



# LA4582CM

## Pre + Power Amplifier for 3-V Headphone Stereo Systems

### Overview

The LA4582CM is a preamplifier plus power amplifier IC that support auto-reverse, and was developed for 3-V headphone stereo systems.

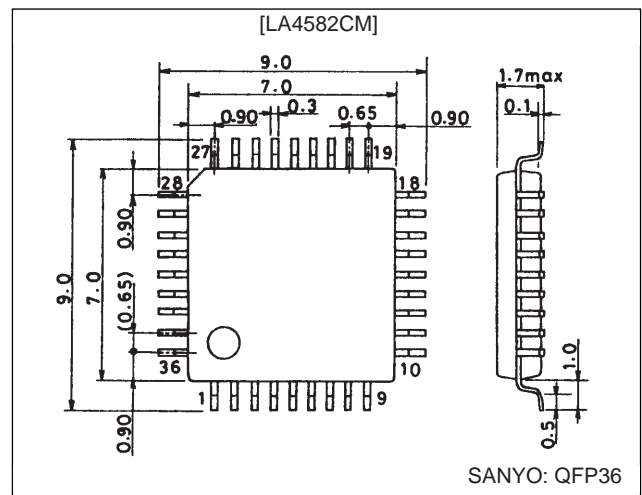
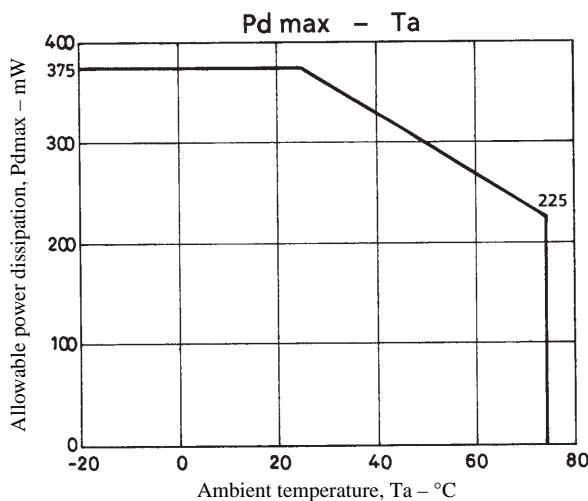
### Features

- The LA4582CM was developed for cassette playback systems, and in addition to preamplifier and power amplifier functions, it also provides low boost and automatic power limitation (PVSS: Peak Volume Select System) functions.

- Provided in a 36-pin miniature flat package (0.65 mm lead pitch) that is optimal for set miniaturization.
- Capable of driving 8-Ω speakers
- Two-channel playback auto-reverse preamplifier
- Two-channel headphone power amplifier
- Low-frequency boost function (auto-loudness effect)
- Output suppression function (PVSS)
- Two-channel radio input switch (pre-mute switch)
- Power mute switch

### Package Dimension

unit: mm



### Specifications

#### Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V <sub>CC</sub> max		4.5	V
Allowable power dissipation	Pd max		375	mW
Operating temperature	T <sub>opr</sub>		-20 to +75	°C
Storage temperature	T <sub>stg</sub>		-40 to +150	°C

#### Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V <sub>CC</sub>		3.0	V
Operating voltage range	V <sub>CC</sub> op		1.8 to 3.6	V

