,2 V.
The power dissipation must not exceed 625 mW at 65 °C ambient temperature.

15. Chrominance output (see pin 1)

16. A.C.C. input

With the system switch input (pin 4) connected for PAL operation, a negative going potential gives a 26 dB range of a.c.c. starting at +1,2 V
During SECAM operation, the voltage at the input should not exceed +0,5 V, otherwise the SECAM identification circuit and the colour killer become inoperative.