THOMSON-EFCIS

Integrated Circuits

TEA2015 A

VERTICAL SWEEP FOR BLACK AND WHITE AND 90° COLOR T.V SETS

The TEA2015 A is a complete vertical sweep system designed for TV sets. It includes a fly-back generator a triggerable ramp generator, a power amplifier, a blanking-pulse generator and safety systems.

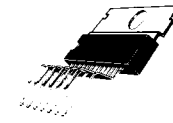
Its large output transistors and special "single in-line" case make it able to work without any external power stage and give it a good reliability, it is protected against thermal over load and short-circuit.

MAIN FEATURES

- V_{CC} max. 30 V
  60 V (Flyback)
- I_{OUT} = ± 1 A
- No frequency adjustment
- Linearity adjustment possible to suppress
- Frequency and linearity adjustments may be suppressed for standard operation.

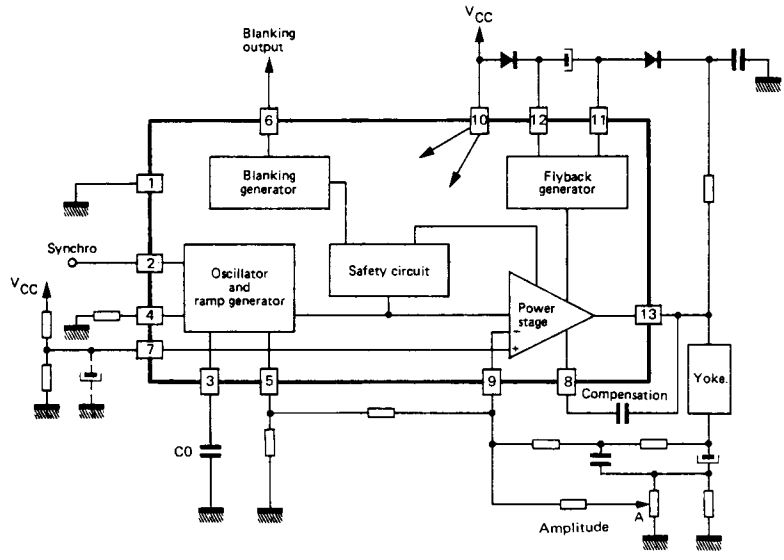
VERTICAL SWEEP FOR BLACK AND WHITE AND 90° COLOR TV SETS

CASE CB-230



SP SUFFIX
PLASTIC PACKAGE

BLOCK DIAGRAM



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THOMSON-CSF COMPONENTS

FUNCTIONAL DESCRIPTION

This integrated circuit, specially intended for 90° color TV sets, includes the following built in units :

Oscillator

It provides a linear positive going ramp voltage. The amplitude keeps proportional to V_{CC}. The free running frequency is fixed by external components : one capacitor and one resistor. The frequency drift versus V_{CC} or temperature is very low.

Synchronization

The synchro stage is gated in order to allow input pulse action only during the last fourth of free running period.

Blanking

During normal operation the circuit provides a positive blanking pulse of 12.6 Volts amplitude. The duration is slightly adjustable around 1.3 ms, depending on the value of an external resistor (pin 4).

Power amplifier

The output stage is a complete power amplifier with high current capability, allowing direct driving of deflection coils. It includes thermal and short circuit protection.

Fly-back generator

During the retrace time the output voltage is permitted to reach 2 x V_{CC}, due to a built in system (fly-back generator) and few external components.

But, the circuit can be used without fly-back generator.

