

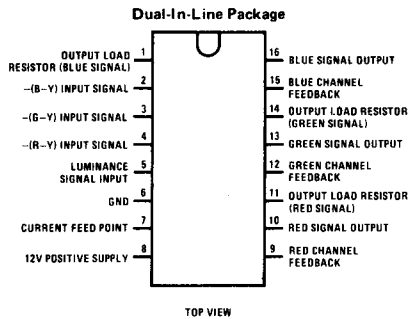
# TBA530 RGB Matrix Preamp

## General Description

The TBA530 is an integrated circuit for color TV receivers incorporating a matrix preamplifier for R-G-B cathode or grid drive of the picture tube without clamping circuits.

It has been designed to be driven from the TBA990 or TBA520 synchronous demodulator circuits and exhibits excellent channel matching and stability.

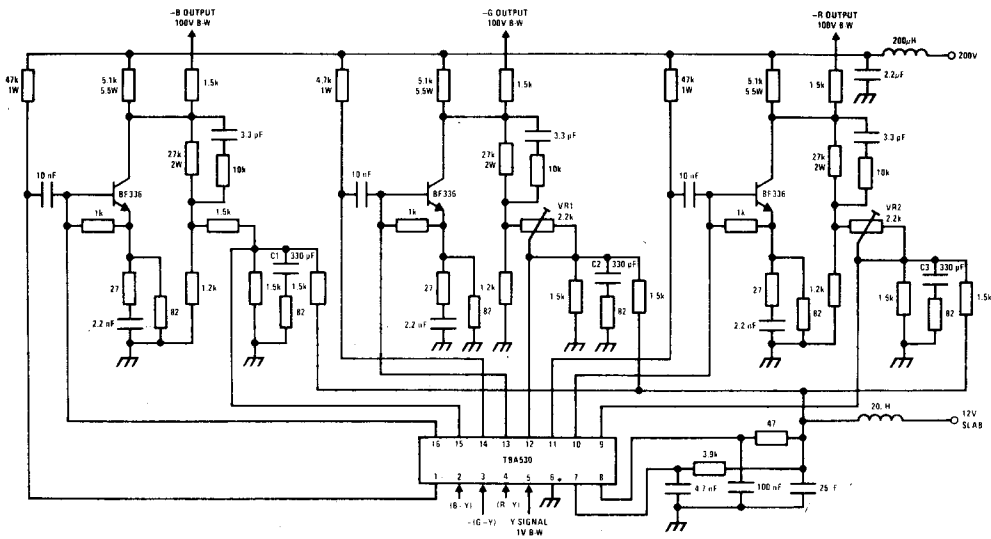
## Connection Diagram



Dual-In-Line Package, Order Number TBA530  
See NS Package N16A

Quad-In-Line Package, Order Number TBA530Q  
See NS Package N16C

## Typical Application



- Note 1:** DC output voltages R, G and B are typically 140V in this circuit.
- Note 2:** The voltage gain between pins 2, 3, 4 and collectors (BF336) is typically 100.
- Note 3:** The normal bias voltage on pins 1, 11, 14 is 8V.
- Note 4:** Pin 7 requires a 4.7 nF decoupling capacitor.
- Note 5:** DC bias level shift, provided by internal zeners between pins 1-16, 14-13 and 11-10, requires 10 nF bypass capacitors for H.F.

### Absolute Maximum Ratings

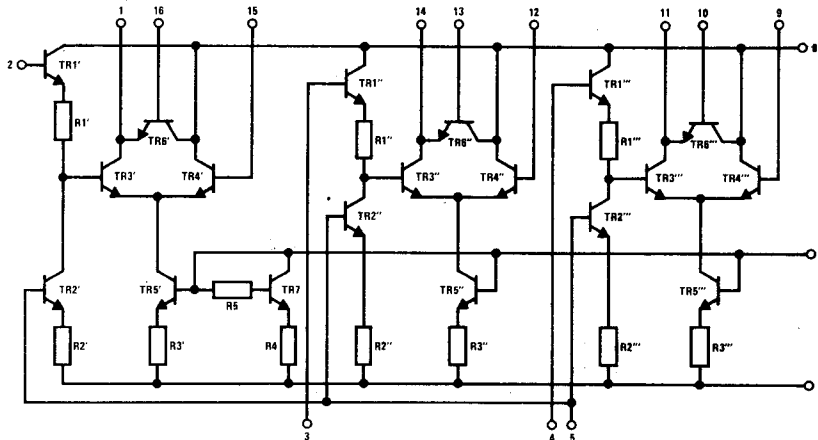
V8-6	13.2V
I1, I11, I14	10 mA
I10, I13, I16	50 mA
Power Dissipation (T <sub>A</sub> = 60°C)	400 mW
Operating Temperature Range	-20°C to +60°C
Storage Temperature Range	-65°C to +150°C
Lead Temperature (Soldering, 10 seconds)	300°C

### Electrical Characteristics

Measuring Conditions: Black Level: V<sub>R-Y</sub> = V<sub>G-Y</sub> = V<sub>B-Y</sub> = 7.5V, V<sub>Y</sub> = 1.5V, V8-6 = 12V, T<sub>A</sub> = 25°C

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Ratio of Gain of Luminance Amplifier to Color Amplifiers	As Measured in Application Circuit	0.9		1.1	
R2-6 Input Resistance of Color	1 kHz		60		kΩ
R3-6 Difference Amplifiers			60		kΩ
R4-6			60		kΩ
C2-6 Input Capacitance of Color	1 MHz		3		pF
C3-6 Difference Amplifiers			3		pF
C4-6			3		pF
R5-6 Input Resistance of Luminance Amplifier	1 kHz		20		kΩ
C5-6 Input Capacitance of Luminance Amplifier	1 MHz		10		pF
B Bandwidth of all Channels	3 dB		6		MHz
I <sub>g</sub> Total Current Drain			30		mA
I <sub>7</sub> Bias Current			2.5		mA

### Schematic Diagram



## Pin Function Description

The function is quoted against the corresponding pin number.

