APPLICATIONS SUMMARY

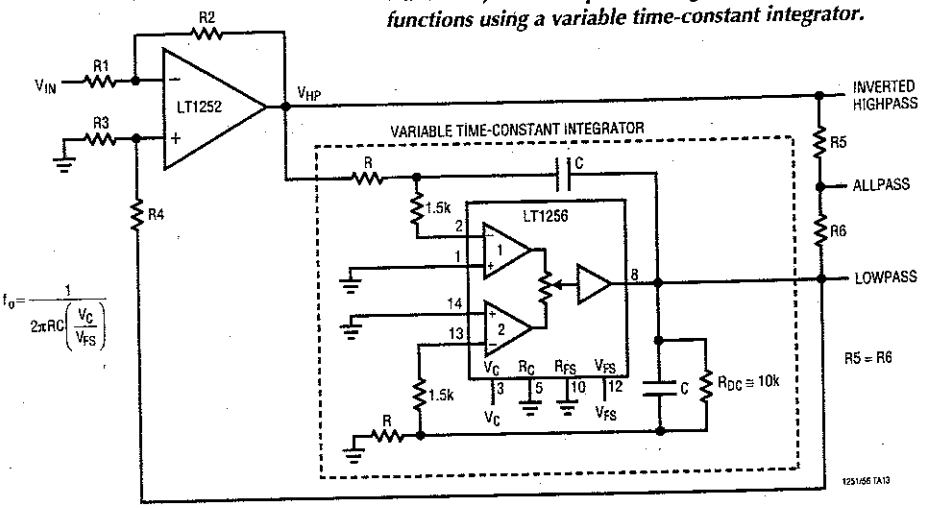
Voltage-controlled low-pass high-pass and all-pass filter

Taken from Linear's High-Speed Amplifier Solutions Handbook, this filter provides high, low and all-pass functions using a variable time-constant integrator.

An integrator within the feedback loop of an *LT1252* current feedback amplifier creates a filter with three output functions – low-pass, high-pass and all-pass.

By using a variable time constant integrator as the feedback element, the cut-off frequencies of the low-pass and high-pass outputs are adjustable, set by control voltage (V_C) on pin 3 of the *LT1256*. On the all-pass filter output, adjusting the control voltage alters the phase of the output. Resistors $R_{5,6}$ set output impedance of the all-pass filter. For the *LT1252* R_2 should satisfy the cf amplifier's minimum resistance (750Ω) and all four resistors must satisfy $R_2/R_1=R_3/R_4$. Pass-band gain for all three outputs is $-R_2/R_1$.

Linear Technology, *The Coliseum, Riverside Way, Camberley, Surrey GU15 3YL, tel. 01276 677676, fax 01276 64851.*



Send colour 1000 feet over low cost twisted pair

Composite video signals can be sent appreciable distances on low-cost twisted pair – in two directions. The cost advantage of this technique is significant. Standard 75Ω RG-9/U coaxial cable costs between 25¢ and 50¢ per foot, but PVC twisted pair is only pennies per foot. This means hundreds of dollars are saved in installations as short as 1000 feet, easily paying for additional electronics. The system also provides for 'drops' or receiver taps along the pair.

This bidirectional 'video bus' consists of the *LT1190* op-amp and the *LT1193* video difference amplifier shown in **Fig. 1**. The two top-left *LT1190*s generate differential signals to drive the line, which is back-terminated in its characteristic impedance. The twisted pair receiver is an *LT1193* video difference amplifier, bottom right, and it converts signals from differential to single-ended.

Because of the *LT1193*'s unique topology, it is possible to provide cable compensation at the amplifier's feedback node as shown. In this case, 1000 feet of twisted pair is compensated with 1000pF and 50Ω to boost the –3dB bandwidth of the system from 750kHz to 4MHz. Attenuation in the cable can be compensated by lowering the gain-setting resistor R_G. At top right, another pair of *LT1190*s provides cable termination via low output impedance and generates differential signals.

A good indication of the system's ability to pass colour video is **Fig. 2**. This multiburst pattern was passed through 1000 feet of low-cost PVC twisted pair; it contains a 3.58MHz chroma subcarrier and a 4.5MHz sound subcarrier. Although the photo shows these frequencies attenuated about 3dB, a clean picture is present at the end of the twisted pair.

This and the above circuit are taken from Linear Technology's High-Speed Amplifier Solutions Handbook.

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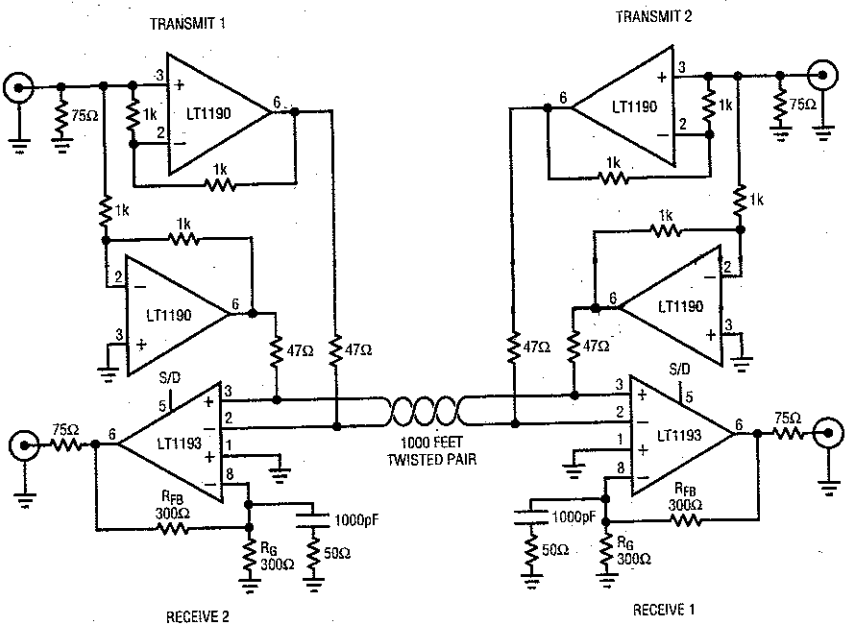

Fig. 1. Video transceiver uses low-cost PVC twisted pair.

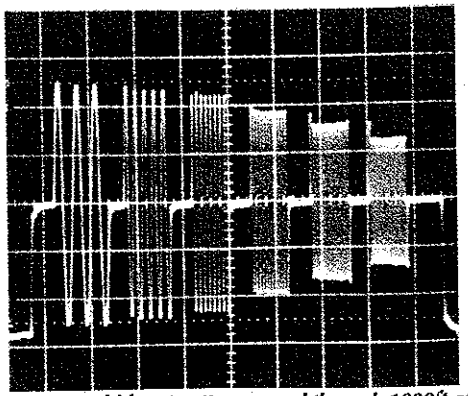

Fig. 2. Multi-burst pattern passed through 1000ft of twisted pair. Although –3dB at around 4MHz is indicated, colour video pictures are clear.