

## Analog Function Switch

### Overview

The LC7824 is an analog switch incorporating seven switches into a single chip, making it ideal for audio and video applications in amplifiers, receivers and television equipment.

The LC7824 is controlled from a three-wire bus (C<sup>2</sup>B), allowing for an easy interface with a microcontroller. In addition, a device select pin allows two devices to be connected to the bus.

The LC7824 operates from a  $\pm 9\text{V}$  supply and is available in 16-pin DIPs.

### Features

- Audio and video bandwidth.
- Seven analog switches.
- Select pin allows two LC7824s to be connected to a common, serial data bus.
- Easy microcontroller interface.
- $\pm 9\text{V}$  supply.
- 16-pin DIP.

### Specifications

#### Absolute Maximum Ratings

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{DD\text{ max}}$		-0.3 to +10	V
	$V_{EE\text{ max}}$		-10 to +0.3	V
Logic-level input voltage range	$V_{IH}$		-0.3 to +10	V
Analog switch input voltage range	$V_{I2}$		$V_{EE}-0.3$ to $V_{DD}+0.3$	V
Voltage differential across switches when closed	$\Delta V_{ON}$		0.5	V
Allowable power dissipation	$P_{d\text{ max}}$		100	mW
Operating temperature range	$T_{opr}$		-30 to +75	$^{\circ}\text{C}$
Storage temperature range	$T_{stg}$		-40 to +125	$^{\circ}\text{C}$

#### Recommended Operating Conditions at $T_a = 25^{\circ}\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	$V_{DD}$		4.5 to 9	V
	$V_{EE}$		-9 to 0	V

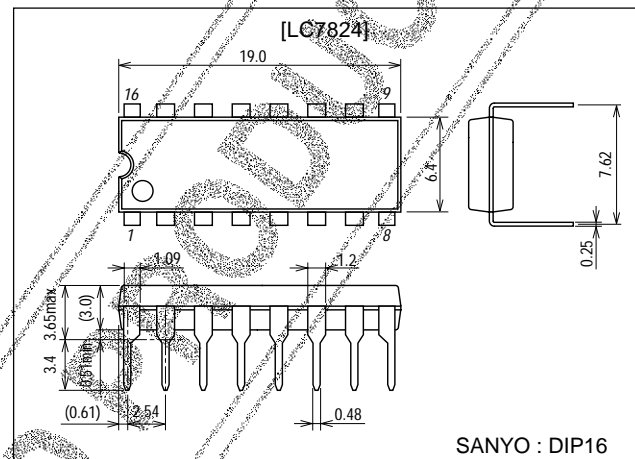
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### Package Dimensions

