

No. 3936 A.

LA7375

Recording and Playback Amplifier for VHS Video Recorders

Overview

The LA7375 is a recording and playback amplifier for VHS-format video tape recorders. It features a two-channel playback amplifier and a single-channel recording amplifier, making it ideal for standard-play mode recorders.

The LA7375 operates from a 5V supply and is available in 16-pin DIPs.

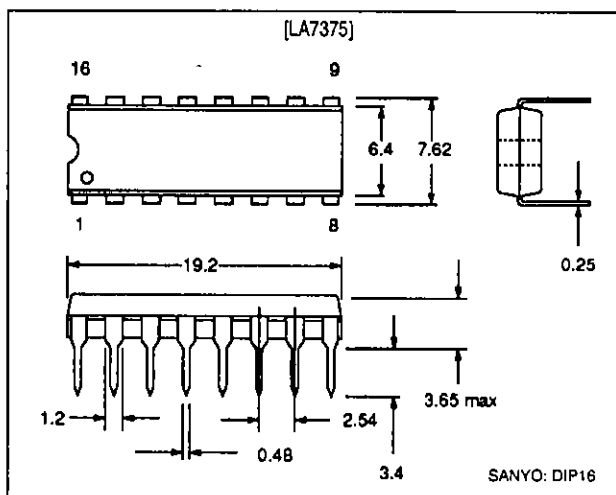
Features

- Two-channel playback amplifier
- Single-channel recording amplifier
- RF envelope detector for automatic tracking
- Constant-current output, high stability recording amplifier
- Automatic gain control
- 5V supply
- 16-pin DIP

Package Dimensions

Unit: mm

3006B-DIP16



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Specifications

Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC}		7	V
Allowable power dissipation	P_D max	$T_a = 65^\circ\text{C}$	650	mW
Operating temperature	T_{opr}		-10 to $+65$	$^\circ\text{C}$
Storage temperature	T_{stg}		-40 to $+150$	$^\circ\text{C}$

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

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V_{CC}		5	V
Supply voltage range	$V_{CC\ op}$		4.75 to 5.5	V

Operating Characteristics at $T_a = 25^\circ\text{C}$

Playback Mode with SW3 = OFF

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Supply current	I_{CCP}		23	28	33	mA
Channel 1 voltage gain	G_{VP1}	$V_i = 38\text{mVp-p}$, $f = 1\text{MHz}$	57	60	63	dB
Channel 2 voltage gain	G_{VP2}		57	60	63	dB
Gain differential	ΔG_{VP}	$G_{VP1} - G_{VP2}$	-1	0	+1	dB
Input conversion rms noise voltage	V_{NI}	1.1MHz lowpass filter	-	1.1	1.5	μV
Frequency response	ΔV_{FP}	$V_i = 38\text{mVp-p}$, $f = 1$ to 7MHz	-3.5	0	-	dB
Second-harmonic distortion	V_{HDP}	$V_i = 38\text{mVp-p}$, $f = 4\text{MHz}$	-	-40	-35	dB
Maximum output level	V_{OMP}	$f = 1\text{kHz}$, -30dB harmonic distortion	0.8	1.0	-	Vp-p
Crosstalk	V_{CR}	$V_i = 38\text{mVp-p}$, $f = 4\text{MHz}$, 8.2 μH input inductor short-circuited	-	-40	-35	dB
Output DC offset voltage between channels	ΔV_{ODC}		-350	0	+350	mV
AGC input level	ΔAGC	$f = 4\text{MHz}$, $TP4 = 250\text{mVp-p}$	300	330	360	mVp-p
AGC second-harmonic distortion	V_{HDAGC}	$V_i = 38\text{mVp-p}$, $f = 4\text{MHz}$	-	-40	-35	dB
AGC control level	V_{AGC}	$f = 4\text{MHz}$, $T4 = 500\text{mVp-p}$	-	1.0	1.5	dB
		$f = 4\text{MHz}$, $T4 = 125\text{mVp-p}$	-1.2	-0.7	-	
Envelope detector quiescent output voltage	V_{ENVQ}	T12 quiescent, no input	0.47	0.52	0.57	V
Envelope detector output	V_{ENV}	$f = 4\text{MHz}$, $T4 = 300\text{mVp-p}$	2.0	2.25	2.5	V
		$f = 4\text{MHz}$, $T4 = 500\text{mVp-p}$	2.9	3.2	3.5	
		$f = 3\text{MHz}$, $T4 = 300\text{mVp-p}$	1.65	1.9	2.15	
		$f = 5\text{MHz}$, $T4 = 300\text{mVp-p}$	2.0	2.3	2.6	
Playback-ON switch ON resistance	R_{PON}	Measured with 1mA and 2mA DC inputs.	-	6	10	Ω
SW1 threshold level	SW_{RF1}	Channel 1 to 2	1.2	-	1.8	V
		Channel 2 to 1	0	-	0.8	
SW2 threshold level	SW_{RF2}	Channel 1 to 2	3.2	-	4.0	V
		Channel 2 to 1	2.2	-	2.8	