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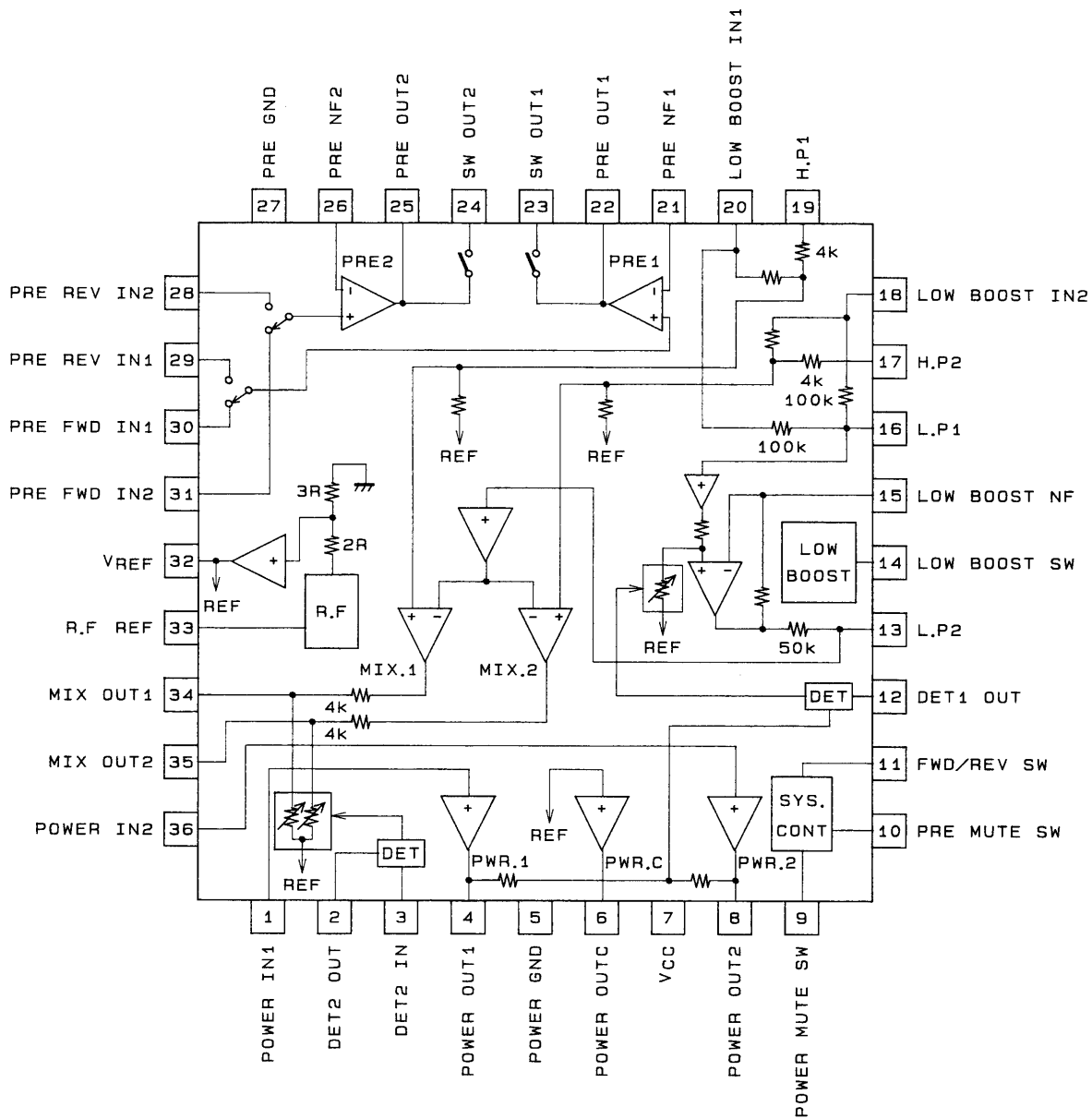
**Operating Characteristics at  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 3.0\text{ V}$ ,  $f_i = 1\text{ kHz}$ ,  $0.775\text{ V} = 0\text{ dBm}$   
 $R_L = 10\text{ k}\Omega$  (preamplifier),  $R_L = 30\text{ k}\Omega$  (low boost),  $R_L = 16\text{ }\Omega$  (power amplifier)**

