



LA1835

Home Stereo Single-Chip Tuner IC with Electronic Tuning Support

Overview

The LA1835 is an AM, FM IF and MPX single-chip tuner IC that supports electronic tuning. It was developed specifically for use in home stereo products and is optimal for products with auto-seek systems, since it combines SD and IF counting in its auto-seek implementation. Furthermore, since the FM detector and MPX VCO circuits are adjustment free, adoption of the LA1835 can reduce the number of adjustment steps in the production line.

Functions

- AM: RF amplifier, mixer, oscillator (with ALC), IF amplifier, detector, AGC, oscillator buffer, tuning indicator (narrow-band SD), IF buffer output, stereo IF output
- FM IF: IF amplifier, quadrature detector, band muting, tuning indicator, IF buffer output, S-meter
- MPX: PLL stereo decoder, stereo indicator, forced mono, VCO stop function, adjacent channel interference rejection function (114 kHz), post-amplifier with muting function

Features

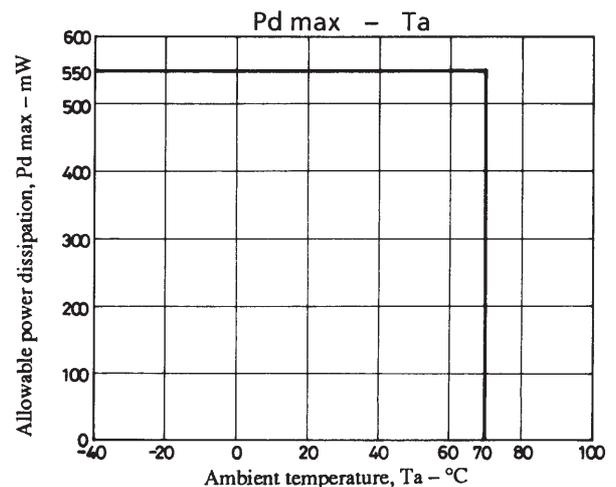
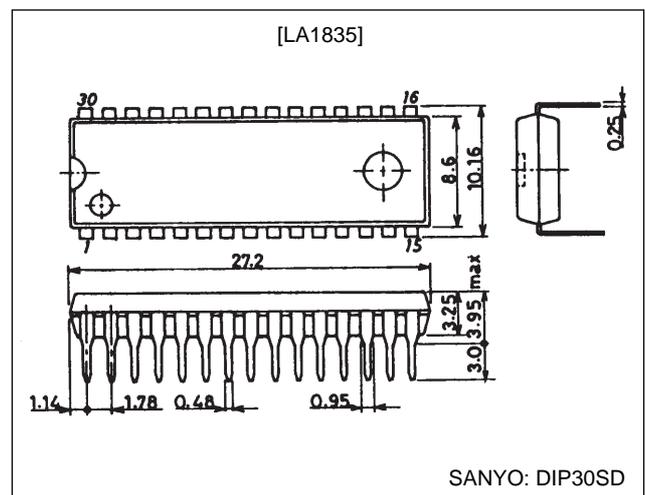
- Significant reduction in the number of manufacturing adjustment steps
 - FM detector: Adjustment free (using a ceramic discriminator)
 - MPX VCO: Adjustment free (using a ceramic resonator)
- Tuning indicator output provided. (This pin can also be used as a narrow band stop signal and as a muting drive output.)
- Adjustable FM stop sensitivity and bandwidth
- Built-in AM local oscillator buffer