ABSOLUTE MAXIMUM RATINGS

Direct supply voltage	V_{CC}	35	V
Flyback peak voltage	V_{FB}	65	V
Output current (repetitive)	I_O	± 2	A
Output current (non repetitive)	I_O	± 2,5	A
Storage and junction temperature	T_j - T_{stg}	−40 → +150	°C
Current at pin 13			
non repetitive	I_{FB}	± 2,5	A
repetitive *	I_{FB}	± 2	A

*$t \leq 1$ ms for $t_o = 20$ms

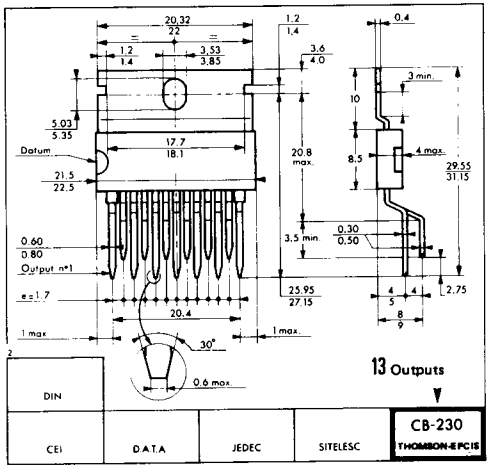
PIN CONFIGURATION

CASE CB-230

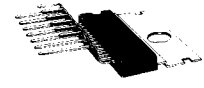
1	Substrate	7	Power amplifier + input
2	Synchronization	8	Compensation
3	Oscillator capacitor	9	Power amplifier − input
4	Reference current	10	$+V_{CC}$
5	Oscillator output and F. adjustment	11	Flyback generator
6	Blanking output	12	V_{CC} power stage
		13	Output

THERMAL CHARACTERISTICS

Junction-ambient thermal resistance	$R_{th(j-a)}$	50	°C/W
Junction-case thermal resistance	$R_{th(j-c)}$	7	°C/W

