DESIGN NOTES

Video Circuits Collection – Design Note 57

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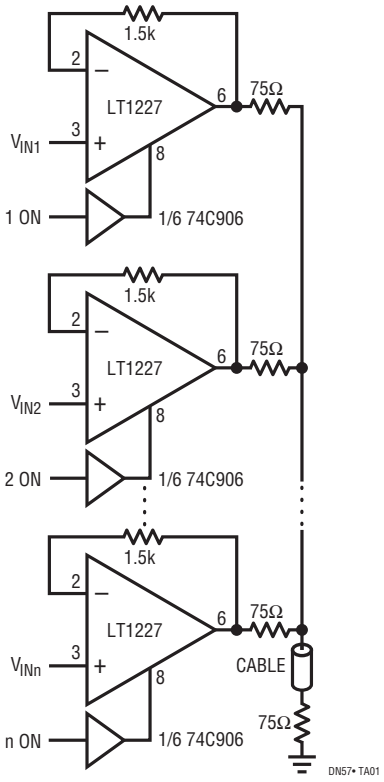
Introduction

This note shows how to make several different video circuits using high speed op amps. All of these circuits work with composite, RGB and monochrome video. For best results, bypass the power supply pins of these amplifiers with 1µF to 10µF tantalum capacitors in parallel with 0.01µF disc capacitors. It is important to terminate both ends of video cables to preserve frequency response. When properly terminated, the cable looks like a resistive load of 150Ω.

Lots of Inputs Video MUX Cable Driver (LT1227)

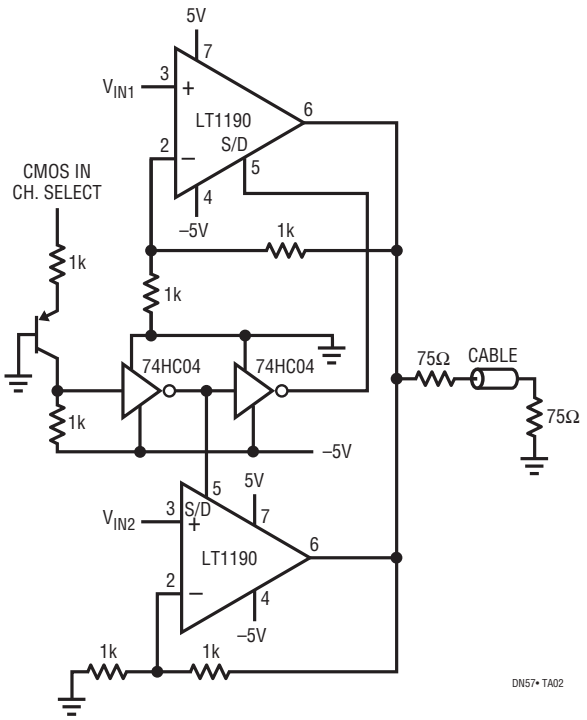


Multiplex Amplifiers

Often it is desirable to select one of several signals to send down a cable. Connecting the outputs of several amplifiers together and using the amplifier's shutdown pin to disable all but one accomplishes this goal. The LT®1190, LT1191, LT1192, and LT1193 are shutdown by pulling pin 5 to the negative supply.

The LT1223 and LT1227 current feedback amplifiers are shutdown by pulling Pin 8 to ground. During normal operation Pin 8 is open and at the positive supply potential. An easy way to interface Pin 8 to logic is with a logic level N-channel FET or a 74C906 (open-drain hex buffer).

Two Input Video MUX Cable Driver (LT1190)



