



# LA1883M

## Single-chip, FM/AM Tuner for Car Radio and Home Stereo Equipment

### Overview

The LA1883M is a single-chip stereo FM/AM tuner system IC for use in car radio and home stereo equipment. It features higher performance and 30% fewer external components than current devices.

The LA1883M is a basic FM/AM tuner block on a single chip. It comprises FM front end, FM IF, MPX, noise canceller, AM and AM/FM switch.

The LA1883M operates from a 7.5 to 9.2V supply and is available in 64-pin QIPs.

### Features

- Single-chip stereo FM/AM tuner.
- FM front end, FM IF, MPX, noise canceller, AM and FM/AM switch.
- Higher performance and 30% fewer external components than current devices.
- High FM front end to FM IF stage isolation.
- 7.5 to 9.2V supply.
- 64-pin QIP.

### Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	$V_{CC}$		9.5	V
Power dissipation	$P_D$		950	mW
Operating temperature range	$T_{opr}$		-30 to +85	$^\circ\text{C}$
Storage temperature range	$T_{stg}$		-40 to +150	$^\circ\text{C}$

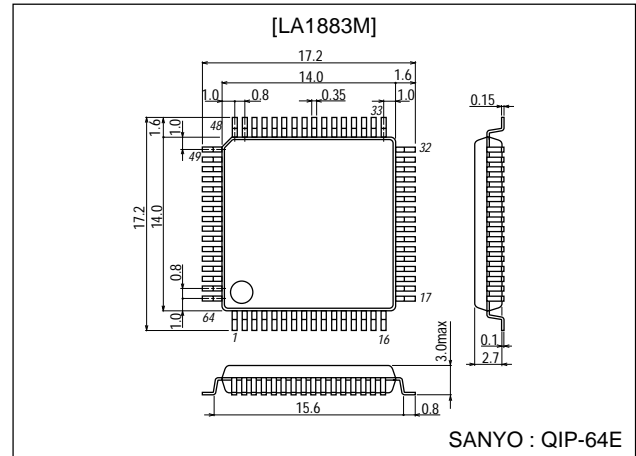
#### Recommended Operating Conditions at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	$V_{CC}$		8.5	V
Supply voltage range	$V_{CC}$	Stabilized state	7.5 to 9.2	V
STEREO INJ supply voltage	$V_{CC\text{ STEREO INJ}}$		5	V

### Package Dimensions

unit:mm

3159



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## Electrical Characteristics