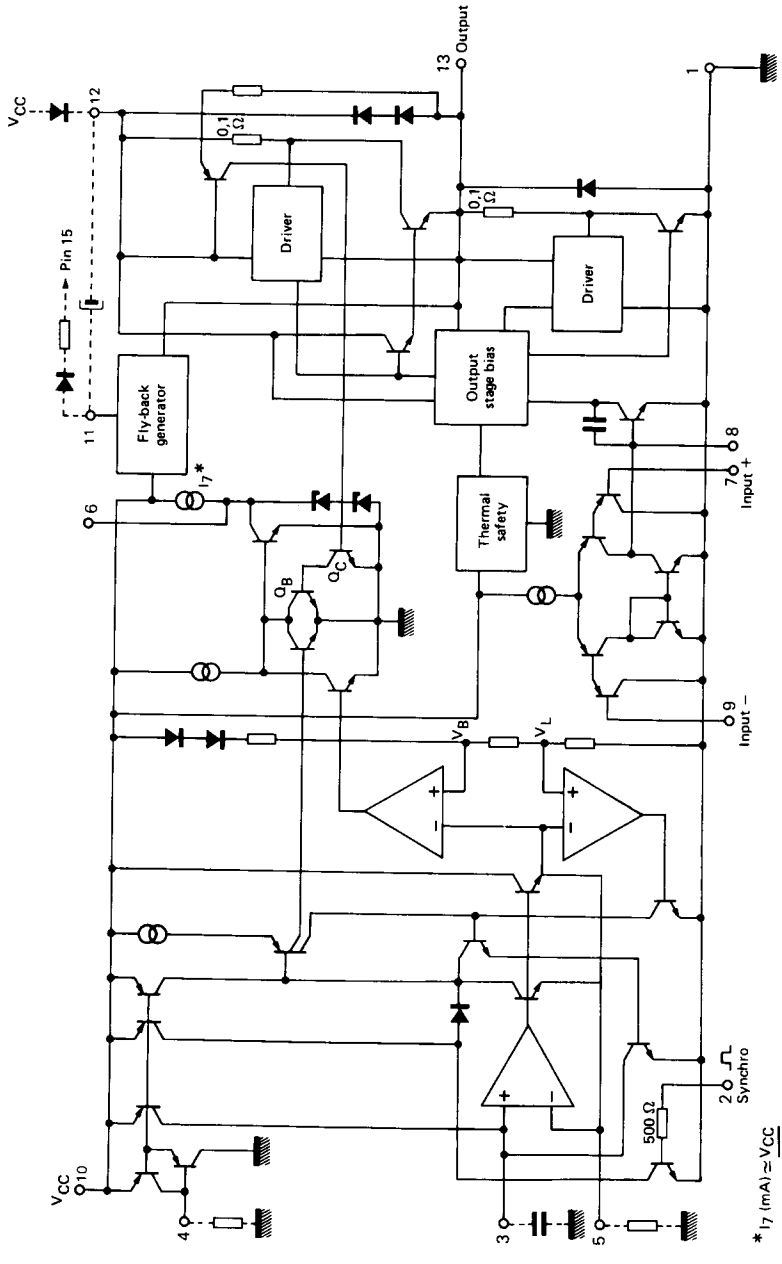


CASE CB-230



SP SUFFIX
PLASTIC PACKAGE

SCHEMATIC DIAGRAM

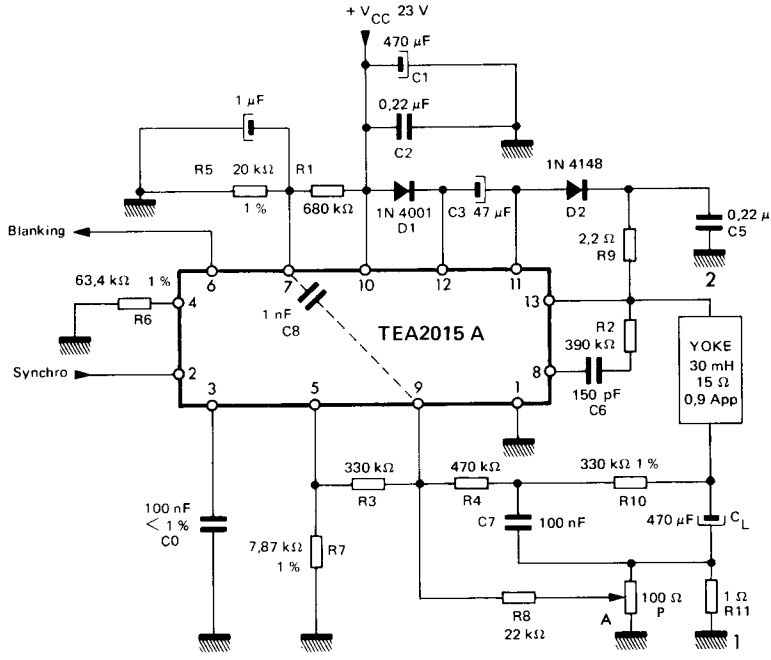


GENERAL ELECTRICAL CHARACTERISTICS (refer to the test circuit) V_{CC} = 23 V , T_{amb} = 25°C

PARAMETERS	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Supply current without load (P10 and P12)	I(10) + I(12)			25	50	mA
Triggering time (pull-in-range)	t_o = 23.5 ms			5.8		ms
Free period time	Co = 0.1 µF R4 = 63,4 kΩ R5 = 7,87 kΩ		21,6	23.5	25,4	ms
Pin 5 peak to peak oscillator saw-tooth voltage	Co = 0.1 µF R4 = 63,4 kΩ V_{CC} = 22 V			$V_{CC}/3$		V
Blanking pulse time	Co = 0.1 µF R4 = 63,4 kΩ		1,15	1.3	1,45	ms
Pin 6 blanking pulse amplitude				12.6		V
Blanking available pin 6* current				150		µA
Blanking time drift versus temperature $\frac{dt}{dTj}$				1		µs/°C
Amplifier input bias current	I(9) − I(7)			100		nA
Synchronisation Pin 2 input current Input impedance Maximum voltage				1 0.5	 1.5	 µA kΩ V
Oscillator frequency drift versus supply voltage $\frac{dF}{dV_{CC}}$	V_{CC} = 15 → 25 V			0.1		Hz/V
Oscillator frequency drift versus temperature $\frac{dF}{dT_{case}}$				0.003		Hz/°C
Thermal protection				140		°C