unit:mm

3006C-DIP16

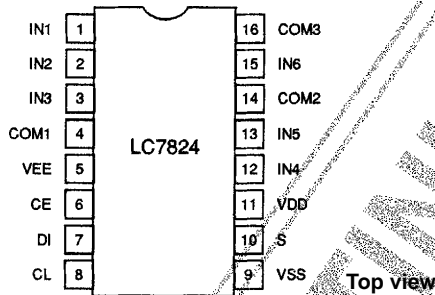


# LC7824

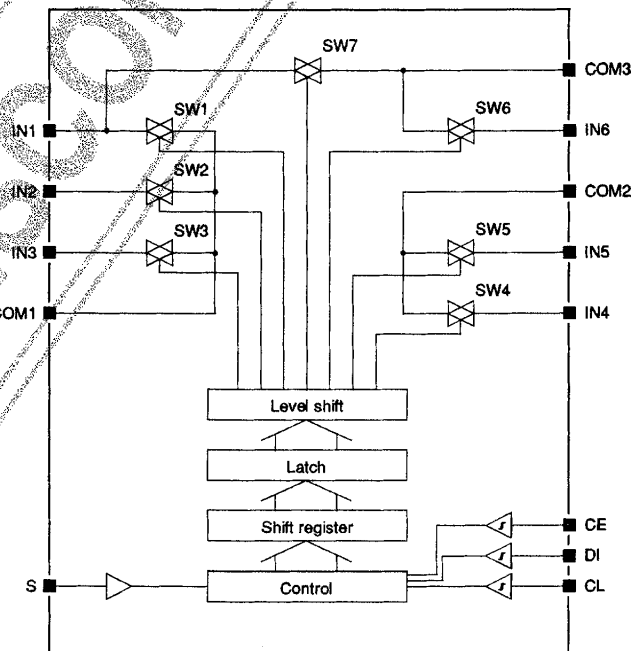
**Electrical Characteristics** at  $T_a = -30$  to  $+75^\circ\text{C}$ ,  $V_{DD}=4.5$  to  $9\text{V}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Supply current	$I_{DD}$	$V_{DD}=9\text{V}$ , $V_{EE}=-9\text{V}$			1	mA
C <sup>2</sup> B input low-level voltage	$V_{IL1}$		$V_{SS}$		1	V
C <sup>2</sup> B input high-level voltage	$V_{IH1}$		4.2		9	V
Select pin input low-level voltage	$V_{IL2}$		$V_{SS}$		$0.3V_{DD}$	V
Select pin input high-level voltage	$V_{IH2}$		$0.7V_{DD}$		$V_{DD}$	V
Analog switch ON resistance	$R_{ON}$	$V_{DD}=5\text{V}$ , $V_{EE}=-5\text{V}$		150		$\Omega$
		$V_{DD}=9\text{V}$ , $V_{EE}=-9\text{V}$		110		$\Omega$
Passband	$f_T$	$V_{IN}=1\text{V}$ , -1dB down	0		5	MHz
		$V_{IN}=1\text{V}$ , -3dB down	0		10	MHz
Second and third order harmonic distortion	H2, H3	$V_{IN}=1\text{V}$ , $f=5\text{MHz}$		60		dB
Total harmonic distortion	THD	$V_{IN}=1\text{V}$ , $f=1\text{kHz}$		0.01		%
		$V_{IN}=0.1\text{V}$ , $f=1\text{kHz}$		0.05		%
Feedthrough	$F_{TH}$	$V_{IN}=1\text{V}$ , $f=5\text{MHz}$		50		dB
Crosstalk	$C_T$	$V_{IN}=1\text{V}$ , $f=5\text{MHz}$		50		dB
Input low-level current	$I_{IL}$	$V_{DD}=9\text{V}$ , $V_{EE}=-9\text{V}$ , $V_I=0\text{V}$	-10			$\mu\text{A}$
Input high-level current	$I_{IH}$	$V_{DD}=9\text{V}$ , $V_{EE}=-9\text{V}$ , $V_I=9\text{V}$			10	$\mu\text{A}$
Switch leakage current	$I_{OFF}$	$V_{DD}=9\text{V}$ , $V_{EE}=-9\text{V}$ , $V_I=-9$ to $+9\text{V}$	-10		+10	$\mu\text{A}$
Analog switch input voltage	$V_{IN}$		$V_{EE}$		$V_{DD}$	V
C <sup>2</sup> B input hysteresis width	$V_H$		0.3			V

## Pin Assignment



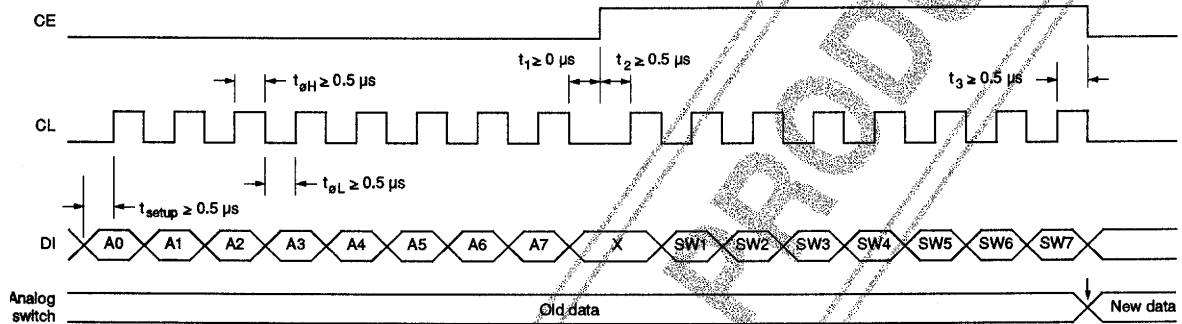
## Block Diagram



**Pin Description**

Number	Name	Description
1, 2, 3, 12, 13, 15	IN1 to IN6	Analog switch inputs/outputs
4, 14, 16	COM1 to COM3	Analog switch common inputs/outputs
5	V <sub>EE</sub>	-4.5 to -9V supply voltage
6	CE	Schmitt-trigger, chip enable
7	DI	Schmitt-trigger, serial data input
8	CL	Schmitt-trigger, clock input
9	V <sub>SS</sub>	Ground
10	S	Device select input
11	V <sub>DD</sub>	4.5 to 9V supply voltage

**Timing Characteristics**



Ta = -30 to +75°C, V<sub>DD</sub>=4.5 to 9V

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
LOW-level clock pulsewidth	t <sub>oL</sub>		0.5			μs
HIGH-level clock pulsewidth	t <sub>oH</sub>		0.5			μs
Setup time	t <sub>setup</sub>		0.5			μs
Serial data input timing	t <sub>1</sub>		0			μs
	t <sub>2</sub>		0.5			μs
	t <sub>3</sub>		0.5			μs

**Functional Description**

The LC7824 analog switch is controlled from a three-wire bus, which comprises chip-enable, clock and serial data inputs. The 16-bit serial input code comprises eight address bits and eight control bits as shown in figure 1.

