



APPLICATION NOTE

TSH10/TSH11/TSH150/TSH151 VIDEO DISTRIBUTOR

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FEATURES

- 4 outputs, 75Ω impedance
- 75Ω or High Z input impedance
- 12V power supply, 50mA
- 20Hz to 30MHz (-3dB) bandwidth

SCHEMATIC

This application uses a high speed Operational amplifier : TSH150 or TSH151. These two Operational amplifiers have a high gain bandwidth product, typically 150MHz, and a large output current, 100mA.

Due to these characteristics, it is possible to drive at a 2V peak-to-peak output a minimum of 4 video lines, each representing a 150Ω load.

Major difference between TSH150 and TSH151 is the input impedance.

- The TSH150 has bipolar inputs with a medium input resistance.
- The TSH151 has MOSFET inputs with a very high input resistance.

In the video distributor application both circuits can be used. The bias resistor R3 can have a very high value if a TSH151 is used, for example 100k and the input capacitor can be a small one ($C1 = 0.1\mu\text{F}$).

As the input bias current is not negligible with the TSH150 ($5\mu\text{Amax}$), it is recommended to use a medium value resistor for R3 (4.7k for example). The input capacitor C1 must have a higher value to not attenuate the low frequencies, a $2.2\mu\text{F}$ is a good choice.

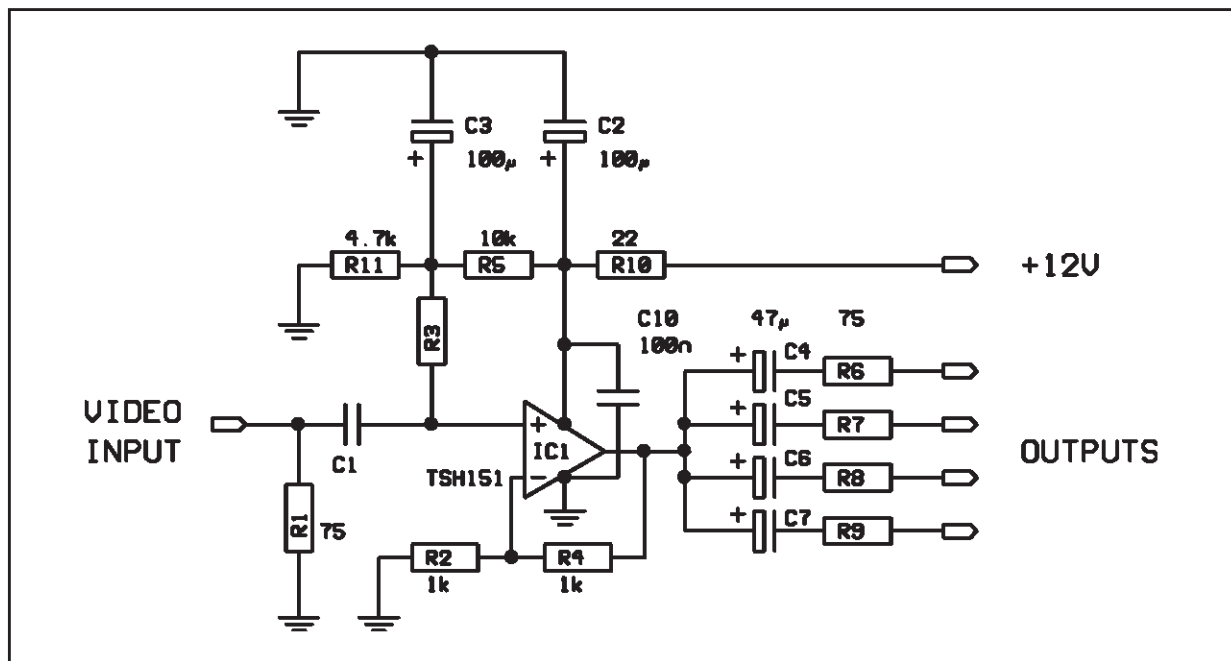
On the schematic below, a single supply (+12V) is used. It is necessary to bias the positive input of the operational amplifier at a DC voltage in order to have a DC output at $V_{CC}/2$.