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[PRE + L.BOOST + PVSS + POWER]						
Quiescent current	I <sub>CCO1</sub>	R <sub>g</sub> = 2.2 k $\Omega$ , low boost off, PVSS off	13	19	29	mA
	I <sub>CCO2</sub>	R <sub>g</sub> = 2.2 k $\Omega$ , low boost on, PVSS on	14	20	30	mA
Voltage gain (closed loop)	V <sub>G<sub>T</sub></sub>	V <sub>O</sub> = -5 dBm	62.5	64.5	67.5	dB
[Preamplifier]						
Voltage gain (open loop)	V <sub>G0</sub>	V <sub>O</sub> = -5 dBm	70	83		dB
Voltage gain (closed loop)	V <sub>G1</sub>	V <sub>O</sub> = -5 dBm		40		dB
Maximum output voltage	V <sub>O max1</sub>	THD = 1%, V <sub>CC</sub> = 1.8 V	0.1	0.2		V
Total harmonic distortion	THD <sub>1</sub>	V <sub>O</sub> = 0.2 V, V <sub>G</sub> = 40 dB/NAB		0.05	0.5	%
Equivalent input noise voltage	V <sub>NI</sub>	R <sub>g</sub> = 2.2 k $\Omega$ , BPF = 20 Hz to 20 kHz		1.3	2.0	$\mu\text{V}$
Crosstalk	CT <sub>1</sub>	R <sub>g</sub> = 2.2 k $\Omega$ , TUNE 1 kHz	60	80		dB
Ripple rejection	R <sub>r1</sub>	R <sub>g</sub> = 2.2 k $\Omega$ , V <sub>CC</sub> = 1.8 V, V <sub>r</sub> = -20 dBm, f <sub>r</sub> = 100 Hz	40	50		dB
[Power Amplifier]						
Output power	P <sub>O</sub>	THD = 10%	23	34		mW
Voltage gain (closed loop)	V <sub>G2</sub>	V <sub>O</sub> = -5 dBm	27	29	32	dB
Total harmonic distortion	THD <sub>2</sub>	P <sub>O</sub> = 1 mW		0.4	1.0	%
Interchannel crosstalk	CT <sub>2</sub>	V <sub>O</sub> = -5 dBm, R <sub>V</sub> = 0 $\Omega$	30	40		dB
Output noise voltage	V <sub>NO1</sub>	R <sub>V</sub> = 0 $\Omega$ , BPF = 20 Hz to 20 kHz		25	40	$\mu\text{V}$
Ripple rejection	R <sub>r2</sub>	R <sub>V</sub> = 0 $\Omega$ , V <sub>r</sub> = -20 dBm f <sub>r</sub> = 100 Hz, V <sub>CC</sub> = 1.8 V	45	55		dB
Input resistance	R <sub>i</sub>		22	30	38	k $\Omega$
DC offset voltage	V <sub>ODC OFF</sub>	Between pin 8 and pins 4 to 6	-90		+90	mV
[L- BOOST]						
Voltage gain	V <sub>G3</sub>	V <sub>IN</sub> = -30 dBm, boost: on/off	-2.3	-3.8	-5.3	dB
Boost	BST <sub>1</sub>	V <sub>INBST</sub> = -30 dBm, f = 100 Hz, boost: on	11.2	14.7	18.2	dB
	BST <sub>2</sub>	V <sub>INBST</sub> = -30 dBm, f = 10 Hz, boost: on	7.0	8.5	10	dB
Maximum output voltage	V <sub>O max2</sub>	THD = 1%, boost: on	0.3	0.5		V
Total harmonic distortion	THD <sub>3</sub>	V <sub>O</sub> = 0.1 V, boost: on		0.04	0.5	%
Interchannel crosstalk	CT <sub>3</sub>	V <sub>O</sub> = -20 dBm, R <sub>g</sub> = 0, boost: on	25	32		dB
Output noise voltage	V <sub>NO2</sub>	R <sub>g</sub> = 0, BPF = 20 Hz to 20 kHz, boost: off		2.0	5.0	$\mu\text{V}$
Ripple rejection	R <sub>r3</sub>	R <sub>g</sub> = 0, f <sub>r</sub> = 100 Hz, V <sub>r</sub> = -20 dBm, V <sub>CC</sub> = 1.8 V, boost: on	45	53		dB
[L- BOOST + PVSS + POWER] R <sub>V</sub> = 30 k $\Omega$ max						
Voltage gain	V <sub>G4</sub>	V <sub>IN</sub> = -40 dBm, f = 1 kHz, boost: on/off	22.0	24.5	28.0	dB
Low boost output voltage	V <sub>O1</sub>	V <sub>IN</sub> = -43 dBm, f = 100 Hz, boost: on	0.13	0.23	0.33	V
	V <sub>O2</sub>	V <sub>IN</sub> = -28 dBm, f = 100 Hz, boost: on	0.25	0.4	0.55	V
Low boost total harmonic distortion	THD <sub>4</sub>	V <sub>IN</sub> = -40 dBm, f = 100 Hz, boost: on		0.5	1.2	%
PVSS voltage	V <sub>O3</sub>	V <sub>IN</sub> = -40 dBm, PVSS2	-40	-37	-34	dBm
PVSS width	W <sub>PVSS</sub>	Input increment between the point where operation starts and the point where the output is +4 dB from there. PVSS: on	30	40		dB
PVSS total harmonic distortion	THD <sub>5</sub>	V <sub>IN</sub> = -40 dBm, PVSS2		0.5	1.2	%
PVSS start input	V <sub>OPIN</sub>	PVSS2	-67	-63	-59	dBm

Note: The amount of boost for a 1-kHz signal.

