



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.

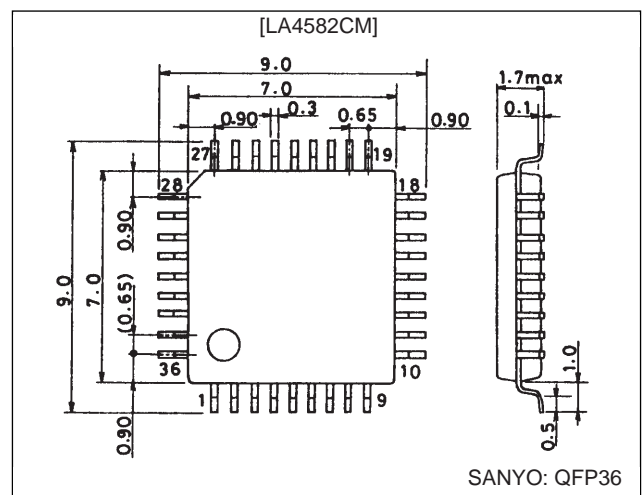
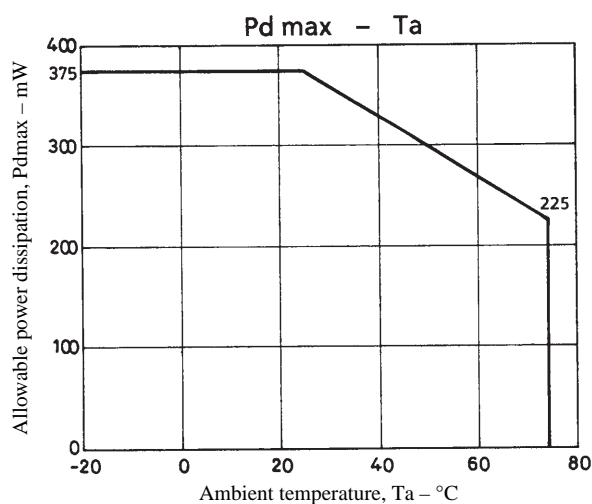
Features

- 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 _{CC} max		4.5	V
Allowable power dissipation	Pd max		375	mW
Operating temperature	T _{opr}		-20 to +75	°C
Storage temperature	T _{stg}		-40 to +150	°C

Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V _{CC}		3.0	V
Operating voltage range	V _{CC} op		1.8 to 3.6	V

SANYO Electric Co., Ltd. Semiconductor Business Headquarters

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110 JAPAN

63097HA(OT) No. 5701-1/6

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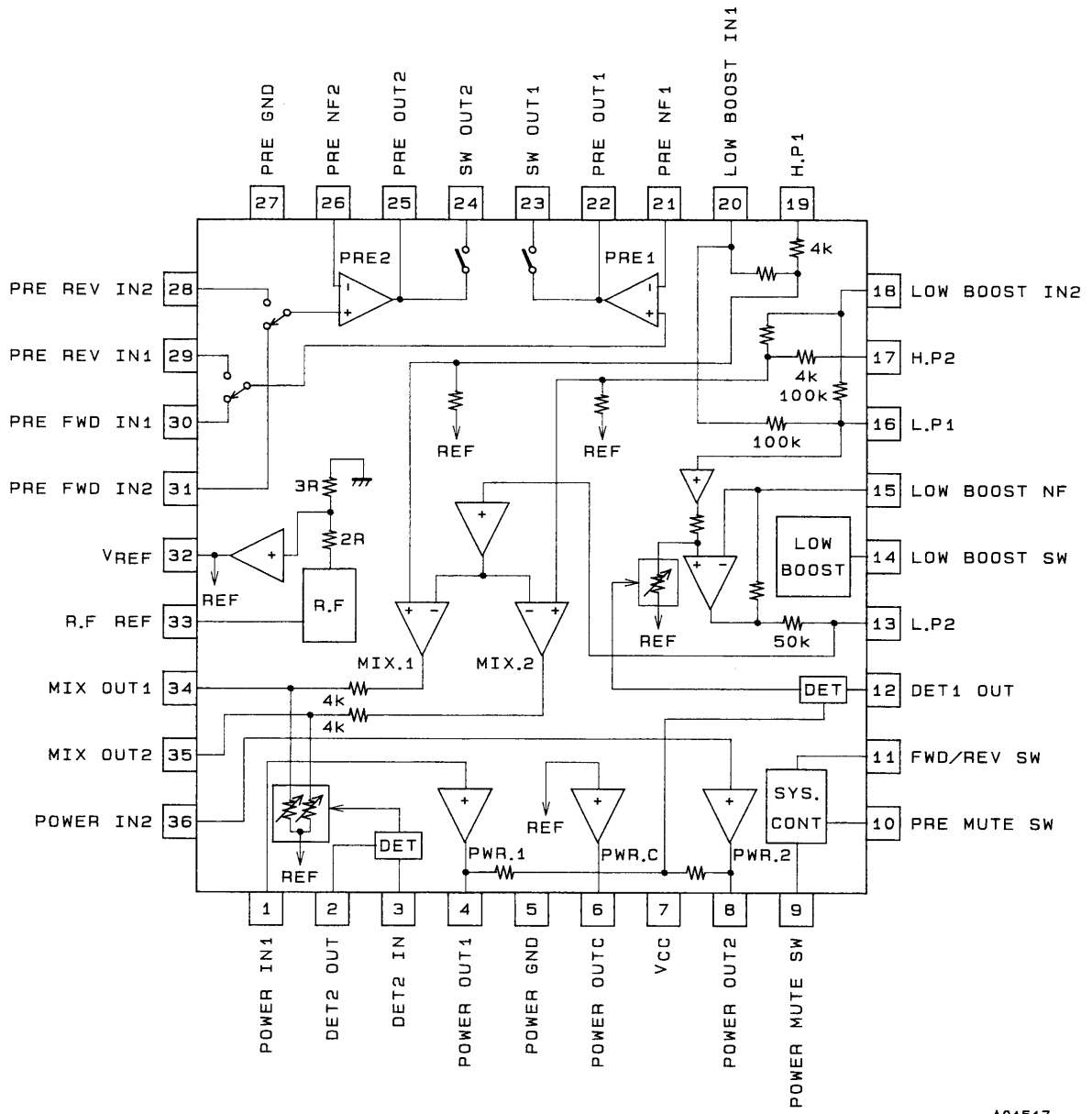
**Operating Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 3.0\text{ V}$, $f_i = 1\text{ kHz}$, $0.775\text{ V} = 0\text{ dBm}$
 $R_L = 10\text{ k}\Omega$ (preamplifier), $R_L = 30\text{ k}\Omega$ (low boost), $R_L = 16\text{ }\Omega$ (power amplifier)**

