Ordering number:ENN3641

CMOS IC

LC7824

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^2B), 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 ±9V supply and is available in 16-pin DIPs.

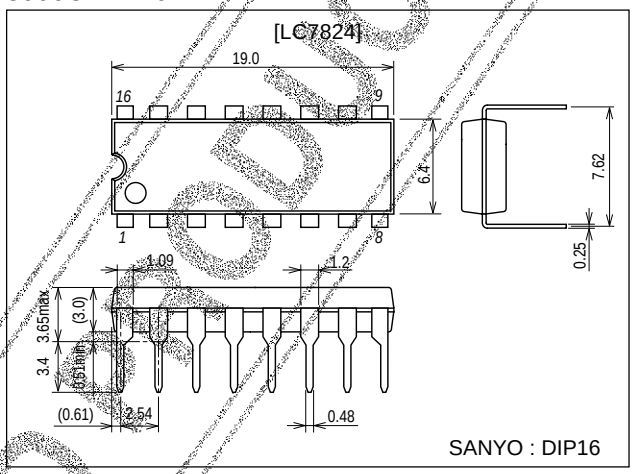
Features

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

Package Dimensions

unit:mm

3006C-DIP16



Specifications

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{DD} max		–0.3 to +10	V
	V_{EE} max		–10 to +0.3	V
Logic-level input voltage range	V_{I1}		–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	ΔV_{ON}		0.5	V
Allowable power dissipation	Pd max		100	mW
Operating temperature range	Topr		–30 to +75	˚C
Storage temperature range	Tstg		–40 to +125	˚C

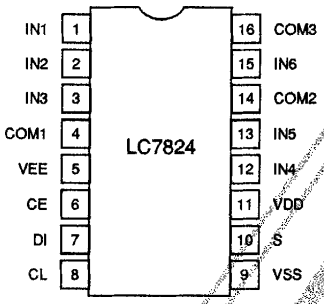
Recommended Operating Conditions at Ta = 25˚C

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

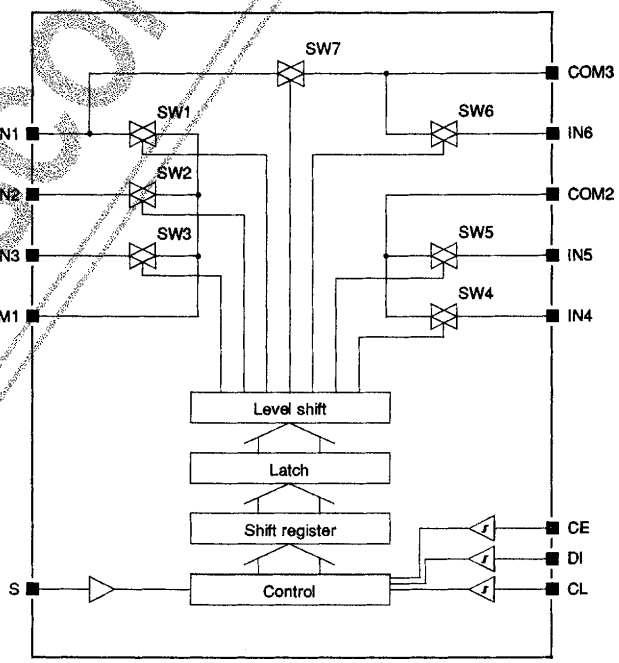
Electrical Characteristics at Ta = –30 to +75˚C, V_{DD}=4.5 to 9V

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Supply current	I_{DD}	V_{DD}=9V, V_{EE}=–9V			1	mA
C²B input low-level voltage	V_{IL1}		V_{SS}		1	V
C²B 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}=5V, V_{EE}=–5V		150		Ω
		V_{DD}=9V, V_{EE}=–9V		110		Ω
Passband	f_T	V_{IN}=1V, –1dB down	0		5	MHz
		V_{IN}=1V, –3dB down	0		10	MHz
Second and third order harmonic distortion	H2, H3	V_{IN}=1V, f=5MHz		60		dB
Total harmonic distortion	THD	V_{IN}=1V, f=1kHz		0.01		%
		V_{IN}=0.1V, f=1kHz		0.05		%
Feedthrough	F_{TH}	V_{IN}=1V, f=5MHz		50		dB
Crosstalk	C_T	V_{IN}=1V, f=5MHz		50		dB
Input low-level current	I_{IL}	V_{DD}=9V, V_{EE}=–9V, V_I=0V	–10			µA
Input high-level current	I_{IH}	V_{DD}=9V, V_{EE}=–9V, V_I=9V			10	µA
Switch leakage current	I_{OFF}	V_{DD}=9V, V_{EE}=–9V, V_I=–9 to +9V	–10		+10	µA
Analog switch input voltage	V_{IN}		V_{EE}		V_{DD}	V
C²B input hysteresis width	V_H		0.3			V