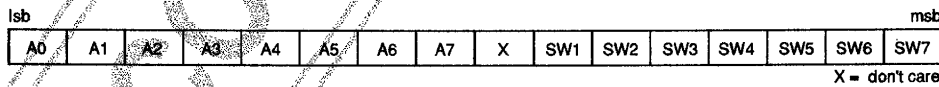


Figure 1. Data input

The address data is latched on the rising edge of CE, and the input data, on the falling edge as shown in figure 2.

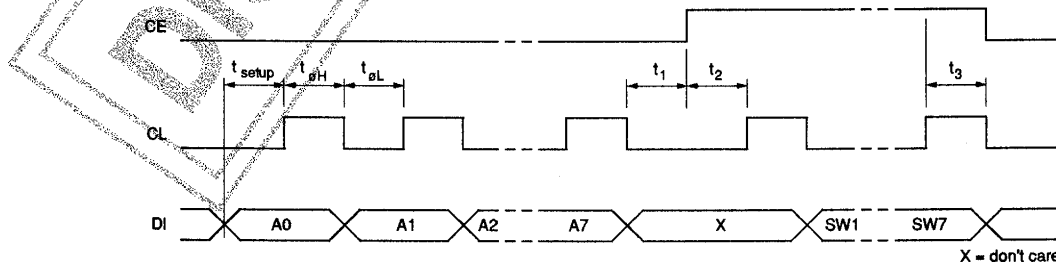


Figure 2. Input timing

When S (pin 10) is LOW, the device address is 01101110 (6EH), and when HIGH, 01101111 (6FH). Each switch is turned ON if the corresponding control bit is 1, and OFF, if 0. The X bit is ignored.

Typical Applications

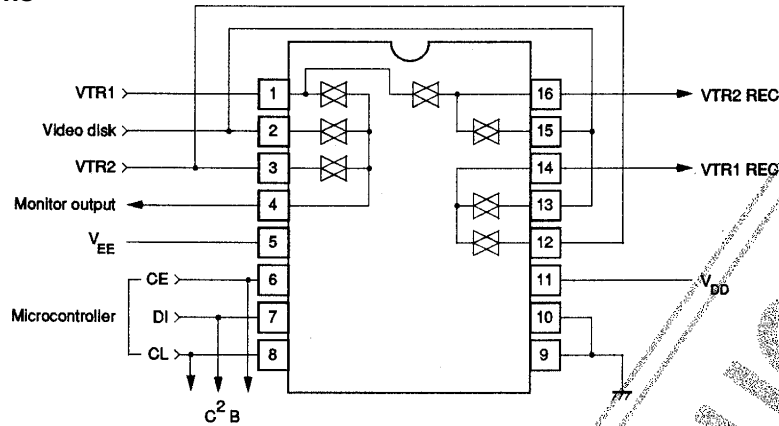


Figure 3. Video switching (1)

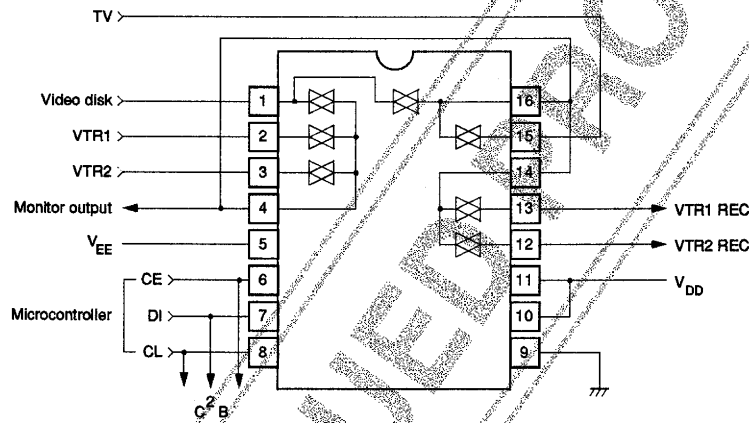


Figure 4. Video switching (2)

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