



## LM1044 Analog Video Switch

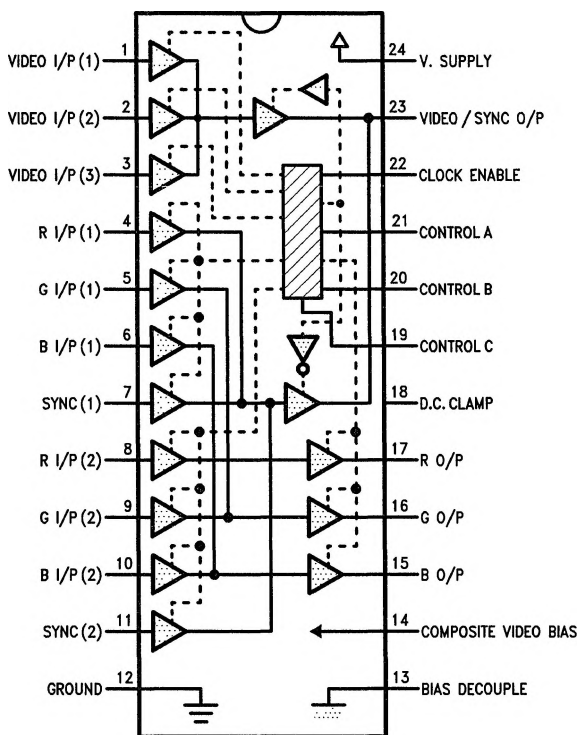
### General Description

The LM1044 is a monolithic D.C. controlled analog switch, allowing the selection of any one of three composite video channels of voltage gain +6 dB or two R.G.B. channels with voltage gains of 0 dB. Channel selection is achieved by utilizing clocked, TTL compatible control logic which can interface to most micro-controllers. The device is supplied in a 24 pin dual-in-line package.

### Features

- R.G.B. channels are level clamped
- Wide bandwidth, typically 10 MHz @ 2 V<sub>p-p</sub>
- High signal to noise ratio, typically -60 dB
- Excellent channel isolation and crosstalk typically -60 dB and -50 dB respectively @ 5 MHz
- High RGB output currents, typically 4 mA peak
- Logically compatible with LM1038 audio select switch

### Block Diagram



**Order Number LM1044N**  
**See NS Package Number N24A**

TL/H/9252-1

## Absolute Maximum Ratings

If Military/Aerospace specified devices are required, contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage

$$V_S = 17V$$

Operating Temperature Range

$$0^{\circ}C \text{ to } +70^{\circ}C$$

Storage Temperature Range

$$-65^{\circ}C \text{ to } +150^{\circ}C$$

Lead Temperature (Soldering, 10 sec.)

$$260^{\circ}C$$

## Electrical Characteristics $V_S = 12V$ , $T_A = 25^{\circ}C$ unless otherwise stated

Parameter	Conditions	Test Limit		Design Limit			Units
		Min	Max	Min	Typ	Max	
Supply Voltage		8	16	8	12	16	V
Supply Current			60		42	60	mA
P.S.R.R.	Signal = 1 V <sub>p-p</sub> @ 1 kHz	50			50		dB
Signal To Noise Ratio					60		dB
TTL High Level (A,B,C Enable)		2.0		2.0			V
TTL Low Level (A,B,C Enable)			0.8			0.8	V
Enable Pulse Length					5.0		$\mu s$
Channel Select Time					4.0		$\mu s$

### COMPOSITE VIDEO CHANNELS

Maximum Input Voltage Swing	$R_L = 600\Omega$ , $V_S = 12V$ Output T.H.D. = 1 %	1.5		1.5			V <sub>p-p</sub>
Input Impedance					2.0		k $\Omega$
Dynamic Output Impedance					10		$\Omega$
Voltage Gain	Signal = 500 mV @ 1 MHz	5.5		5.5	6.0	6.5	dB
Bandwidth	-3 dB, $R_L = 600\Omega$	6.0		6.0	10.0		MHz
Channel Isolation In Mute	Signal = 500 mV @ 5 MHz				-60		dB
Crosstalk	Signal = 500 mV @ 5 MHz				-50		dB
Load Resistance				600			$\Omega$