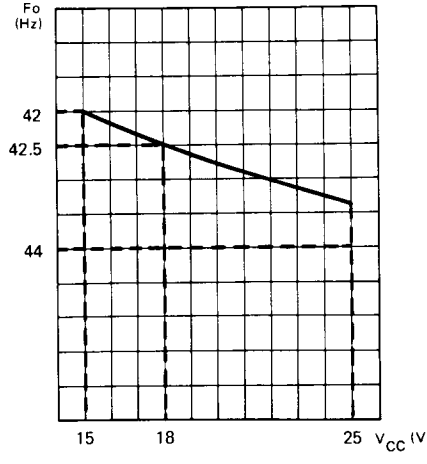
* To get an upper blanking current, put an external resistor from 6 to V_{CC}
The pin 6 capability to switching an external current to ground is 4 mA

DYNAMIC TEST CIRCUIT

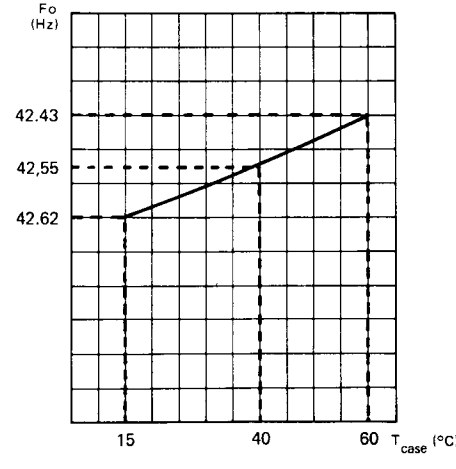


If necessary connect a capacitor 1 nF between pins 9 and 7 to reject line influence.