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Block Diagram

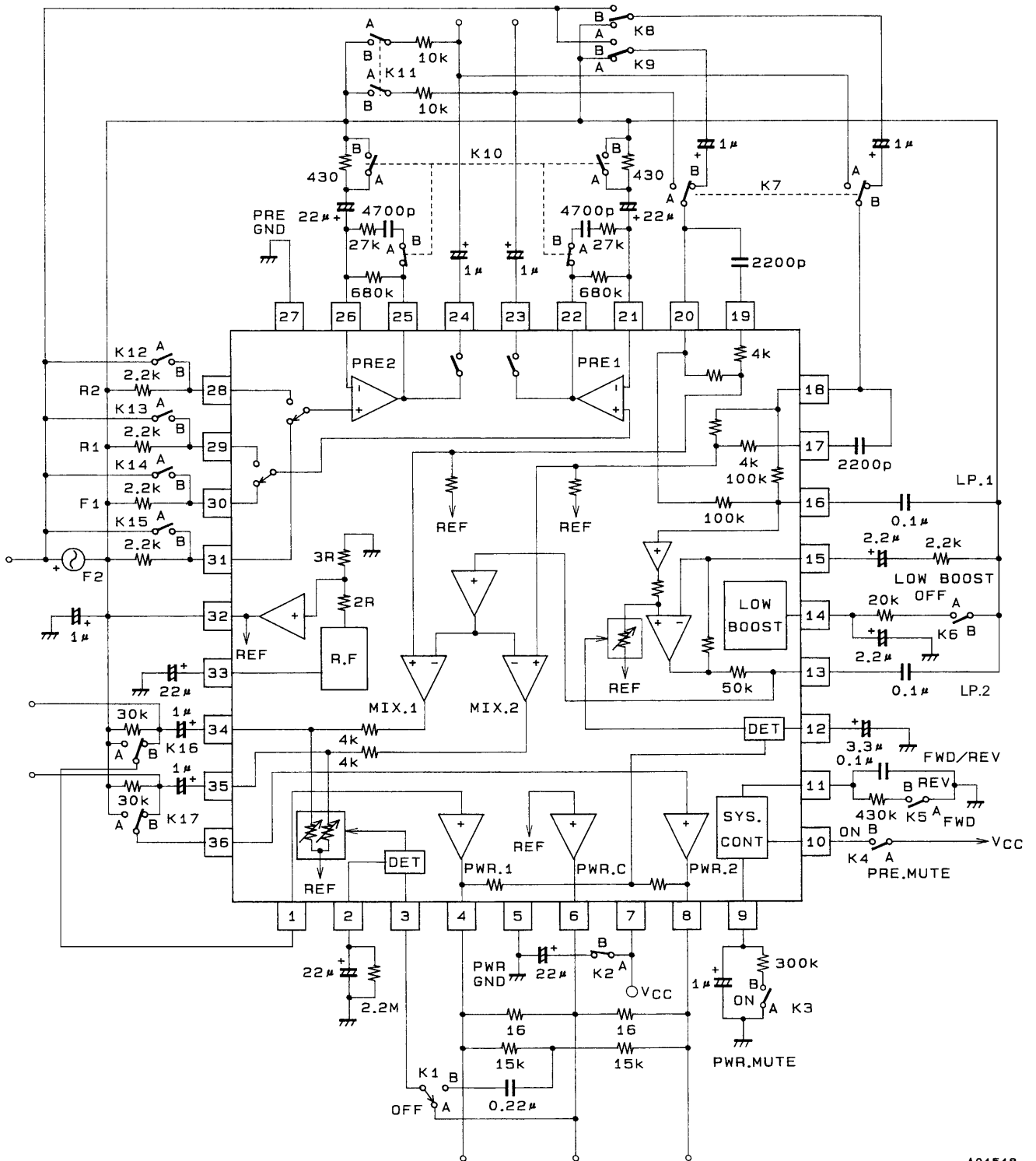


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Unit (Resistance: Ω)

