

SANYO

No.1359B

LC7817

CMOS IC

2-Pole 4-Position Analog Function Switch

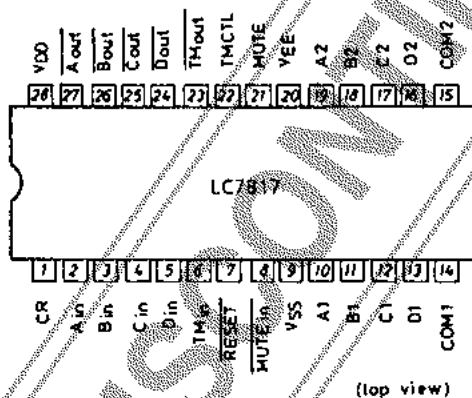
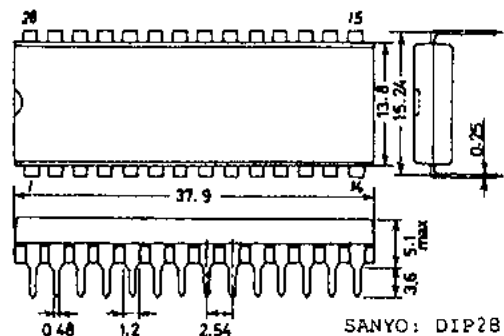
The LC7817 is a 2-pole 4-position analog function switch with 2 built-in CMOS analog switches (LC4066 type). A soft touch of a button enables switchover of the input signal source of an audio amplifier.

Applications

- Function switchover of amplifier, receiver, etc. (2 poles 4 positions)

Features

- Good distortion characteristic because of built-in analog switches of LC4066 type :
Distortion 0.01% max. / $V_i = 1V_{rms}$, $V_{DD} - V_{EE} = 15$ to $37V$
- Capable of outputting audio muting control signal to minimize noise to be generated at the time of switchover
- Built-in controller for tape monitor switchover (using LC4966 together)
- Built-in driver for LED which displays function mode, tape monitor mode
- Since control input can be operated from + supply alone when using dual supplies (+, -), interface with other circuits can be achieved easily.
- Since audio muting control signal can be triggered independently from external pin ($MUTE_{in}$), audio muting at the time of return from backup can be achieved easily.
- Control input pin ($RESET$) to be used for turning OFF all analog switches
- Backup can be performed easily because of CMOS structure. (Backup voltage : 3V min.)
- Operating Voltage : ± 18 /dual supplies
- Package : DIP-28

Pin Assignment**Case Outline 3012A-D281C**
(unit: mm)

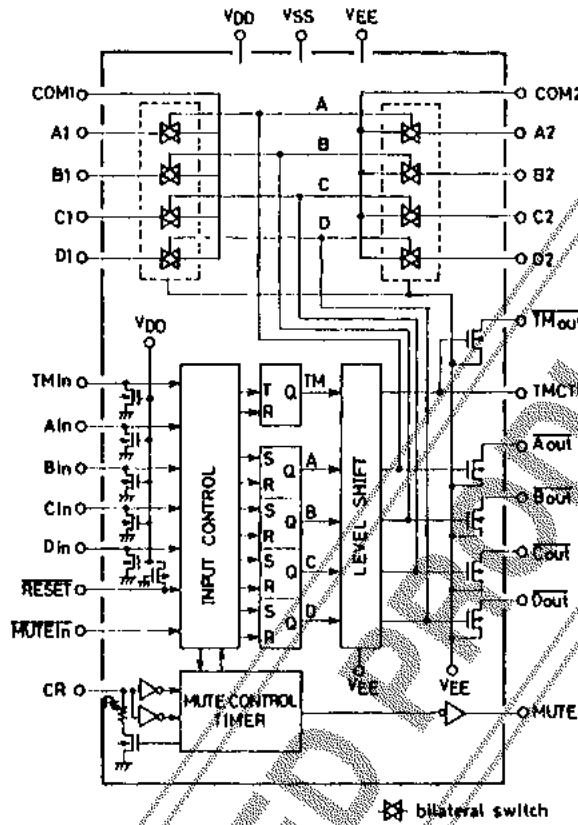
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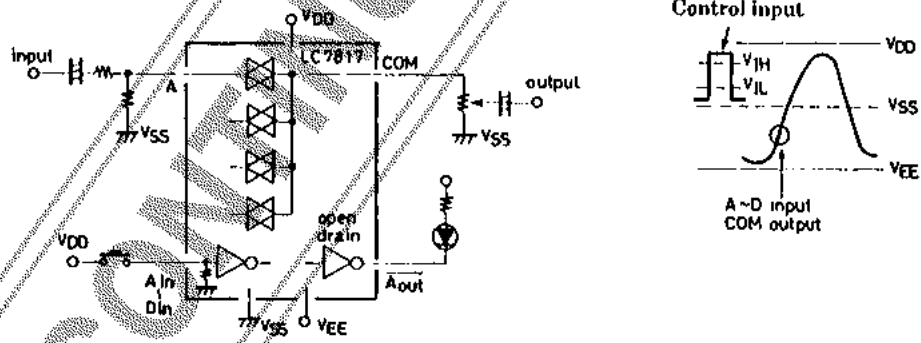
LC7817