FREQUENCY VARIATION OF UNSYNCHRONIZED OSCILLATOR VERSUS SUPPLY VOLTAGE



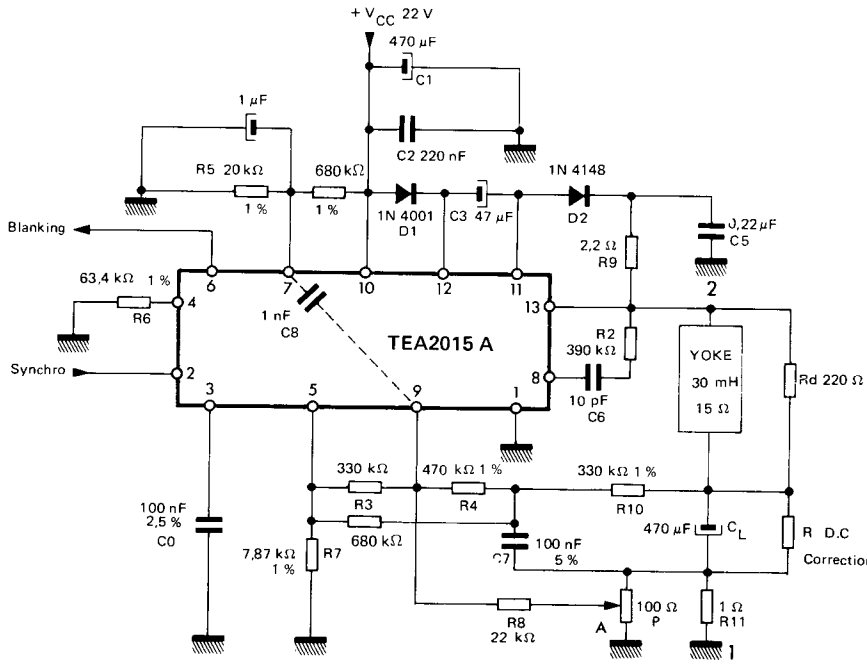
FREQUENCY VARIATION OF UNSYNCHRONIZED OSCILLATOR VERSUS TEMPERATURE



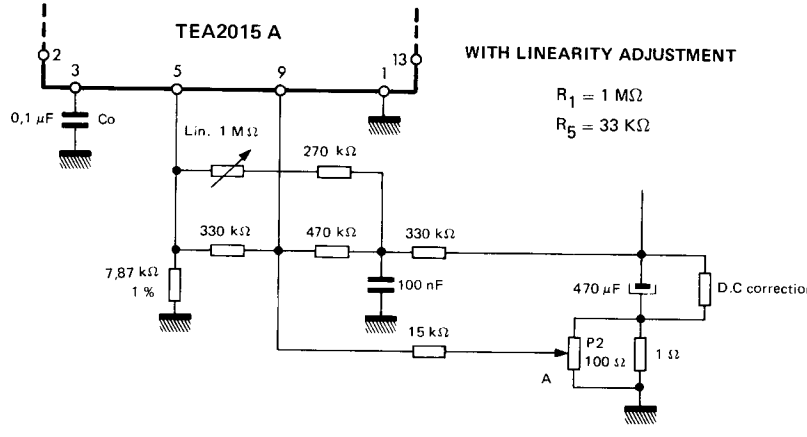
ELECTRICAL CHARACTERISTICS FOR DEFLECTION CIRCUIT WITH VIDEOCOLOR PIL A 421 X SERIES COILS

PARAMETERS	SYMBOLS	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
YOKE FEATURES PIL S4							
Resistance	Rd					15	Ω
Inductance	Ld					30	mH
Peak to peak yoke current	I_{CC}					0,9	A
Supply voltage	V_{CC}			20		22	V
Supply current		V_{CC} = 22 V				155	mA
Fly-back time		V_{CC} = 22 V				1	ms
IC power dissipation	P_D	V_{CC} = 22 V				2,3	W
Pin 12 operating peak current in fly-back generator	I_{FB}					± 0,45	A
Non repetitive (accidental) maximum peak current in fly-back		t = 1 ms t_o = 20 ms				±2	A
Pin 13 non repetitive (accidental) maximum peak output current						±2,5	A
Fly-back voltage						44	V
Pin 5 oscillator saw-tooth amplitude		C_3 = 100 nF V_{CC} = 22 V R_4 = 63,4 kΩ				9	V
Pin 6 blanking time		C_3 = 100 nF V_{CC} = 22 V R_4 = 63,4 kΩ				1,3	ms
Junction temperature with heatsink of R_{th} = 10°C/W	T_j	V_{CC} = 22 V T_{amb} = 30°C				70	°C

TYPICAL APPLICATION CIRCUIT FOR 90° COLOR TV SETS USING A 421 X TUBE WITH NO LINEARITY ADJUSTMENT



If necessary connect a capacitor 1 nF between pins 9 and 7 to reject line influence.