Recording Mode with SW3 = ON

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Supply current	I_{CCR}		50	55	60	mA
Voltage gain	G_{VR}	$V_i = 150\text{mVp-p}$, $f = 4\text{MHz}$	-3.5	-1.5	+0.5	dB
Frequency response	ΔV_{FR}	$V_i = 150\text{mVp-p}$, $f = 1$ to 7MHz	-2	0	-	dB
Second-harmonic distortion	V_{HDR}	$f = 4\text{MHz}$, $V_o = 15\text{mVp-p}$	-	-45	-40	dB
Maximum output level	V_{OMP}	$f = 4\text{MHz}$, -40dB harmonic distortion	15	20	-	mVp-p
Muting attenuation	V_{MR}	$V_i = 150\text{mVp-p}$, $f = 4\text{MHz}$	-	-45	-40	dB
Intermodulation distortion	V_{CY}	$f_{(T8Y)} = 4\text{MHz}$, $f_{(T8C)} = 629\text{kHz}$, $T15A = 150\text{mVp-p}$, $T15 = 40\text{mVp-p}$	-	-45	-40	dB
Luminance and chrominance mixer voltage gain	G_{MIX}	$V_i = 150\text{mVp-p}$, $f = 4\text{MHz}$	9	11	13	dB
REC switch threshold level	SW_{REC}		3.9	-	5.0	V
REC MUTE threshold level	SW_{MUTE}		2.2	-	4.0	V

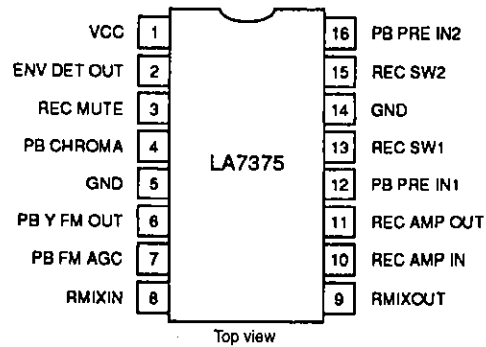
Measurement Conditions**Playback Mode**

Parameter	Channel	Test points		Switch positions	
		Input	Output	SW30	Mute
Supply current		T1		1	
Voltage gain, frequency response, harmonic distortion, output level and crosstalk	1	T16	T4	1	
	2	T12	T4	2	
Input conversion rms noise level	1, 2		T4	1	
Output DC offset		PB CHROMA		1 to 2	
AGC input level, AGC harmonic distortion and AGC control voltage		T16	T6	1	
Envelope detector quiescent current			T2	1	
Envelope detector output voltages		T16	T2	1	
Playback-ON switch ON resistance			T11		
RF SW1 threshold		T3			1
RF SW2 threshold		T3			2