Equivalent Circuit Block Diagram

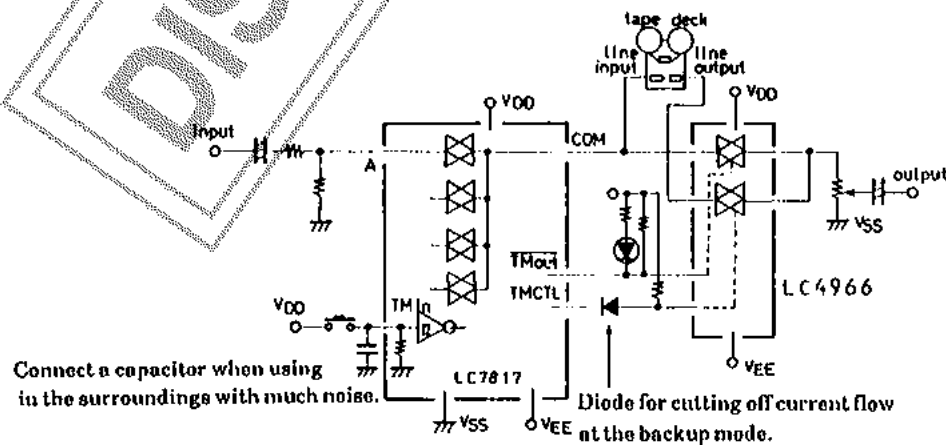


Sample Application Circuits

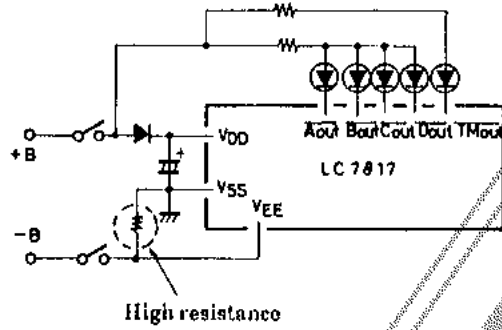
1. Dual-supply operation/without tape monitor function



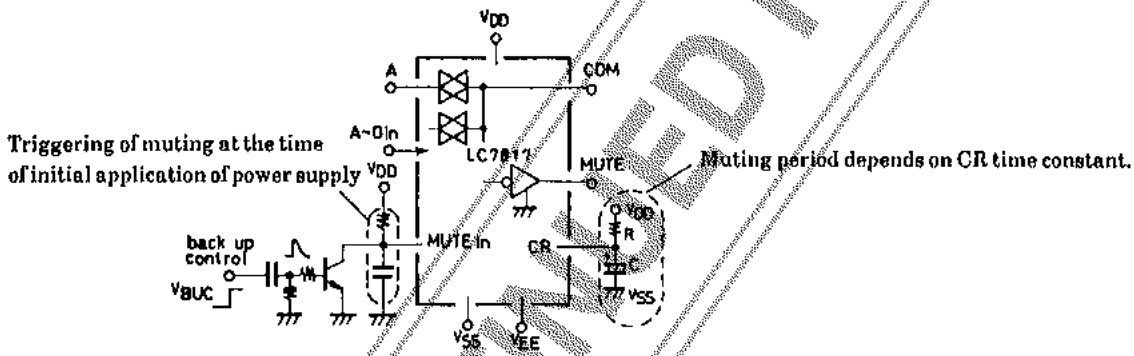
2. Dual-supply operation/with tape monitor function