WITH LINEARITY ADJUSTMENT

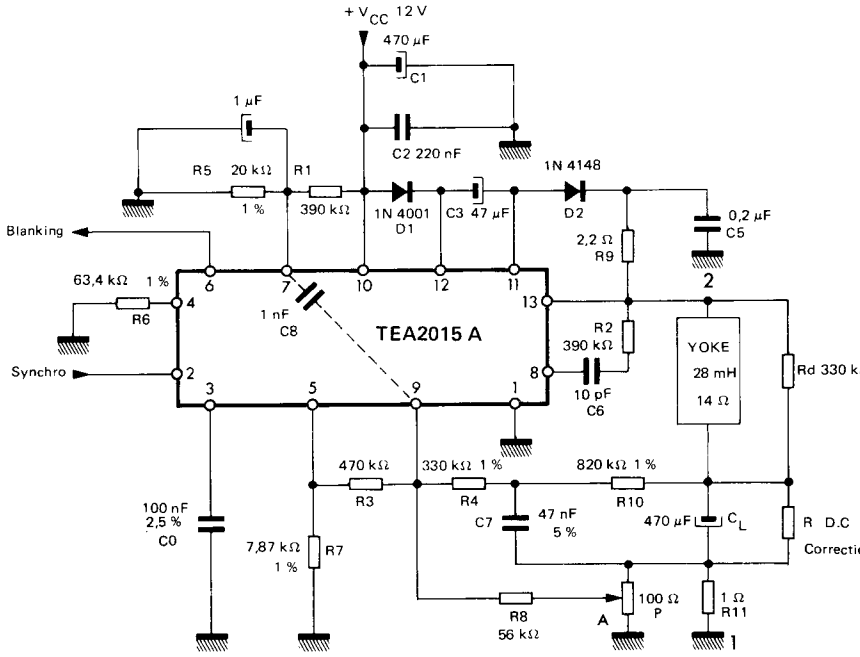
$R_1 = 1\ M\Omega$

$R_5 = 33\ K\Omega$

ELECTRICAL CHARACTERISTICS FOR SMALL SCREEN B/W DEFLECTION CIRCUIT WITH SERIES COILS

PARAMETERS	SYMBOLS	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
YOKE FEATURES SERIES COILS							
Resistance	Rd					14	Ω
Inductance	Ld					28	mH
Peak to peak yoke current	I_{CC}					0,6	A
Supply voltage	V_{CC}				12		V
Fly-back time		V_{CC} = 12 V			1,2		ms
Power dissipation in the IC	P_D	V_{CC} = 12 V			0,9		W
Pin 11 operating peak current in fly-back generator					± 0,3		A
Non repetitive (accidental) maximum peak current in fly-back		t = 1 ms t_o = 20 ms				± 2	A
Pin 13 non repetitive (accidental) maximum peak output current						±2,5	A
Fly-back voltage					24		V
Pin 5 oscillator saw-tooth amplitude		V_{CC} = 12 V			4,7		V
Pin 6 blanking time		V_{CC} = 12 V			1,3		ms
Junction temperature without heatsink	T_j	V_{CC} = 12 V T_{amb} = 30 °C			75		°C

TYPICAL APPLICATION CIRCUIT FOR SMALL SCREEN B/W TV SET SERIES COILS

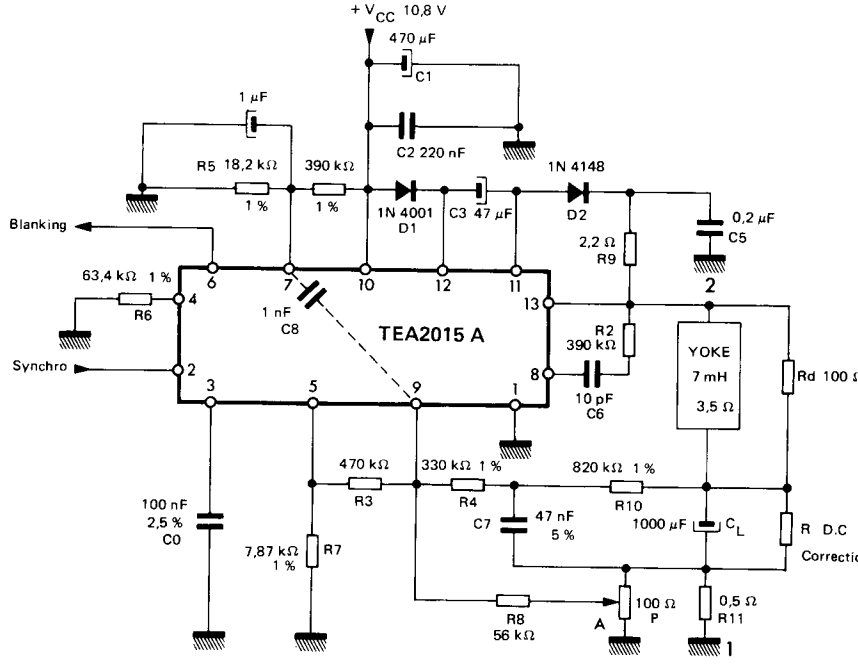


If necessary connect a capacitor 1 nF between pins 9 and 7 to reject line influence.