**FM IF** at  $T_a = 25^\circ\text{C}$ ,  $V_{CC}=8.5\text{V}$ ,  $f_c=10.7\text{MHz}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Demodulator output voltage	$V_{OFM}$	$f_m=1\text{kHz}$ , 100% modulation, $V_I=80\text{dB}\mu$	180	280	380	mV
Channel balance	CB	$f_m=1\text{kHz}$ , 100% modulation, $V_I=80\text{dB}\mu$	-1	0	+1	dB
FM total harmonic distortion	$\text{THD}_{FM}$	$f=1\text{kHz}$ , 100% modulation, $V_I=80\text{dB}\mu$		0.5	1.2	%
Signal-to-noise ratio	$S/N_{FM\ IF}$	$f=1\text{kHz}$ , 100% modulation, $V_I=80\text{dB}\mu$	68	75		dB
AM suppression ratio	AMR	$f=1\text{kHz}$ , $f_m=1\text{kHz}$ , 30% AM modulation, $V_I=80\text{dB}\mu$	56	69		dB
Muting attenuation	$\alpha_{MUTE}$	$f=1\text{kHz}$ , $V_I=80\text{dB}\mu$ , $V_{33}$ changed from 0 to 2V.	5	10	15	dB
		$f=1\text{kHz}$ , $V_I=80\text{dB}\mu$ , $V_{33}$ changed from 0 to 4V.	19	24	29	
Separation	Sep	See note 2.	35	45		dB
Stereo LED turn-ON pilot tone modulation	$ST_{ON}$	$V_6<1.5\text{V}$	2.5	3.7	6.6	%
Stereo LED turn-OFF pilot tone modulation	$ST_{OFF}$	$V_6<3.5\text{V}$	1.5	2.7		%
Main channel total harmonic distortion	$\text{THD}_{main}$	See note 2.		0.4	1.5	%
Pilot signal cancellation level	$P_{CAN}$	10% pilot signal, $V_I=80\text{dB}\mu$ , Pilot-level leakage DIN-AUDIO measurement	15	22		dB
SNC output voltage	$V_{OSUB}$	$V_I=80\text{dB}\mu$ , $V_{31}=0.1\text{V}$ . See note 2.			5	mV
SNC output attenuation	$\alpha_{SNC}$	$V_I=80\text{dB}\mu$ , $V_{31}$ changed from 3.0 to 0.6V. See note 2.	0	4	8	dB
HCC output attenuation	$\alpha_{HCC}$	$V_I=80\text{dB}\mu$ , $f=10\text{kHz}$ , $V_{28}$ changed from 3.0 to 0.6V. See note 2.	0.5	4.5	8.5	dB
		$V_I=80\text{dB}\mu$ , $f=10\text{kHz}$ , $V_{28}$ changed from 3.0 to 0.1V. See note 2.	20	24	28	
Input -3dB limiting voltage	$V_{ILIM}$	Referred to $V_I=80\text{dB}\mu$	33	40	47	dB $\mu$
Muting sensitivity	$V_{IMUTE}$	Unmodulated signal, $V_{33}=2\text{V}$	27	35	43	dB $\mu$
SD sensitivity	$SD_{SEN\ MPX}$	Unmodulated signal. IF count buffer is ON ( $V>100\text{mV}$ ).	60	72	84	dB $\mu$
		Unmodulated signal. SD is ON.	60	72	84	
IF count buffer output voltage	$V_{IF\ BUFF\ FM}$	Unmodulated input and output, $V_{FM\ IF}=100\text{dB}\mu$	170	260	400	mV
S-meter output voltage	$V_{SM\ FM}$	No signal	0	0.4	1.0	V
		$V_I=50\text{dB}\mu$	1.0	1.9	3.0	
		$V_I=70\text{dB}\mu$	1.9	3.4	5.5	
		$V_I=100\text{dB}\mu$	3.3	5.2	6.9	
Muting bandwidth	$BW_{MUTE}$	$V_I=100\text{dB}\mu$ , $V_{33}=2\text{V}$ unmodulated wideband signal	150	230	330	kHz

### Note

1. Mounted in Yamaichi Electrical Industries' IC-51-0644-824 or KS8277 IC socket.
2.  $f_1$  comprises 90% left and right signals, and 10% pilot signal.

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## FM front end at $T_a = 25^\circ\text{C}$ , $V_{CC}=8.5\text{V}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
RF AGC turn-ON input voltage	$V_{IAGC}$	$V_{64}=0.7\text{V}$	65	72	79	$\text{dB}\mu$
Conversion voltage gain	$A_V$	$V_{MIX IN}=70\text{dB}\mu$ at 98MHz with no modulation	74	118	187	mV
OSC BUFF output voltage	$V_{OSC BUFF FM}$	No signal, $f_{OSC}=108.7\text{MHz}$ , $V_I=4.6\text{V}$	130	200	270	mV
FM section quiescent supply current	$I_{CCOFM}$	No signal. $I_{40}+I_{49}+I_{54}+I_{60}+I_{61}$	54	77	95	mA