Differential Gain and Phase of Several Amplifiers

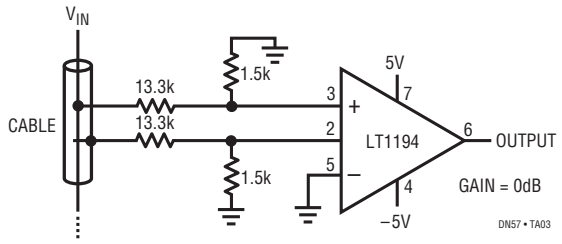
	DIFFERENTIAL			
	LOAD = 1kΩ		LOAD = 150Ω	
PART NUMBER	GAIN	PHASE	GAIN	PHASE
LT1190*	0.05	0.02	0.23	0.16
LT1191*	0.03	0.01	0.09	0.07
LT1192**	0.10	0.01	0.23	0.15
LT1193*	0.20	0.08	0.20	0.08
LT1194**	0.20	0.08	0.20	0.08
LT1223	0.01	0.02	0.12	0.26
LT1227	0.01	0.01	0.01	0.01
LT1228	0.01	0.01	0.04	0.10
LT1229	0.01	0.01	0.04	0.10

V_S = ±15V, A_V = 2
*V_S = ±8V, A_V = 2
**V_S = ±8V, A_V = 10

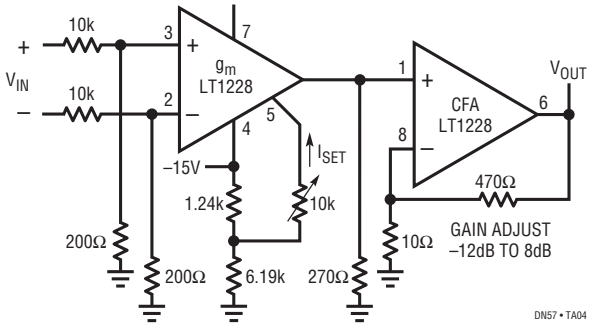
Loop Through Cable Receivers

Most video instruments require high impedance differential input amplifiers that will not load the cable even when the power is off.

Differential Input Video Loop Through Amplifier Using a Video Difference Amplifier (LT1194)



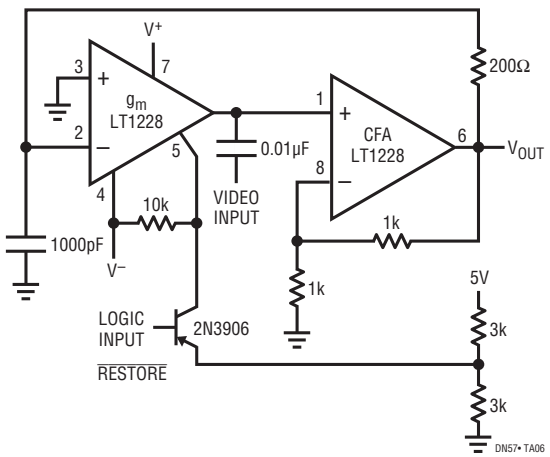
Electronically Controlled Gain, Video Loop Through Amplifier (LT1228)



DC Restore Circuits

The following circuit restores the black level of a monochrome composite video signal to 0V at the beginning of every horizontal line. This circuit is also used with CCD scanners to set the black level.

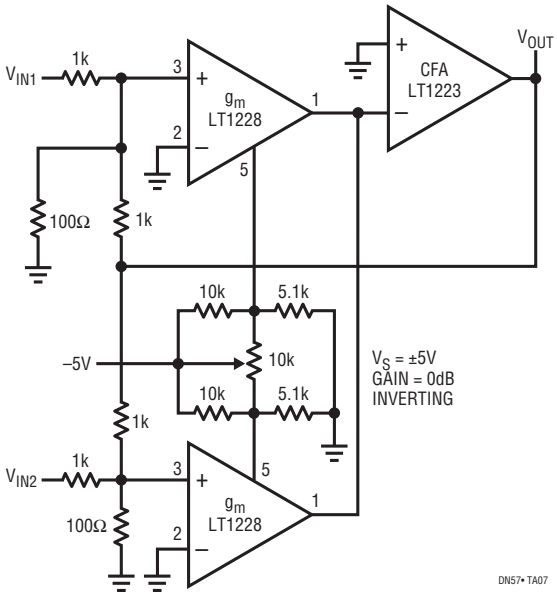
Video DC Restore (Clamp) Circuit (LT1228)



Fader Circuits

Using two LT1228 transconductance amplifiers in front of a current feedback amplifier forms a video fader. The ratio of the set currents into Pin 5 determines the ratio of the inputs at the output.

Video Fader (LT1228, LT1223)



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