3. Backup
Dual-supply operation

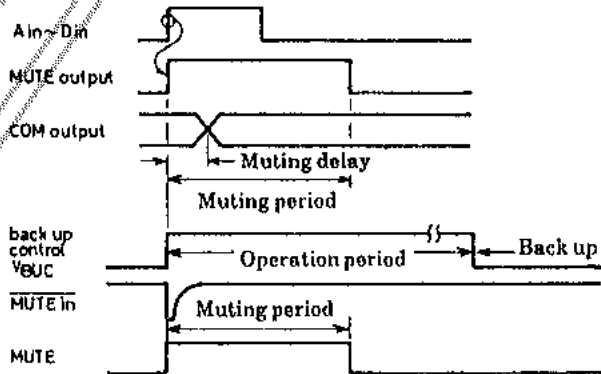


4. Muting



Function switchover

Return from backup



DISCONTINUED PRODUCT

Pin Description

Pin Name	Pin No.	Input/Output	Pin Function																									
V _{DD} V _{SS} V _{EE}	28 9 20		<ul style="list-style-type: none"> Power supply pins Dual supplies (+ -): V_{SS} - GND, V_{EE} (-) V 																									
A _{in} , B _{in} C _{in} , D _{in}	2,3, 4,5		<ul style="list-style-type: none"> Specified input pins for tuning ON individual analog switches Priority order of simultaneous push (A_{in} > B_{in} > C_{in} > D_{in}) Prevention of malfunction attributable to pulse noise (Pulse width is discriminated by muting delay time.) 																									
A _{out} , B _{out} , C _{out} , D _{out}	27, 26, 25, 24		<ul style="list-style-type: none"> Output of driver for LED which displays ON state corresponding to individual analog switches N channel open drain (Source is connected to V_{EE}.) 																									
A1,B1, C1,D1, A2,B2, C2,D2 COM1 COM2	10,11, 12,13, 19,18, 17,16 14 15		<ul style="list-style-type: none"> A to D: Audio signal input pins COM: Audio signal output pins Signal inputs (A to D) conduct according to signal inputs (A_{in} to D_{in}) as follows: <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>COMn Output</th> <th>A_{in}</th> <th>B_{in}</th> <th>C_{in}</th> <th>D_{in}</th> </tr> </thead> <tbody> <tr> <td>Speci- fied</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Input</td> <td>※</td> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td></td> <td>※</td> <td>※</td> <td>1</td> <td>0</td> </tr> <tr> <td></td> <td>※</td> <td>※</td> <td>※</td> <td>1</td> </tr> </tbody> </table> <p style="text-align: center;">※: Don't care</p>	COMn Output	A _{in}	B _{in}	C _{in}	D _{in}	Speci- fied	1	0	0	0	Input	※	1	0	0		※	※	1	0		※	※	※	1
COMn Output	A _{in}	B _{in}	C _{in}	D _{in}																								
Speci- fied	1	0	0	0																								
Input	※	1	0	0																								
	※	※	1	0																								
	※	※	※	1																								
TMin	6		<ul style="list-style-type: none"> Input pin for specifying tape monitor mode ON/OFF Rise of input signal is detected: monitor mode ON/OFF are inverted to monitor mode OFF/ON respectively. 																									
TMCTL	22		<ul style="list-style-type: none"> Output pin for controlling external analog switch (LC4966) for tape monitor Source of N channel transistor of complementary buffer output is connected to V_{EE}. 																									
TMout	23		<ul style="list-style-type: none"> Output pin for driver for LED which displays tape monitor state as well as external analog switch (LC4966) for tape monitor TMout is opposite in polarity to TMCTL. 																									
MUTE _{in}	8		<ul style="list-style-type: none"> Input pin for forcing audio muting control signal (MUTE) to be triggered externally If fixed at 'L' level, MUTE output becomes 'H' level. 																									
MUTE	21		<ul style="list-style-type: none"> Output pin for audio muting control signal Signal with pulse width to be determined by external constant at CR pin is output at the time of function switchover or MUTE_{in} input. 																									
CR	1		<ul style="list-style-type: none"> CR time constant pin for determining time interval of audio muting control signal Time lag (muting delay) between muting signal rise and analog switch switchover depends on C·R_s time constant at the time of transistor ON. 																									
RESET	7		<ul style="list-style-type: none"> Input pin for turning OFF all analog switches and resetting tape monitor flip-flop ('L' level active) 																									

