SGS-THOMSON MICROELECTRONICS

APPLICATION NOTE

VIDEO LINE TRANSCEIVER WITH REMOTE CONTROL

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INTRODUCTION

The TSH94 is a quad low power video operational amplifier with two operators having an independent complementary standby mode.

This standby mode decreases the consumption of the corresponding amplifier and puts its output in high impedance state. The TSH94 has high video performances, a 100MHz follower bandwidth, 0.03% differential gain and 0.07° differential phase.

In this note, three amplifiers are used to transmit and receive video bandwidth signals on a single line. A remote control function is added to control the equipment on the other side of the line.

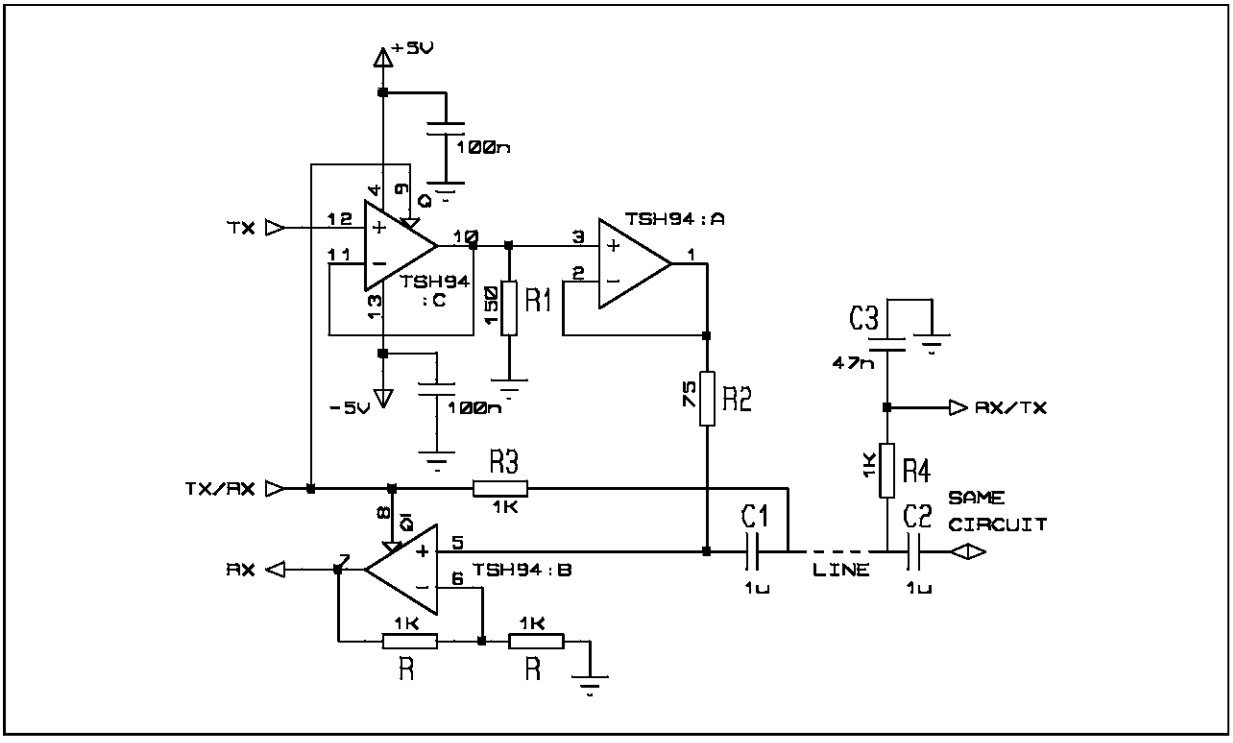
DESCRIPTION

Two operational amplifiers are used for transmission as followers. TSH94:C is a switch, to have on TSH94 : A input the TX signal during transmission, and a ground in reception. Thus, output of TSH94:A drive the line in transmission and shows a virtual ground in reception allowing good impedance matching at cable end.