As the operational amplifier is used with a gain of 2, a 3V DC bias is necessary at the input.

This voltage is obtained by the resistors R5 (10k) and R11 (4.7k) and a decoupling capacitor C3 ($100\mu\text{F}/6.3\text{V}$).

Each output is impedance matched to 75Ω by the resistors R6, 7, 8, 9 and the DC voltage is removed by $47\mu\text{F}$ capacitors C4, 5, 6, 7.

SCHEMATIC DIAGRAM



APPLICATION NOTE

PRECAUTIONS

As with every high frequency circuit, it is mandatory to have a decoupling capacitor close to the operational amplifier. The best solution is to use an SMD 100nF cap connected directly to the pins of the IC (C10). A series resistor in the positive rail (R10) limits the sensitivity to high frequency noise present on the power supply.

An electrolytic capacitor (C2) is used to decouple the power supply at low frequency. It can be removed if the power supply is closed to the video

distributor and has a large output capacitor. In this case resistor R10 must be short-circuited, assuming the power supply is noise-free.

TSH10 and TSH11

For less demanding applications, it is possible to use the low cost TSH10/11 operational amplifiers. The TSH10/11 are basically identical to the TSH150/151 with relaxed parameters, particularly the output current. The TSH10/11 are the best choice for consumer applications.

Figure 1 - PHOTO PLOT (top view - not to scale)