- Support for AM low band cut control
- Adjustable AM stop sensitivity

Package Dimensions

unit: mm

3196-DIP30SD



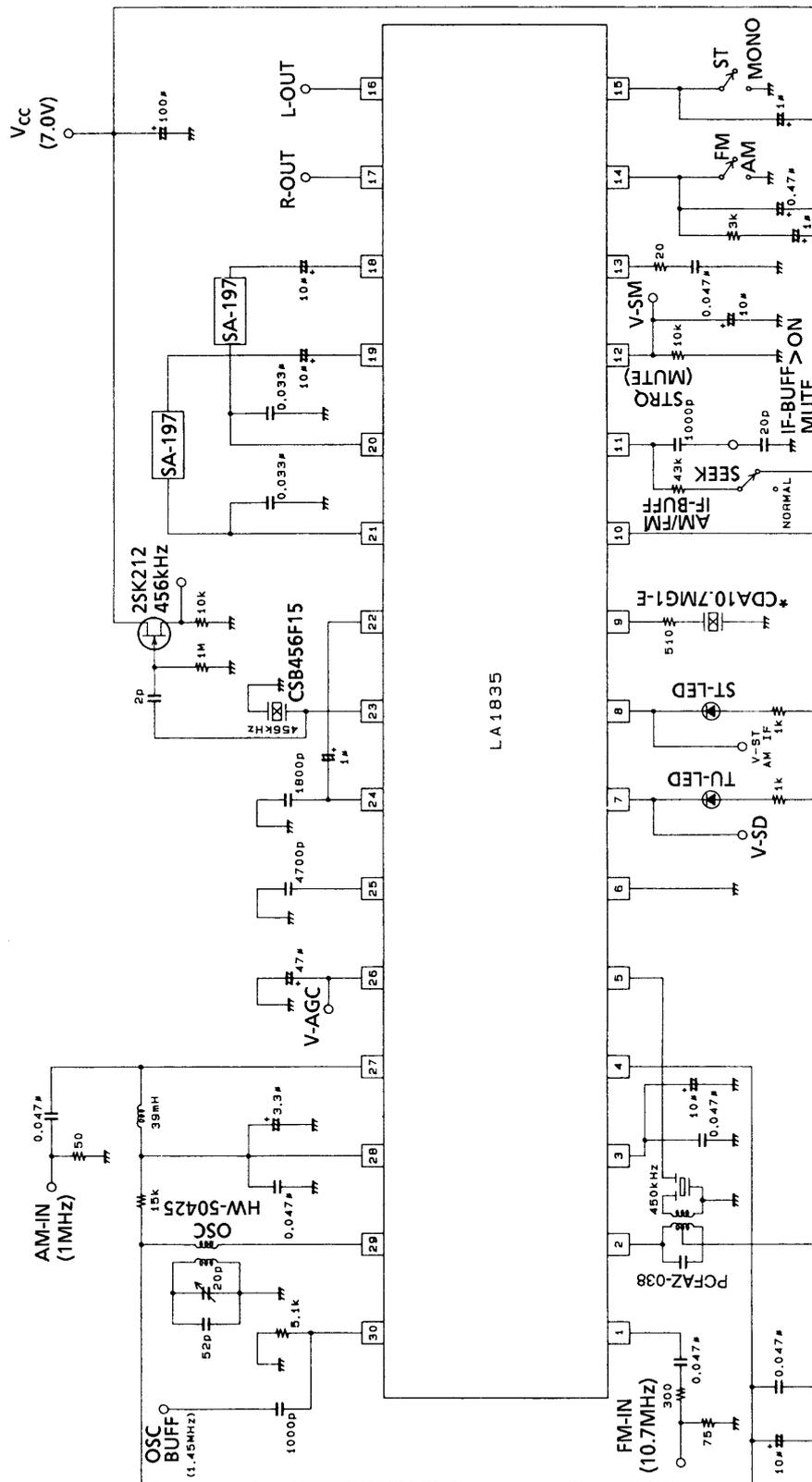
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Test Circuit Diagram



403887

Unit (resistance: Ω, capacitance: F)

Note: Since an IC socket is used, these values differ from those used when the IC is mounted on a printed circuit board.

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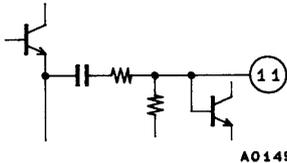
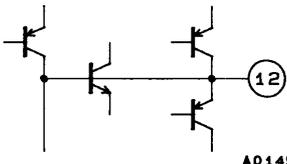
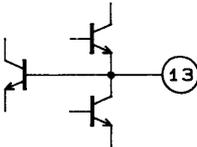
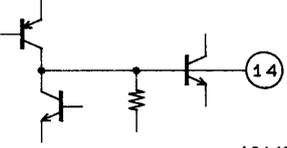
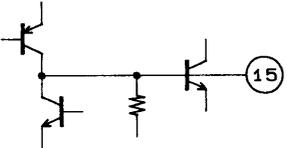
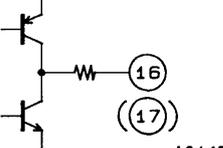
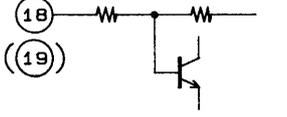
Pin Functions

No.	Function	Voltage	Internal equivalent circuit	Note
1	FM IF input	Vreg	<p style="text-align: right;">A01486</p>	Input impedance: $r_i = 330 \Omega$
2	AM mixer output	V _{CC}	<p style="text-align: right;">A01487</p>	Recommended AM IFT coil: PCFAZ-037 (Toko Co., Ltd.)
3	FM IF input bypass	Vreg	<p style="text-align: right;">A01486</p>	Also used for the AF noise filter.
4	REG	Vreg	<p style="text-align: right;">A01488</p>	Vreg = 3.6 V
5	AM IF input	Vreg	<p style="text-align: right;">A01489</p>	Input impedance: $r_i = 2 \text{ k}\Omega$
6	GND	0		
7	Tu-LED	V _{CC}	<p style="text-align: right;">A01490</p>	Active low open collector outputs Pin 8 is used for the AM stereo IF output.
8	ST-LED	V _{CC}		
9	FM detector	2.1 (FM) 2.7 (AM)	<p style="text-align: right;">A01491</p>	Recommended ceramic discriminator: CDA 10.7MG-48 (Murata Mfg. Co., Ltd.)