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

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

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Block Diagram

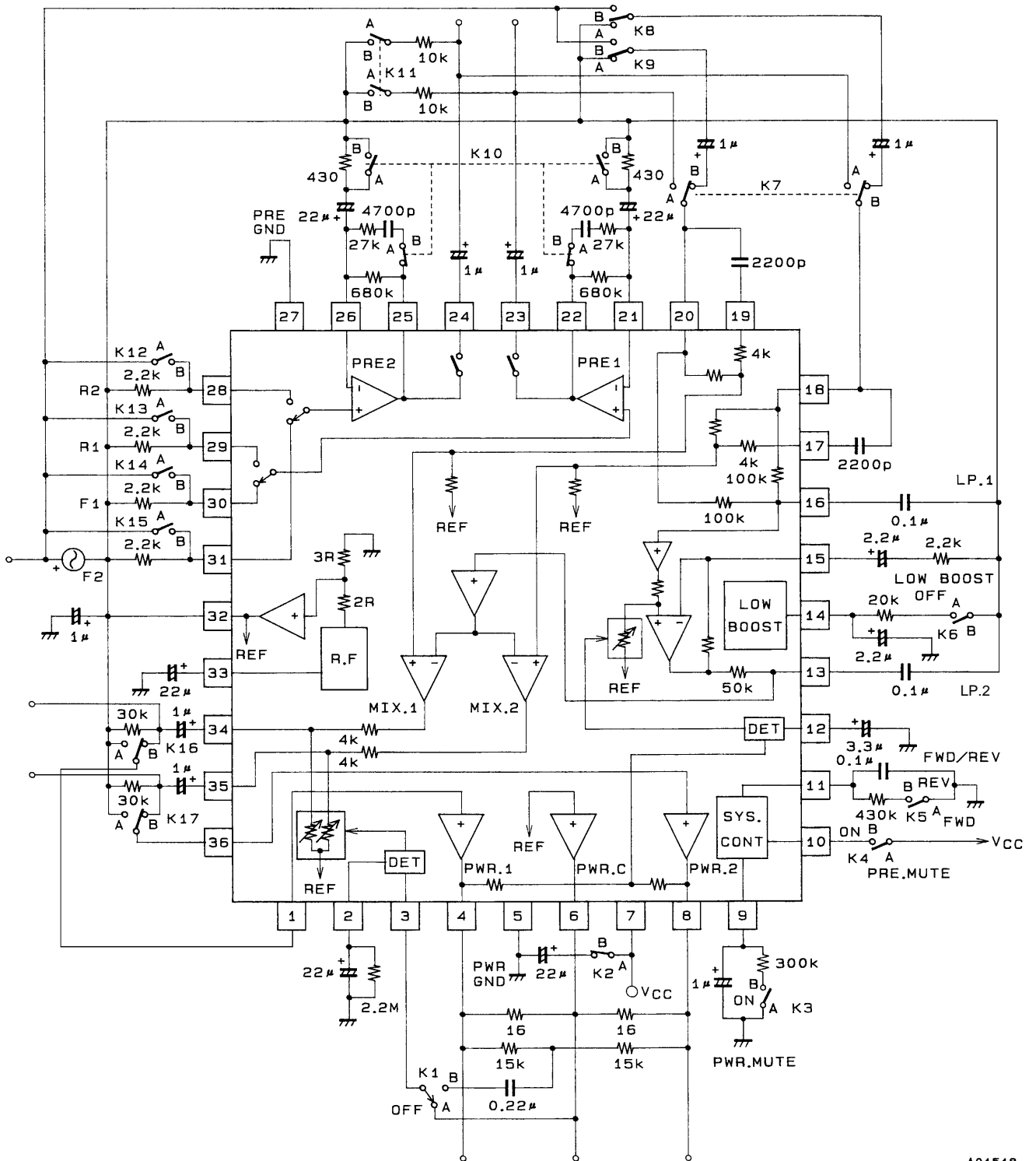


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Unit (Resistance: Ω)

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Test Circuit