### R.G.B. CHANNELS

Clamp Drive High Level Threshold				9.0			V
Clamp Drive Low Level Threshold						5.0	V
Clamp Pulse Delay					0.2		ns
Input Voltage Swing	$R_L = 600\Omega$ Output T.H.D. = 1 %					3.0	V <sub>p-p</sub>

# Electrical Characteristics $V_S = 12V$ , $T_A = 25^\circ C$ unless otherwise stated (Continued)

Parameter	Condition	Test Limit		Design Limit			Units
		Min	Max	Min	Typ	Max	
Input Impedance					2.0		$k\Omega$
Dynamic Output Impedance					10		$\Omega$
Voltage Gain	Signal = 500 mV @ 1 MHz	-0.5		-0.5	0	+0.5	dB
Input Bias Current	Clamp Drive Low. DC bias = 7V		50			50	$\mu A$
Bandwidth	-3 dB, $R_L = 600\Omega$	6.0		6.0	10.0		MHz
Load Resistance				600			$\Omega$
Channel Isolation	Signal = 500 mV @ 5 MHz			-60			dB
Crosstalk	Signal = 500 mV @ 5 MHz			-50			dB

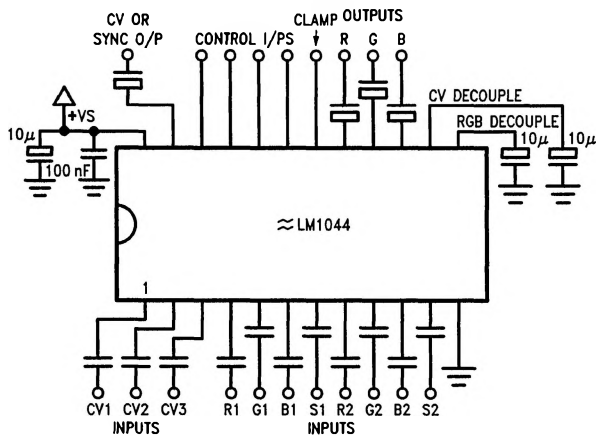
## Application Notes

Signal channel selection is achieved by the application of D.C. voltages to control pins 19, 20, 21, and 22. Pin 22 is the logic enable pin and may be used to clock in logic data on pins 19, 20, and 21 by applying a pulse of  $> 5 \mu s$ . Alternatively pin 22 may be wired TTL HIGH and channels selected directly by applying the appropriate logic levels on pins 19, 20 and 21.

The control logic of the LM1044 is designed to be compatible with that of the LM1038N four channel stereo audio switch. The control pins of each device may be connected in parallel to give stereo audio selection on Composite Video channels 1, 2 and 3 and RGB channel 1. This is achieved by connecting pins 19, 20, 21 and 22 of the LM1044 to pins 1, 16, 3 and 18 of the LM1038N respectively.

Control Logic				Channel Selected
Pin 22	Pin 19	Pin 21	Pin 20	
1	0	0	0	Composite Video 1, RGB outputs muted
1	0	0	1	Composite Video 2, RGB outputs muted
1	0	1	0	Composite Video 3, RGB outputs muted
1	0	1	1	RGB 1 with sync.
1	1	1	1	RGB 2 with sync.
1	1	0	1	Mute
1	1	1	0	Mute
1	1	0	0	Mute
0	X	X	X	Previous selection retained

## Application Circuits



Coupling Capacitors  
 RGB and Sync i/ps 100 nF  
 RGB and Sync o/ps 10  $\mu$ F  
 Composite Video o/p 10  $\mu$ F  
 Composite Video i/ps 100 nF

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