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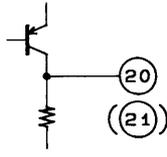
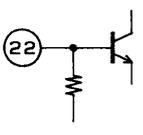
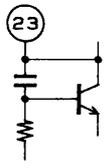
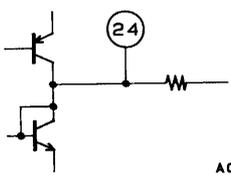
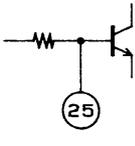
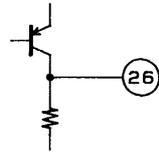
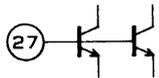
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No.	Function	Voltage	Internal equivalent circuit	Note
10	V_{CC}	V_{CC}		
11	AM/FM IF buffer output Also functions as the output control switch (muting switch).	0	 A01492	A voltage of 1.3 V or higher turns on the post-amplifier output muting. A voltage of 4.0 V or higher turns on the IF buffer output. The recommended control voltage for turning muting on is 1.9 V.
12	S-meter output Also functions as the AM SD sensitivity adjustment.	0.3 (FM) 0 (AM)	 A01493	The AM SD sensitivity can be adjusted with the resistor inserted between this pin and ground. Since the FM SD sensitivity is affected by this resistor, the AM SD sensitivity must be adjusted first.
13	AM narrow band ceramic filter connection	1.5	 A01494	Recommended narrow band ceramic filter: BFU450 C4N (Murata Mfg. Co., Ltd.)
14	Phase comparator low-pass filter (FM/AM switch)	$V_{CC} - 1.4$ (FM) 0 (AM)	 A01495	The LA1835 switches to AM mode when this pin is connected to ground.
15	Pilot detector low-pass filter (forced mono) (VCO stop)	$V_{CC} - 1.0$	 A01496	If a current of 50 μ A or larger flows from this pin, the LA1835 switches to mono mode. The VCO is stopped if this pin is connected to ground.
16 17	Post-amplifier left and right outputs	V_{reg} V_{reg}	 A01497	Output impedance: $r_o = 200 \Omega$ Pin 16: left output Pin 17: right output
18 19	Post-amplifier left and right inputs	V_{reg} V_{reg}	 A01498	Inverting inputs, $r_i = 3.3 \text{ k}\Omega$ Pin 18: left input Pin 19: right input

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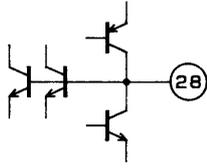
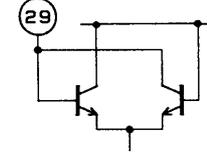
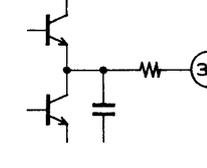
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No.	Function	Voltage	Internal equivalent circuit	Note
20 21	MPX outputs Left and right outputs	3.5 3.5	 <p style="text-align: center;">A01499</p>	Output impedance $r_o = 3.3 \text{ k}\Omega$ Pin 20: left de-emphasis Pin 21: right de-emphasis
22	MPX input	2.9	 <p style="text-align: center;">A01500</p>	Input impedance $r_i = 20 \text{ k}\Omega$ Increasing the value of the external capacitor connected between this pin and pin 24 improves the low frequency separation characteristics. However, the impulse noise associated with switching between AM and FM also increases.
23	MPX VCO	3.5 (FM) 0 (AM)	 <p style="text-align: center;">A01501</p>	Recommended ceramic oscillator: CSB456F15 (Murata Mfg. Co., Ltd.)
24	AM/FM demodulator output	2.9 (FM) 3.0 (AM)	 <p style="text-align: center;">A01502</p>	Output impedances FM: $r_o = 250 \Omega$ AM: $r_o = 10 \text{ k}\Omega$ The separation can be adjusted by changing the value of the external capacitor connected between this pin and ground.
25	AM low cut	2.9 (FM) 3.0 (AM)	 <p style="text-align: center;">A01503</p>	The low-band frequency characteristics of the AF demodulator can be adjusted by changing the value of the external capacitor connected between this pin and ground. The AM detector output can be attenuated by adding a resistor in series with the capacitor.
26	AMAGC	0 (FM) 0.5 (AM)	 <p style="text-align: center;">A01504</p>	The internal load resistance, R is $6.7 \text{ k}\Omega$.
27	AM RF input	Vreg	 <p style="text-align: center;">A01505</p>	Pin 27 must be used at the same voltage as pin 4, the regulator voltage.

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No.	Function	Voltage	Internal equivalent circuit	Note
28	AFC	Vreg	 <p>A01506</p>	The FM SD bandwidth can be adjusted by changing the value of the external resistor inserted between pin 28 and pin 4, the regulator voltage.
29	OSC	Vreg	 <p>A01507</p>	The oscillator coil is connected between pin 29 and pin 4, the regulator voltage.
30	Oscillator buffer output Also functions as the FM SD sensitivity adjustment.	1.6 (FM) 1.3 (AM)	 <p>A01508</p>	The FM SD sensitivity can be adjusted by changing the value of the external resistor inserted between this pin and ground. The AM SD sensitivity must be adjusted before the AM FD sensitivity. Output impedance $r_o = 200 \Omega$