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Absolute Maximum Ratings at Ta = 25°C

			unit
Maximum Supply Voltage	V _{DD} max	V _{SS} - 0.3 to V _{EE} + 40	V
	V _{EE} max	V _{DD} - 40 to V _{SS} + 0.3	V
Output Current	I _{OUT}	A _{out} , B _{out} , C _{out} , D _{out} , T _{Mout}	30 mA
Output Voltage	V _{OUT}	A _{out} , B _{out} , C _{out} , D _{out} , T _{Mout}	V _{EE} - 0.3 to V _{DD} + 0.3 V
Voltage Difference at Analog Switch ON	ΔV _{on}	Switch ON	0.5 V
Allowable Power Dissipation	P _d max	Ta ≤ 85°C	350 mW
Operating Temperature	T _{opg}		-40 to +85 °C
Storage Temperature	T _{stg}		-40 to +125 °C

Allowable Operating Conditions at Ta = -40 to +85°C

		Pin No.	Conditions	min	typ	max	unit
Supply Voltage	V _{DD} 1	V _{DD} (28)	V _{EE} ≤ V _{SS} - 4.5	V _{SS} + 4.5		V _{EE} + 37	V
	V _{EE}	V _{EE} (20)	V _{DD} ≥ V _{SS} + 4.5	V _{DD} - 37		V _{SS} - 4.5	V
	V _{DD} 2	V _{DD} (28)	Backup	V _{SS} + 3		V _{SS} + 18.5	V
'H'-Level Input Voltage	V _{IH} 1	A _{in} (2) to D _{in} (5), RESET (7), MUTE _{in} (8)	V _{EE} ≤ V _{SS}	0.75V _{DD}		V _{DD}	V
	V _{IH} 2	T _{Min} (6)		0.8V _{DD}		V _{DD}	V
'L'-Level Input Voltage	V _{IL} 1	A _{in} (2) to D _{in} (5), RESET (7), MUTE _{in} (8)		V _{SS}		0.25V _{DD}	V
	V _{IL} 2	T _{Min} (6)		V _{SS}		0.2V _{DD}	V
Analog Switch Input Voltage	V _{IN}	A1 (10) to D1 (13), A2 (19) to D2 (16)		V _{EE}		V _{DD}	V
External Capacitance for Muting Timer	C	CR (1)				10	μF
External Resistance for Muting Timer	R	CR (1)	V _{DD} - V _{SS} = 4.5V	40		100	kΩ
			14V > V _{DD} - V _{SS} ≤ 9V	80		300	kΩ
			18V > V _{DD} - V _{SS} ≤ 14V	90		300	kΩ
			37V > V _{DD} - V _{SS} ≤ 18V	100		300	kΩ
Input Receiving Pulse Width	T _{IN}	A _{in} (2) to D _{in} (5) T _{Min} (6)	V _{DD} = 9V, C = 3.3μF, R = 220kΩ	120			ms