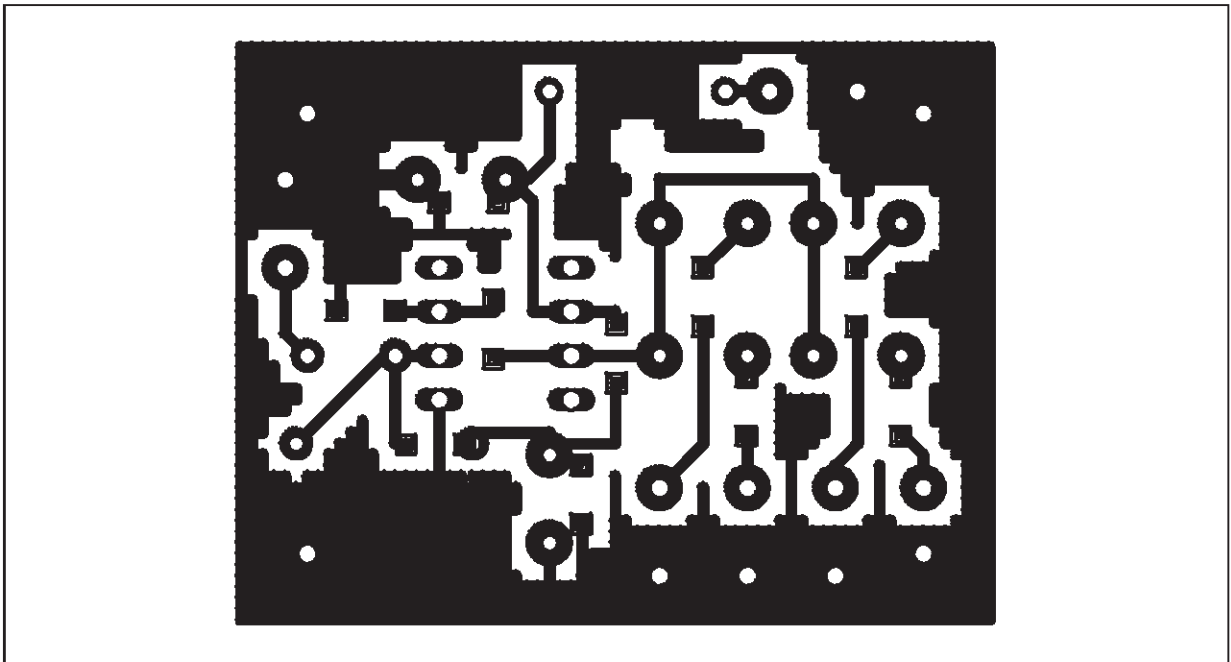
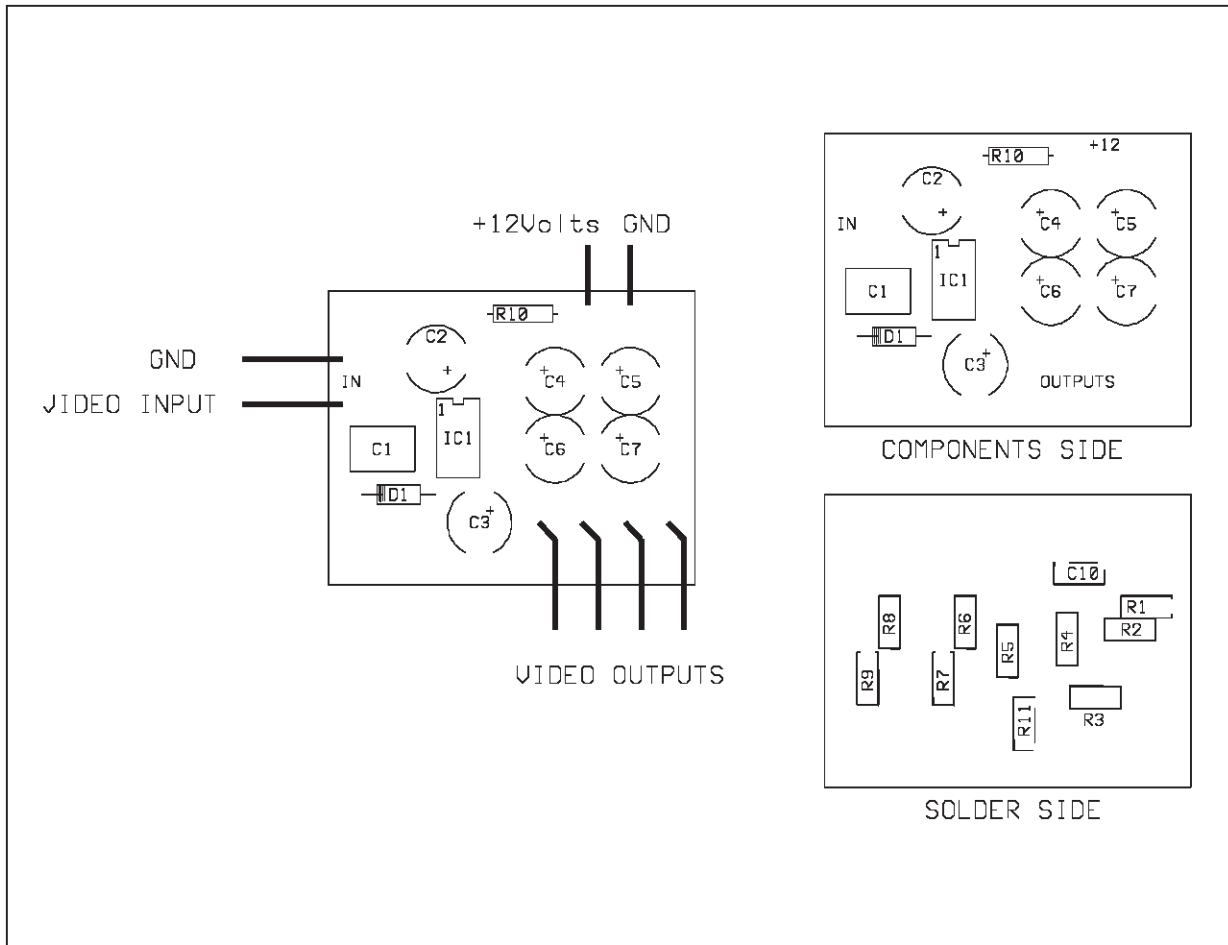


Figure 2 - PHOTO PLOT (top view - not to scale)



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