

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.

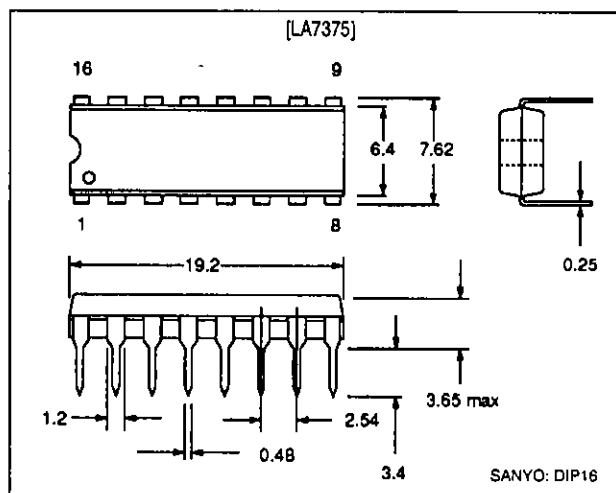
## Features

- 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	$\Delta G_{VP}$	$G_{VP1} - G_{VP2}$	-1	0	+1	dB
Input conversion rms noise voltage	$V_{NI}$	1.1MHz lowpass filter	-	1.1	1.5	$\mu\text{V}$
Frequency response	$\Delta V_{FP}$	$V_i = 38\text{mVp-p}$ , $f = 1$ to $7\text{MHz}$	-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 $\mu\text{H}$ input inductor short-circuited	-	-40	-35	dB
Output DC offset voltage between channels	$\Delta V_{ODC}$		-350	0	+350	mV
AGC input level	$\Delta AGC$	$f = 4\text{MHz}$ , $TP4 = 250\text{mVp-p}$	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	$\Omega$
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	$\Delta V_{FR}$	$V_i = 150\text{mVp-p}$ , $f = 1$ to $7\text{MHz}$	-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

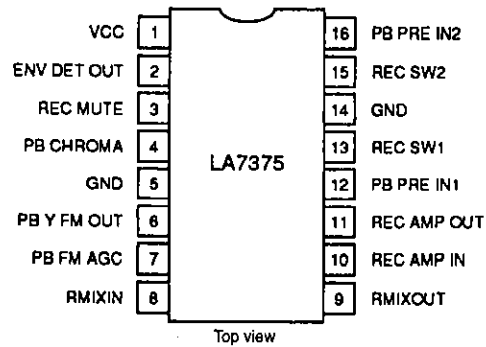
**Measurement Conditions****Playback Mode**