**1. Output load resistor, blue signal.** (Also pins 11 and 14 for red and green signals respectively.) Resistors (47 k $\Omega$ , 1W) connected to +200V provide the high value loads for the internal amplifying stages. The nominal operating potential on these pins is defined by the IC and dc feedback and is approximately +8V. The maximum current which can be allowed at each of these pins is 10 mA.

**2. -(B-Y) input signal.** This signal is fed via a low-pass filter from the TBA520 demodulator IC (pin 7) having a dc level of about +7.5V. The input resistance for this pin is typically 60 k $\Omega$  with an input capacitance of less than 5 pF (similarly for pins 3 and 4).

**3. -(G-Y) input signal.** The dc black level of this signal is about +7.5V. (See pin 2.)

**4. -(R-Y) input signal.** The dc black level of this signal is about +7.5V. (See pin 2.)

**5. Luminance signal input.** The dc level on this pin for picture black is +1.6V. The required signal amplitude is 1V black-to-white with negative-going syncs (or blanking) for cathode drive as shown. The input resistance at this pin is 20 k $\Omega$  approximately with a capacitance of less than 15 pF.

**6. Negative supply (earth).**

**7. Current feed point.** A current of approximately 2.5 mA is required at this pin, fed via a 3.9 k $\Omega$  resistor from +12V, to bias the internal differential amplifiers. A decoupling capacitor of 4.7 nF is necessary.

**8. Positive 12V supply.** Maximum supply voltage permitted, 13.2V. Current consumption approximately 30 mA.

**9. Red channel feedback (green channel, pin 12; blue channel, pin 15).** The dc working points and gains of both the output stages and the IC amplifier stages are stabilized by the feedback circuits. The black level potentials at the collectors of the output stages (tube cut-off) are adjusted by setting correctly the dc levels of the color difference signals produced by the TBA520 demodulator IC. The gains of the R-G-B output stages are adjusted to give the correct white points setting on the picture tube by adjusting the potentiometers in the feedback paths (VR1, VR2). (See notes on setting up decoder.)

**10. Red signal output (green and blue signal outputs on 13 and 16).** These pins are internally connected with pins 11, 14 and 1 respectively via zener type junctions to give a dc level shift appropriate for driving the output transistor bases directly. To bypass the zener junctions at h.f. three 10 nF capacitors are required.

**11. Output load resistor, red channel (see pin 1).**

**12. Green channel feedback (see pin 9).**

**13. Green signal output (see pin 10).**

**14. Output load resistors, green channel (see pin 1).**

**15. Blue channel feedback (see pin 9).**

**16. Blue signal output (see pin 10).**

**Note 1:** Careful attention to earth paths should be given, avoiding common impedances between the input (decoder) side and the output stages. Also, to enable matched performance to be achieved, a symmetrical board and component layout should be adopted for the three output stages. To compensate for the effect upon h.f. response of inevitable differences the compensating capacitors C1 and C2 and C3 may be appropriately selected for any given board layout.

**Note 2:** The signal black level at the collectors of the R-G-B output stages depends upon the +12V supply, the dc level of the color difference signals from the TBA520 demodulator IC and the black level potential of the luminance signal applied to the TBA530 matrix IC. The dc levels of the signals produced and handled by the IC's are designed to have approximately proportional tracking with the 12V supply potential.

$$\text{i.e., } \frac{\Delta V(\text{dc level, signal})}{\Delta V_{12V}} \approx \frac{V_{\text{nom}}(\text{dc level, signal})}{12}$$

To ensure that changes in picture black level due to variations on the 12V supply to the IC's occur in a predictable way, all the IC's should be operated from a common supply line. This is specially important for the TBA520 and TBA530. Furthermore, to limit the changes in picture black level during receiver operation, the 12V supply should have a stability of not worse than  $\pm 3\%$  due to operational variations.

**Note 3:** To reduce the possibility of patterning on the picture due to radiation of the harmonics of the products of the demodulation process, the leads carrying the drive signals to the picture tube should be as short as the receiver layout will allow. Resistors (typically 1k  $\Omega$ ) connected in series with the leads and mounted close to the collectors of the output transistors provide useful additional filtering of harmonics.

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[www.DatasheetCatalog.com](http://www.DatasheetCatalog.com)

Datasheets for electronic components.

# National Semiconductor was acquired by Texas Instruments.

[http://www.ti.com/corp/docs/investor\\_relations/pr\\_09\\_23\\_2011\\_national\\_semiconductor.html](http://www.ti.com/corp/docs/investor_relations/pr_09_23_2011_national_semiconductor.html)

This file is the datasheet for the following electronic components:

TBA530 - <http://www.ti.com/product/tba530?HQS=TI-null-null-dscatalog-df-pf-null-ww>