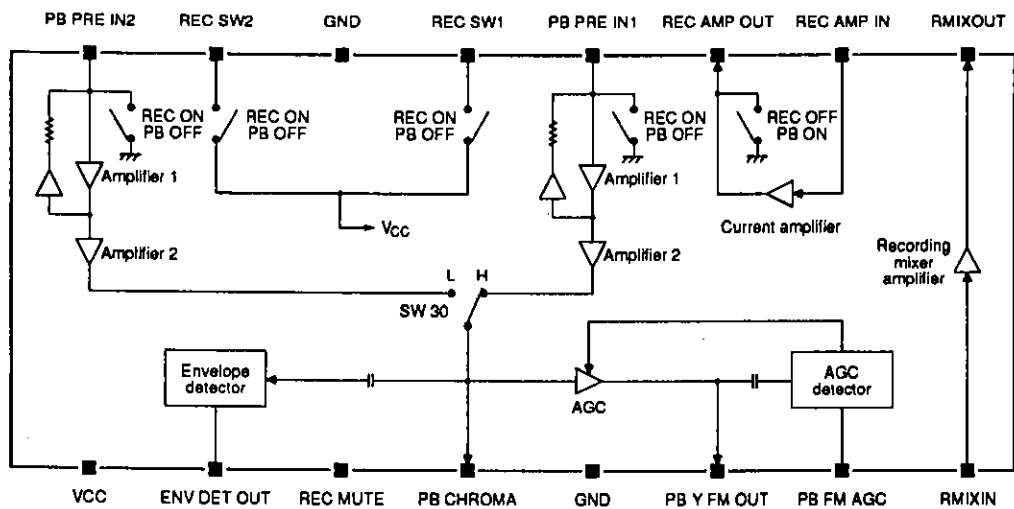
Recording Mode

Parameter	Test points		Switch positions	
	Input	Output	SW30	Mute
Supply current	T1			1
Voltage gain, frequency response, harmonic distortion and output level	T8Y	T15A, T15		1
Muting attenuation	T8Y	T15A, T15		2
Intermodulation distortion	T8Y, T8C	T15A, T15		1
Luminance and chrominance mixer gain	T8Y	T9		1
REC switch threshold	T3			1
REC MUTE switch threshold	T3			2