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

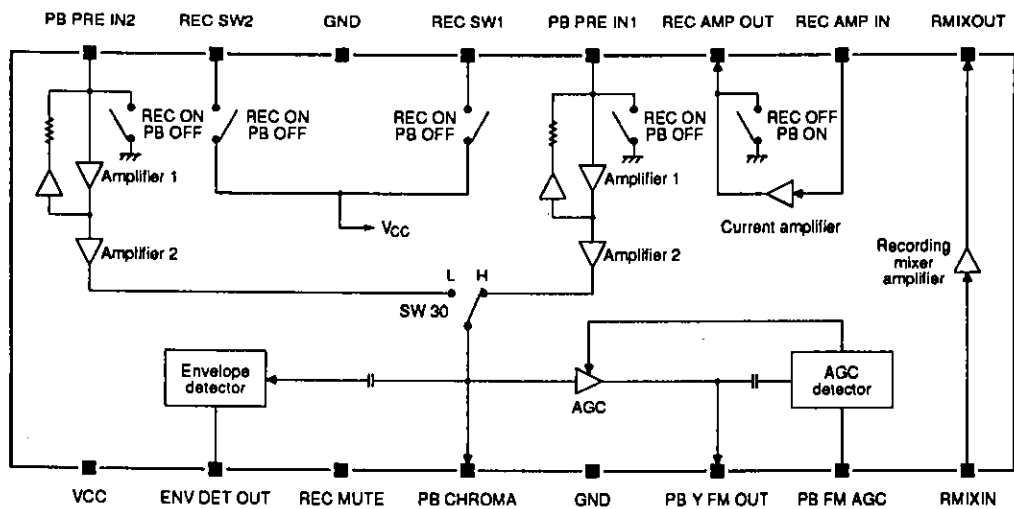
**Recording Mode**

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

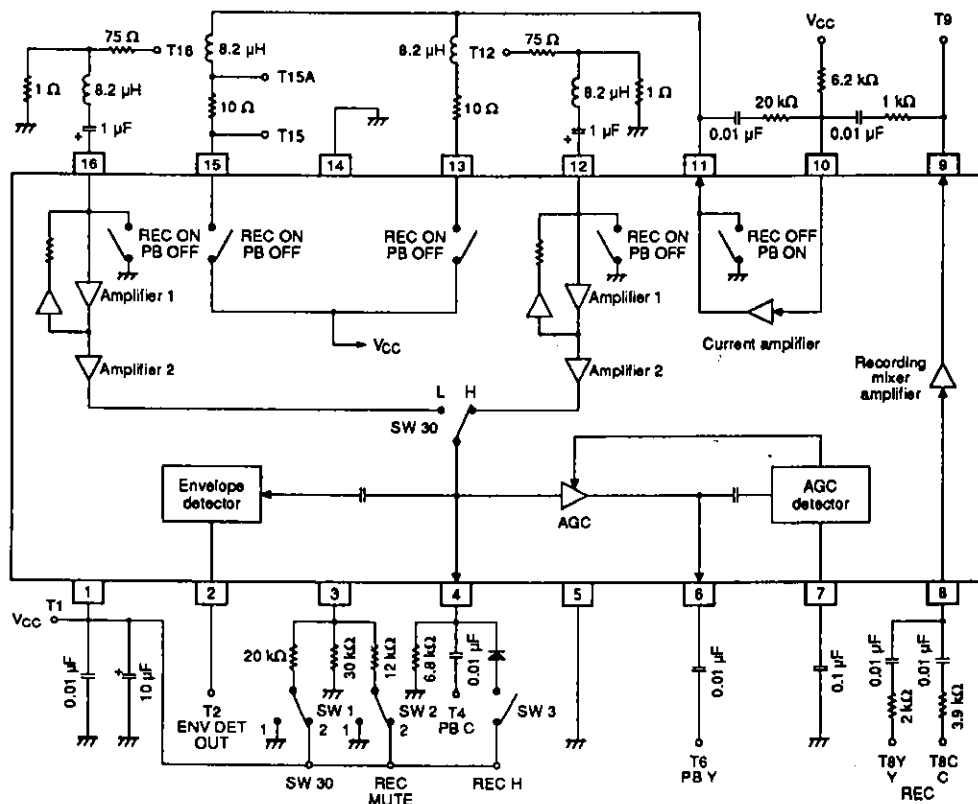
## Pin Assignment



## Block Diagram

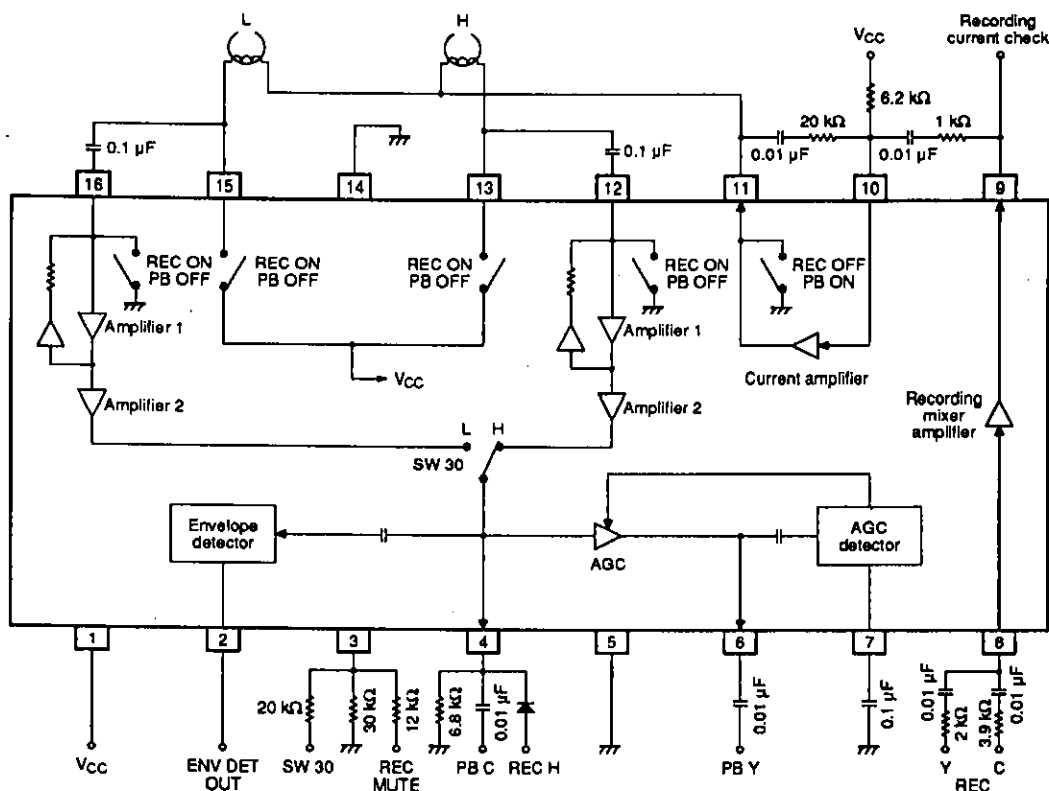


## AC Measurement Circuit

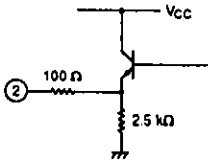
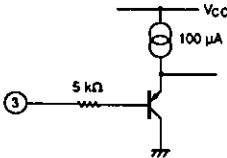
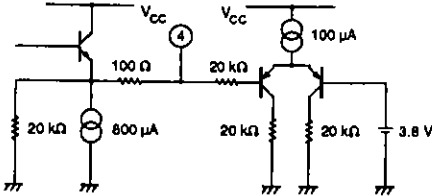
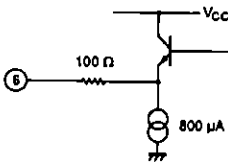
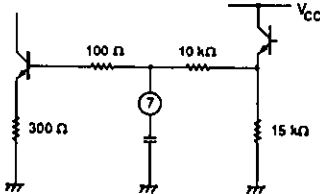
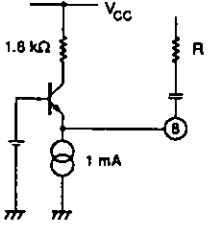
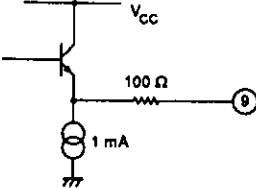


Note that the SW30 switch is in the L position when the voltage on pin 3 is 0 to 1V (muting OFF) or 2 to 3V (muting ON), and in the H position when the voltage on pin 3 is 1 to 2V (muting OFF) or 3 to 4V (muting ON).

## 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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