Electrical Characteristics at Ta = 25 ± 2°C, V_{SS} = 0V

		Pin No.	Conditions	min	typ	max	unit
'H'-Level Output Voltage	V _{OH}	TMCTL (22)	I _{OH} = -0.1mA	0.8V _{DD}		V _{DD}	V
			V _{DD} = 4.5 to 37V				
			I _{OH} = -0.4mA, V _{DD} = 4.5V	V _{DD} - 1.5		V _{DD}	V
'L'-Level Output Voltage	V _{OL}	TMCTL (22)	I _{OH} = -0.4mA, V _{DD} = 9V	V _{DD} - 0.5		V _{DD}	V
			I _{OL} = 0.1mA	V _{EE}		0.2 × (V _{DD} - V _{EE})	V
			I _{OL} = 0.4mA, V _{DD} = 4.5V	0		1.5	V
Analog Switch ON Resistance	Ron	AOUT (27) to DOUT (24)	I _{OL} = 0.4mA, V _{DD} ≥ 9V	0		0.5	V
			I _{OL} = 7mA, V _{DD} - V _{EE} = 4.5V	V _{EE}		V _{EE} + 2	V
			I _{OL} = 30mA, V _{EE} - V _{EE} = 9V	V _{EE}		V _{EE} + 4	V
Analog Switch ON Resistance	Ron	TMOU (23)	I _{OL} = 30mA, V _{DD} - V _{EE} ≥ 18V	V _{EE}		V _{EE} + 2	V
			I = 1mA, V _{DD} - V _{EE} = 4.5V		400		Ω
			I = 1mA, V _{DD} - V _{EE} = 9V		120		Ω
Analog Switch ON Resistance	Ron	COM1 (14), A2 (19), B2 (18), C2 (17), D2 (16), COM2 (15)	I = 1mA, V _{DD} - V _{EE} ≥ 18V		80		Ω

Continued on next page.

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	Pin No.	Conditions	min	typ	max	unit
Input/Output OFF Leak Current	I_{OFF1} AOUT (27) to DOUT (24) TMOU (23)	{ Output transistor OFF $V_o = V_{EE} + 37V$			10	μA
	I_{OFF2} CR (1)	{ Output transistor OFF $V_o = V_{SS} + 18V$			3	μA
	I_{OFF3} A1 (10) to D1 (13), COM1 (14), A2 (19) to D2 (16), COM2 (15)	{ Analog switch OFF $V_{IN} = V_o = V_{EE}$ to $V_{EE} + 37V$	-10		10	μA
Total Harmonic Distortion	THD 1 COM1 (14), COM2 (15)	{ $V_{IN} = 1V_{rms}, f = 1kHz,$ $V_{DD} - V_{EE} = 15$ to $37V,$ refer to Fig.1.			0.01	%
	THD 2 COM1 (14), COM2 (15)	{ $V_{IN} = 0.1V_{rms}, f = 1kHz,$ $V_{DD} - V_{EE} = 4.5V,$ refer to Fig.1.			0.05	%
Feedthrough (Switch OFF)	FTH { A1 (10) to →to COM1 (14) D1 (13) A2 (19) to →to COM2 (15) D2 (16)	{ $V_{DD} - V_{EE} = 37V, f = 10kHz,$ $V_{IN} = 0.77V_{rms},$ refer to Fig.2, $R_L = 47k\Omega$		55		dB
Crosstalk	CT { A1 (10) to →to COM2 (15) D1 (13) A2 (19) to →to COM1 (14) D2 (16)	{ $V_{DD} - V_{EE} = 37V, f = 10kHz,$ $V_{IN} = 0.77V_{rms},$ refer to Fig.3, $R_L = 47k\Omega$		75		dB
Muting Time	TM 1 MUTE (21)	{ $V_{DD} = 9V,$ refer to Fig.4, $C = 3.3\mu F \pm 20\%,$ $R = 220k\Omega \pm 5\%$	350	580	1000	ms
	TM 2 MUTE (21)	{ $V_{DD} = 9V,$ $C = 3.3\mu F \pm 0\%,$ $R = 220k\Omega \pm 0\%$	450	580	800	ms
Switch Switchover Delay Time	T_{SWD} { Ain (2) to Din (5) TMin (6)	{ $V_{DD} = 9V,$ refer to Fig.5, $C = 3.3\mu F, R = 220k\Omega$	30	50	120	ms
Supply Current	I_{DD1} VDD (28)	Operating, refer to Fig.6, $V_{DD} - V_{EE} = 37V$			1000	μA