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Test Circuit

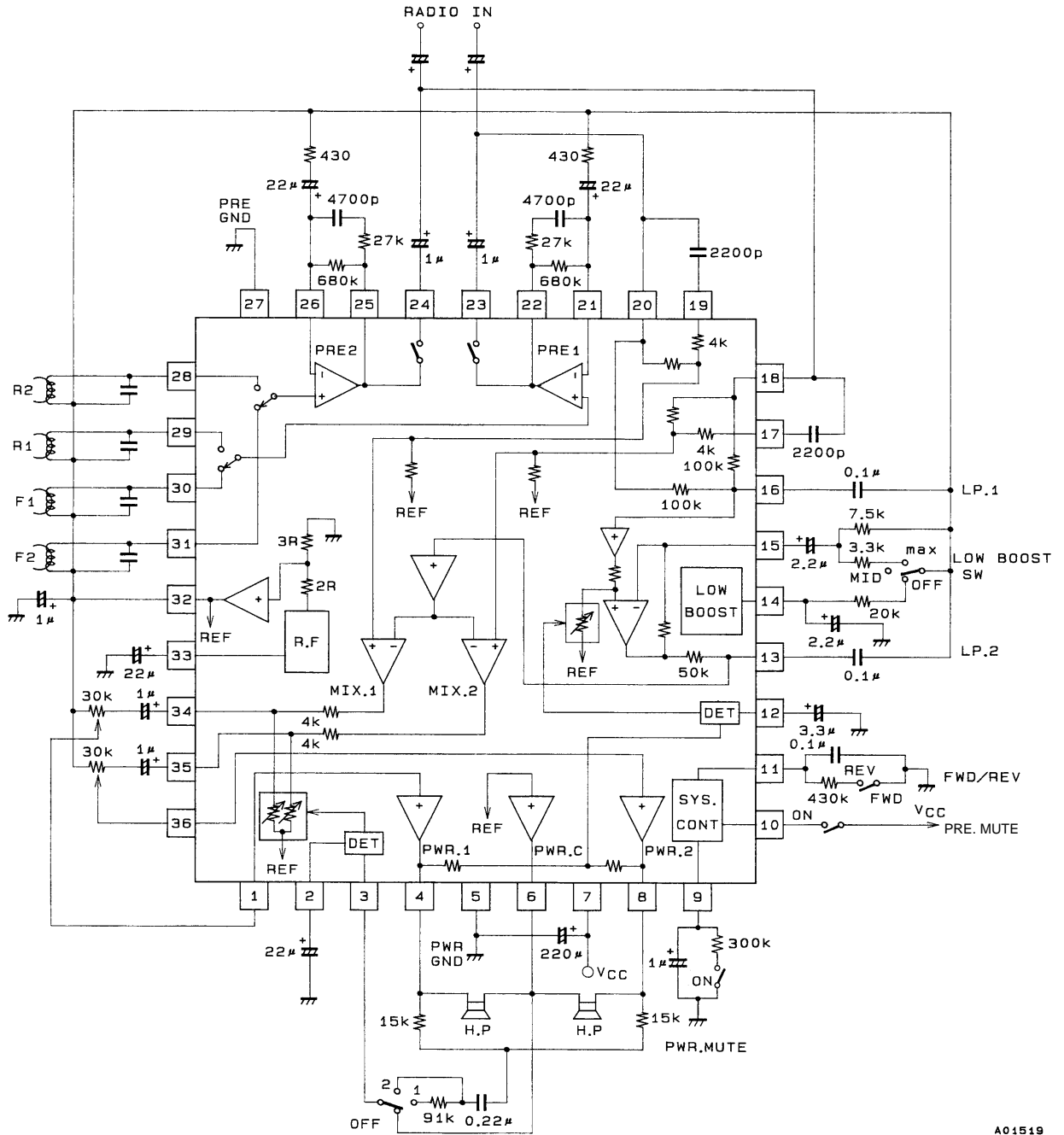


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Unit (Resistance: Ω, Capacitance: F)

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Sample Application Circuit



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Unit (Resistance: Ω, Capacitance: F)

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