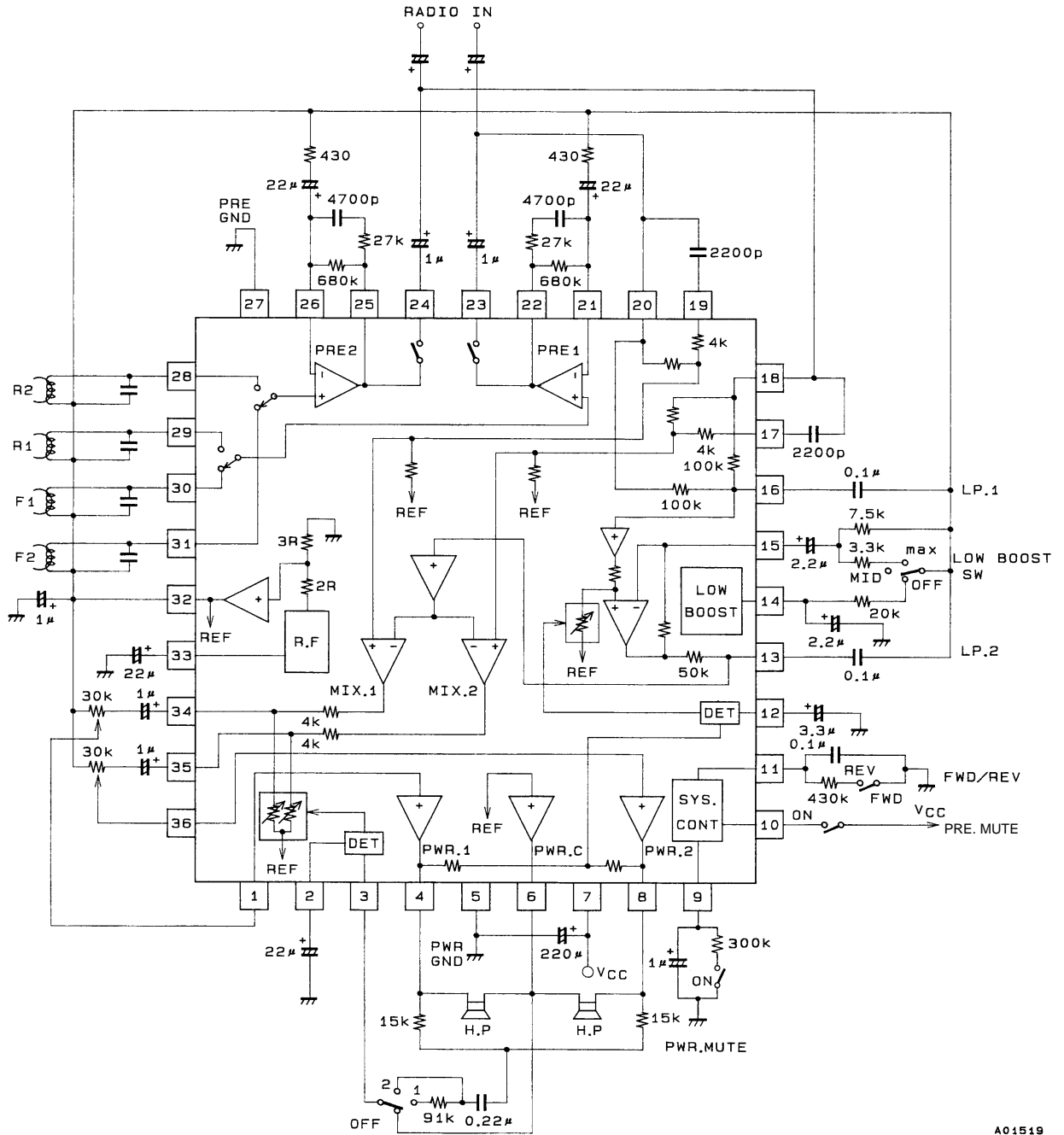


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Unit (Resistance: Ω, Capacitance: F)

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Sample Application Circuit



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Unit (Resistance: Ω, Capacitance: F)