In reception, TSH94:B is a +2 amplifier to compensate the necessary voltage loss due to impedance matching resistors.

The remote control is achieved using a coupling capacitor on each line side, allowing to use the DC

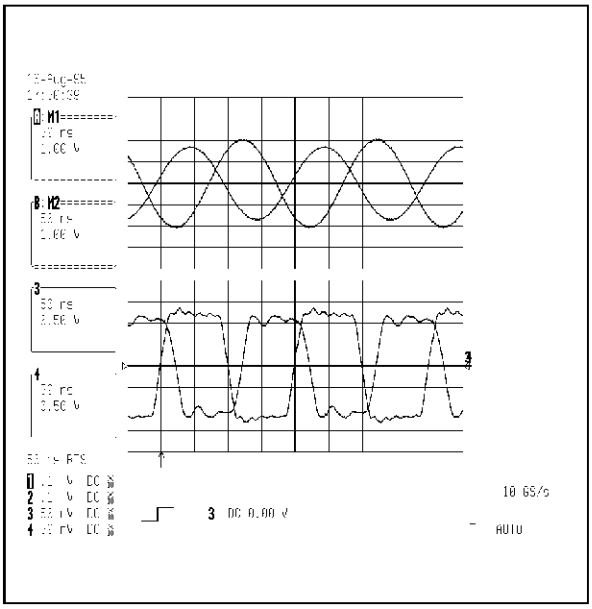
Figure 1 : Electrical Schematic



component for TX/RX signal. A RC network is sufficient on slave side to average video signal before driving RX/TX input. On slave side, operators B and C must be inverted.

Figure 2 shows two pairs of signals acquired at different times, on each cable side. The cable is a 25 meters RG59, 75Ω. At the top is a 4Vpp 5MHz sine wave and at the bottom a 2.4Vpp 5MHz square wave. One can see the 120ns delay and 25% attenuation due to the cable.

Figure 2 : Two TX and RX Example Signals

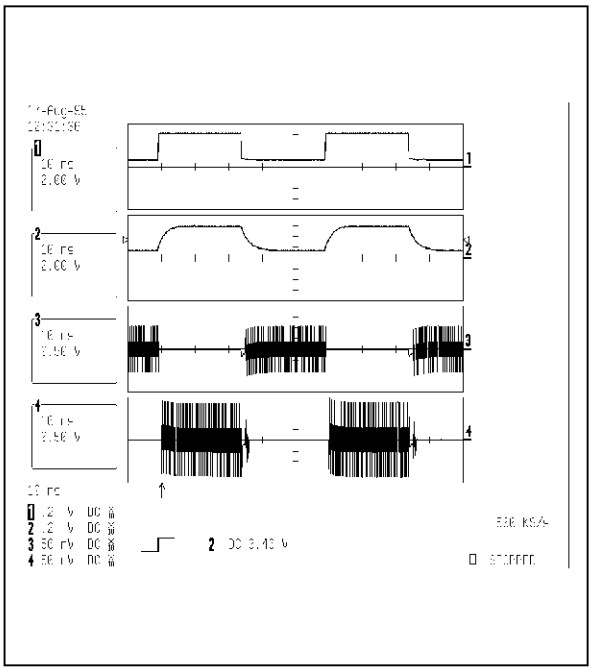


SPECIAL PRECAUTIONS

A compromise must be found between the low frequency bandwidth limit and the amplitude of the transmitted signal, and the switching speed of the remote control. It can be adjusted by modifying R3, R4, C1, C2 and C3 values. To transmit the 20Hz low frequency limit of video signal, C1 and C2 must have values above 100µF.
For better performance, TX/RX driving signal will be adjusted around standby threshold level, i.e. Vcc+ - 1.6V.
Note that ESD rating of TSH94 is more than 3KV-HBM on output and inputs.

Figure 3 shows the reception signal on each side and the standby signals with a 20Hz TX/RX.

Figure 3 : TX/RX(1), RX/TX(2), RX1(3), RX2(4)



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