Fig.1 Total harmonic distortion

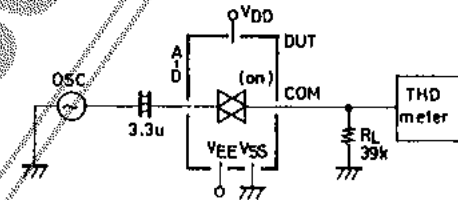
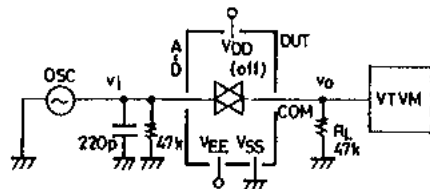


Fig.2 Feedthrough



$$FTH = 20 \log \frac{V_o}{V_i} \text{ (dB)}$$

$$V_i = 770mV_{rms}$$

$$V_{DD} - V_{EE} = 38V$$

Fig.3 Crosstalk

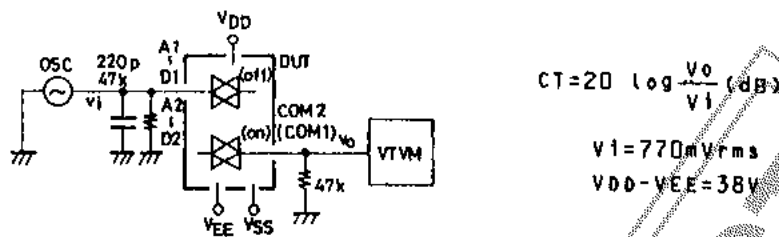


Fig.4 Muting period

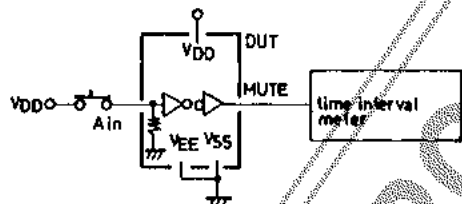


Fig.5 Switch switchover delay time

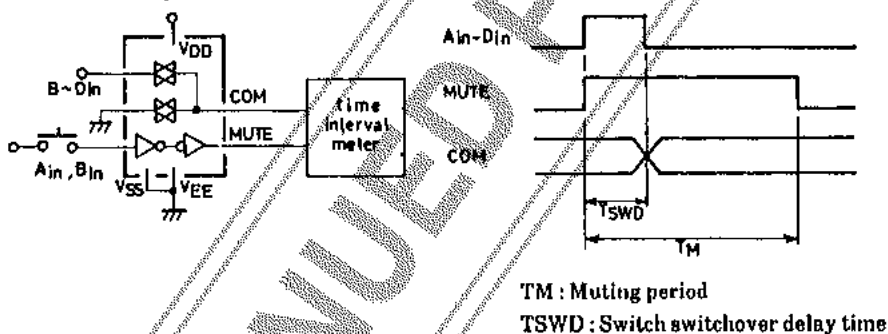
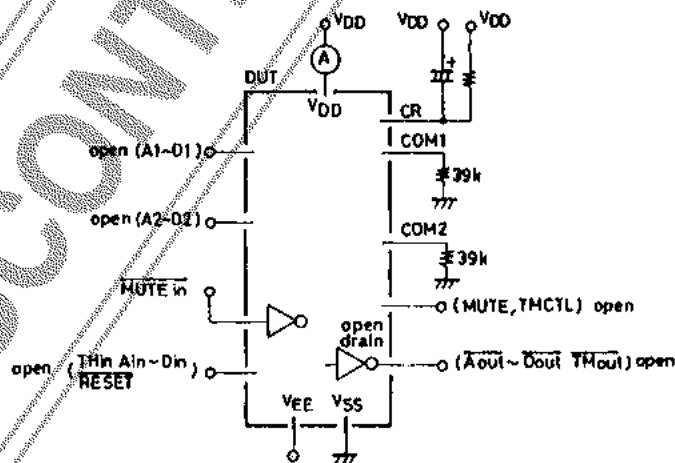


Fig.6 Supply current



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