Pin Assignment



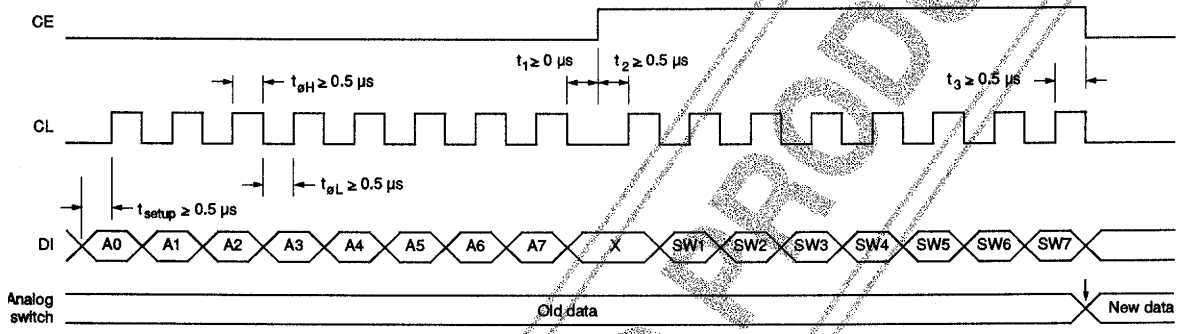
Block Diagram



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_{EE}	–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_{SS}	Ground
10	S	Device select input
11	V_{DD}	4.5 to 9V supply voltage

Timing Characteristics



Ta = –30 to +75˚C, V_{DD}=4.5 to 9V

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
LOW-level clock pulsewidth	$t_{øL}$		0.5			µs
HIGH-level clock pulsewidth	$t_{øH}$		0.5			µs
Setup time	t_{setup}		0.5			µs
Serial data input timing	t_1		0			µs
	t_2		0.5			µs
	t_3		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.

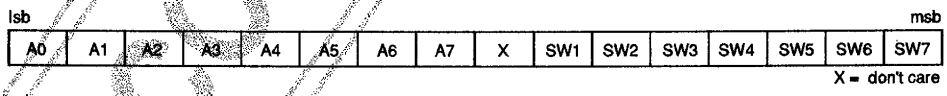


Figure 1. Data input

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

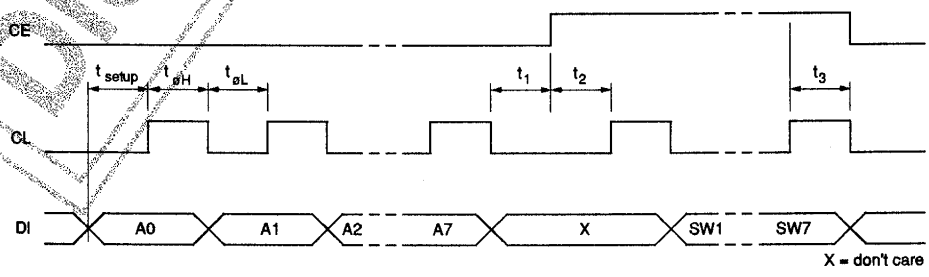


Figure 2. Input timing

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

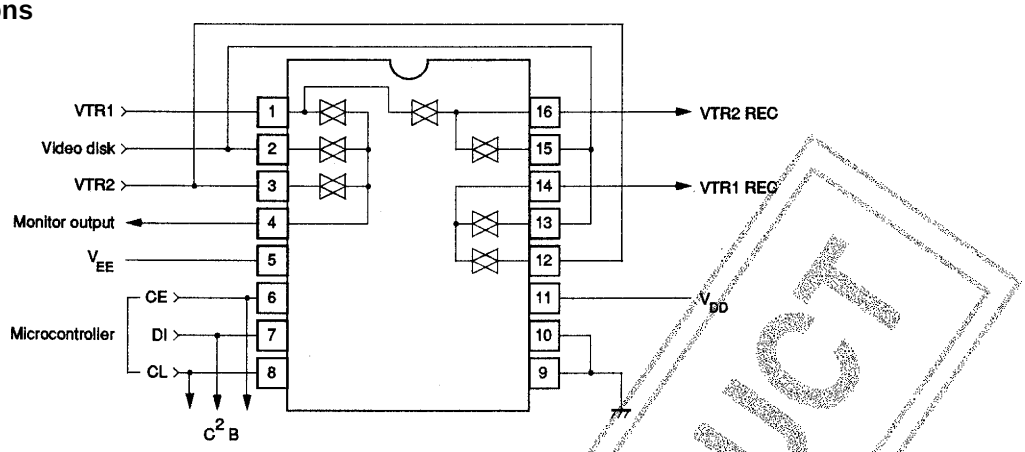


Figure 3. Video switching (1)

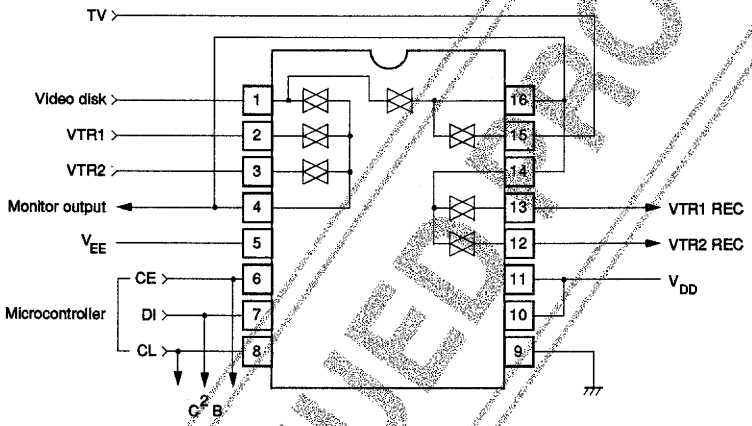


Figure 4. Video switching (2)