ELECTRICAL CHARACTERISTICS FOR SMALL SCREEN B/W DEFLECTION CIRCUIT WITH PARALLEL COILS

PARAMETERS	SYMBOLS	TEST CONDITIONS		MIN. TYP. MAX.	UNITS
YOKE FEATURES PARALLEL COILS					
Resistance	Rd			3,5	Ω
Inductance	Ld			7	mH
Peak to peak yoke current	I_{CC}			1,2	A
Supply voltage	V_{CC}			8,8 10,8	V
Fly-back time		V_{CC} = 10,8 V		0,8	ms
Power dissipation in the IC	P_D	V_{CC} = 10,8 V		1,5	W
Pin 11 operating peak current in fly-back generator				± 0,6	A
Non repetitive (accidental) maximum peak current in fly-back		t = 1 ms t_o = 20 ms		± 2	A
Pin 13 non repetitive (accidental) maximum peak output current				±2,5	A
Fly-back voltage				21	V
Pin 5 oscillator saw-tooth amplitude		V_{CC} = 10,8 V		4	V
Pin 6 blanking time		V_{CC} = 10,8 V		1,3	ms
Junction temperature with heatsink of R_{th} = 30°C/W	T_j	V_{CC} = 10,8 V T_{amb} = 30°C		85	°C

TYPICAL APPLICATION CIRCUIT FOR SMALL SCREEN B/W SET PARALLEL COILS



If necessary connect a capacitor 1 nF between pins 9 and 7 to reject line influence.

APPLICATION INFORMATION

Blanking time

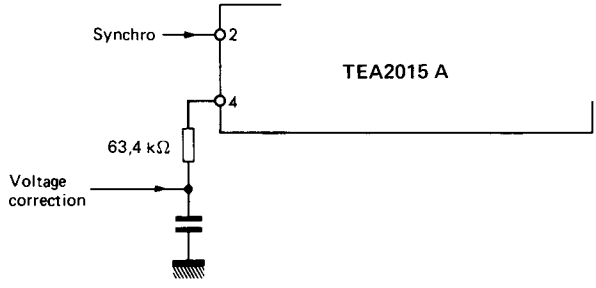
Can be adjusted by the value of R4

R4 = 63,4 kΩ Co = 0,1 µF t_{blank} = 1,3 ms

Automatic format correction

The saw-tooth amplitude is proportional to V_{CC} so that the format is made automatically when the supply voltage is given by the horizontal transformer. In an other case two other possibilities.

a — When the voltage correction comming from the beam current increase and the amplitude must decrease.

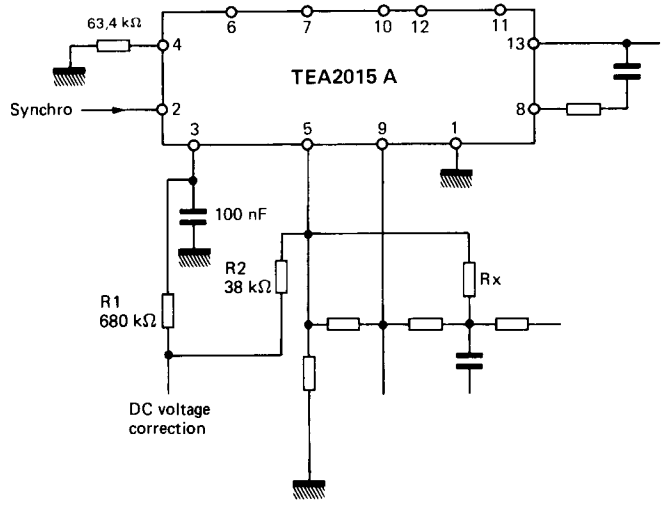


Format correction	5 %
V_{CC}	20 V
Voltage correction	0 - 1 V

No effect on the free frequency

In this case if the amplitude decreases of 5% the blanking time increases of 5%.

b – When the voltage correction decreases and the amplitude must decrease

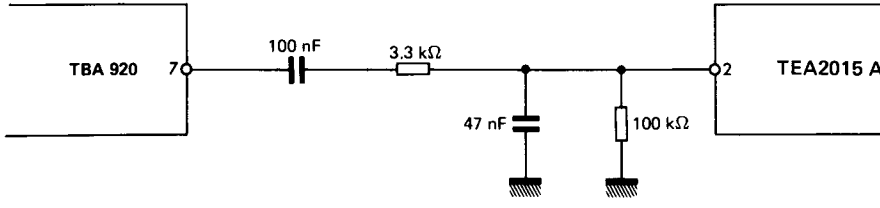


Rx must be adjusted to compensate the parabolic effect of R1 if there is no linearity adjustment.