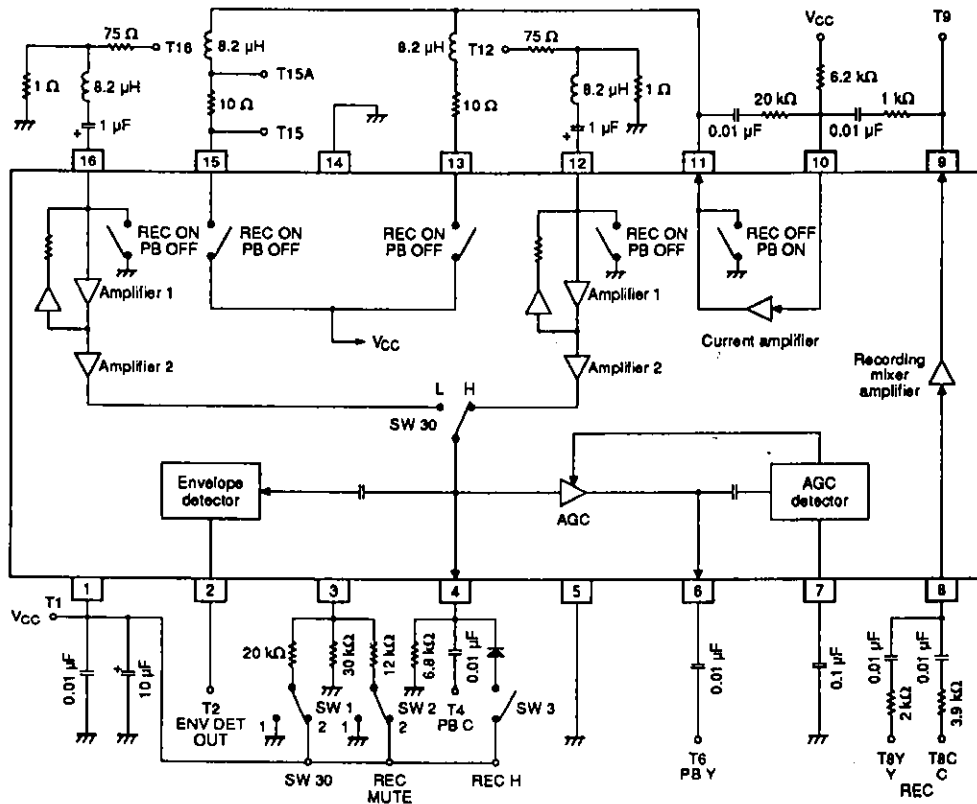
Pin Assignment



Block Diagram

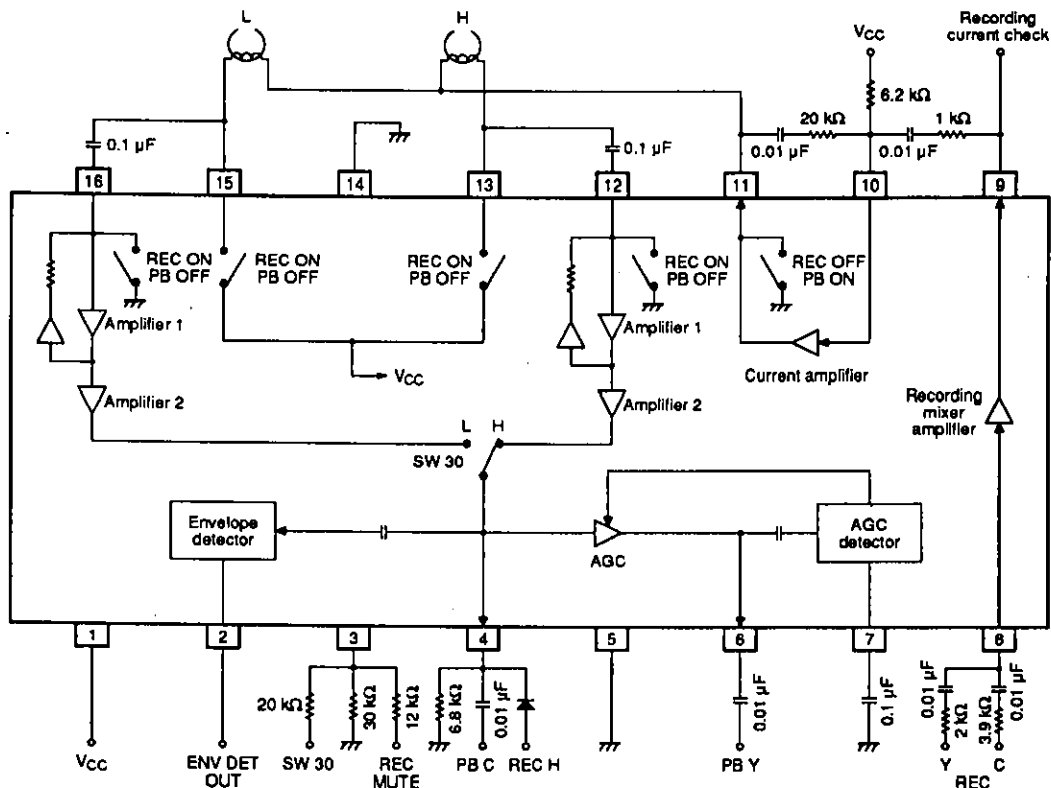


AC Measurement Circuit



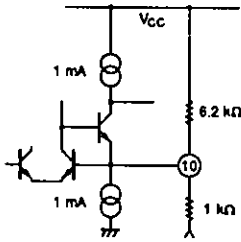
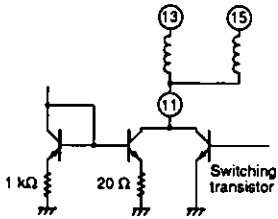
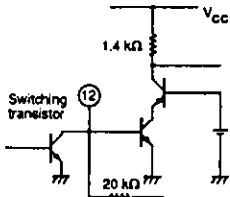
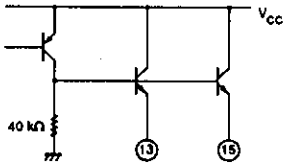
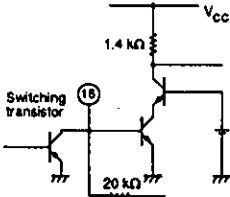
Note that the SW30 switch is in the L position when the voltage on pin 3 is 0 to 1V (muting OFF) or 2 to 3V (muting ON), and in the H position when the voltage on pin 3 is 1 to 2V (muting OFF) or 3 to 4V (muting ON).

Typical Application



Pin Functions

Number	Name	Equivalent circuit	Function
1	VCC		5V supply
2	ENV DET OUT		Playback-mode envelope detector output. Nominal voltages are 0.5V (PB with no signal) and 0V (REC).
3	REC MUTE		Muting control and playback SW30 switch control input
4	PB CHROMA		Playback chrominance output. Nominal voltages are 2.0V (PB) and > 3.8V (REC).
5	GND		Ground
6	PB Y FM OUT		Luminance FM output. Nominal voltages are 2.5V (PB) and 4.0V (REC).
7	PB FM AGC		Playback AGC detector output. Nominal voltages are 1.5V (PB) and 0V (REC).
8	RMIXIN		Recording-mode mixer amplifier input. Nominal voltages are 2.1V (PB) and 1.65V (REC). Gain is 11dB when R is 2kΩ, and 6dB when R is 3.9kΩ.
9	RMIXOUT		Recording-mode mixer amplifier output. Nominal voltages are 4.1V (PB) and 1.8V (REC).

Number	Name	Equivalent circuit	Function
10	REC AMP IN		Recording-mode current amplifier input. Nominal voltages are 1.77V (PB) and 1.85V (REC).
11	REC AMP OUT		Recording-mode current amplifier output. Nominal voltages are 0V (PB) and 4.2V (REC). Switching transistor ON resistance is 5Ω.
12	PB PRE IN1		Playback-mode preamplifier input. Nominal voltages are 0.7V (PB) and 0V (REC). Low-noise input transistor.
13	REC SW1		Recording-mode switches. Nominal voltages are 0V (PB) and 4.2V (REC).
15	REC SW2		
14	GND		Preamplifier ground
16	PB PRE IN2		Playback-mode preamplifier input. Nominal voltages are 0.7V (PB) and 0V (REC). Low-noise input transistor.

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