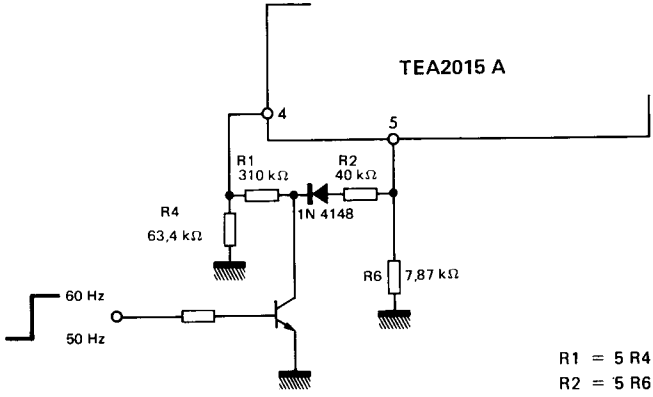
Format correction	5 %
DC voltage correction	2 V – 0
V_{CC}	20 V

– no effect on free frequency
– Blanking time variation ⩽ 3 %

Synchronization network for synchro coming from TBA 920 Pin 7

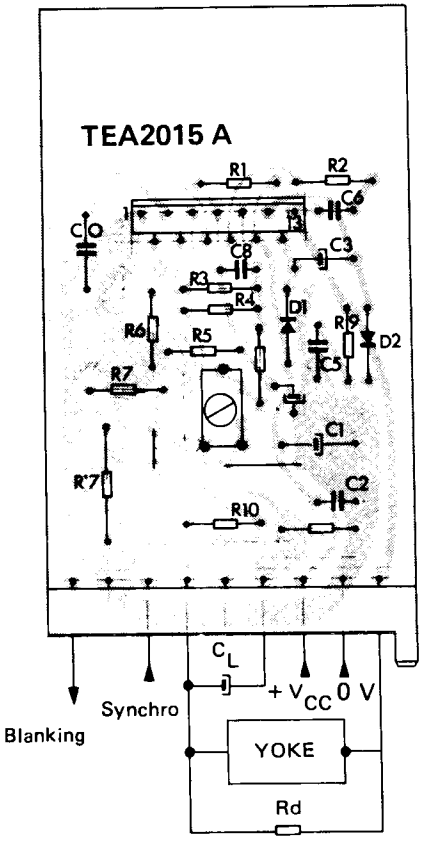


Automatic standard switching with constant amplitude (50 Hz - 60 Hz)

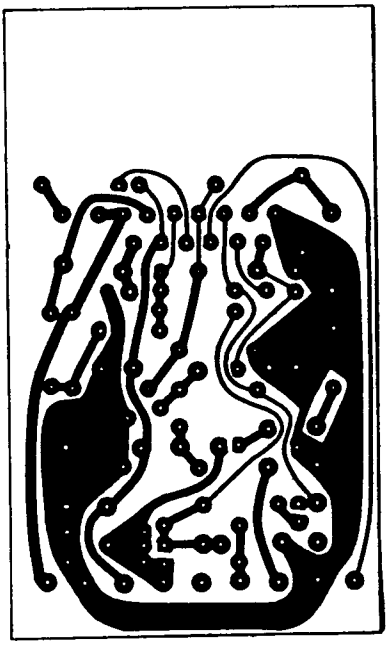


Printed circuit board layout information refered to the application diagram 90° COLOR TV SET

COMPONENT SIDE



COPPER SIDE



Each power ground 1, 2, 3 (refer to the application diagram 90° COLOR TV SET) must be connected to the –supply (pin 1) with a minimum copper resistance.
Other grounds (oscillator and outputs) must be well decoupled from the power ground and connected to the –supply.

Copper connections to pins 7 and 9 as short as possible to reject the line influence.

These specifications are subject to change without notice.
Please inquire with our sales offices about the availability of the different packages.