## Noise canceller at $T_a = 25^\circ\text{C}$ , $V_{CC}=8.5\text{V}$

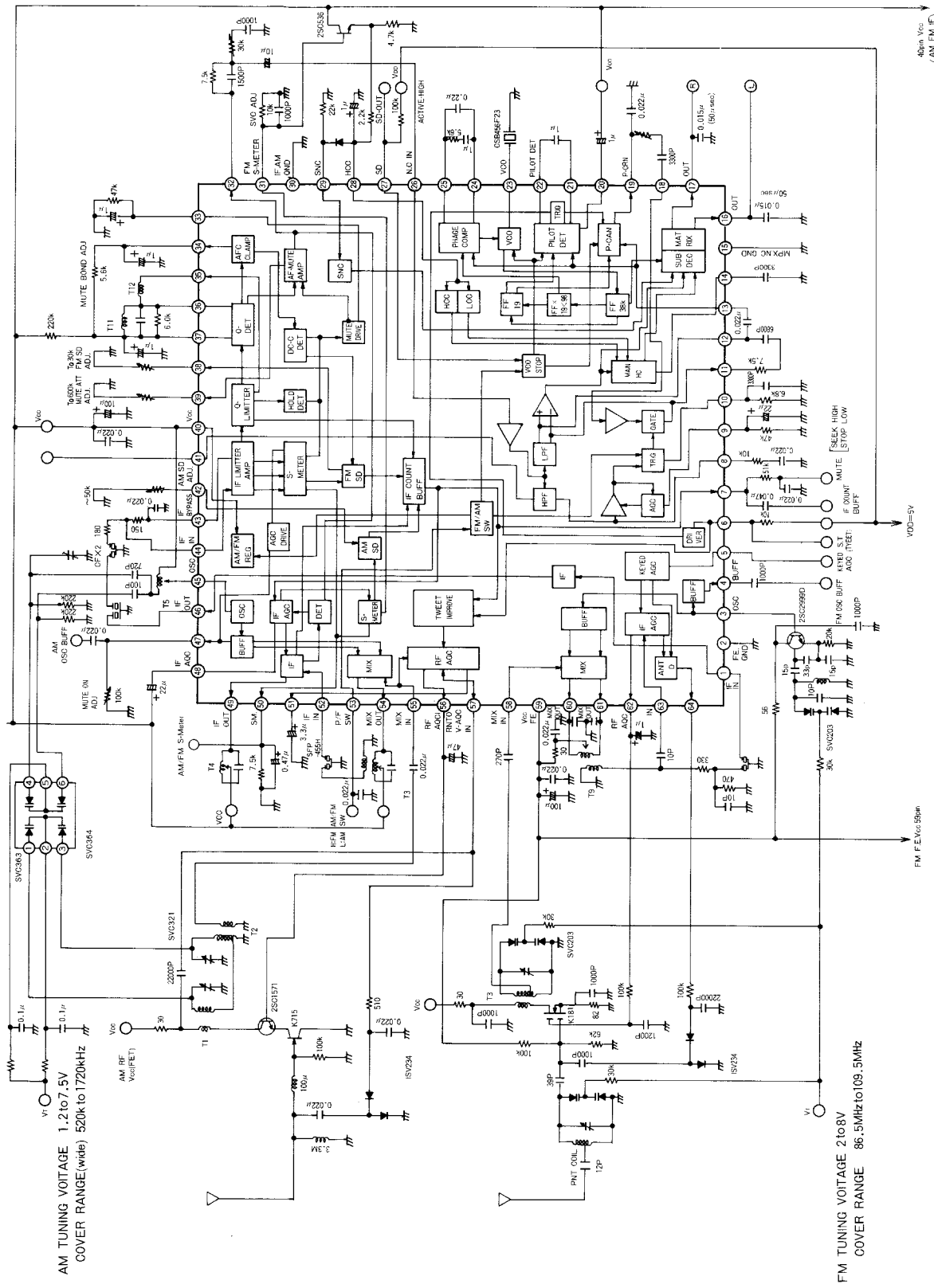
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Gate time	$\tau_{GATE}$	$V_{NC IN}=100\text{mV}$ peak at $f=1\text{kHz}$ , $1\mu\text{s}$ pulse	15	25	35	$\mu\text{s}$
Noise sensitivity	$N_{SEN}$	1kHz, $1\mu\text{s}$ pulse input level when noise canceller is ON			30	$\text{mVp}$

## AM at $T_a = 25^\circ\text{C}$ , $V_{CC}=8.5\text{V}$ , $f_{AM ANT}=1\text{MHz}$ unless otherwise noted

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Usable sensitivity	S	$V_{AM ANT}=27\text{dB}\mu$ , $f_m=1\text{kHz}$ , 30% modulation	16	20		dB
Detector output voltage	$V_{OAM}$	$V_{AM ANT}=74\text{dB}\mu$ , $f_m=1\text{kHz}$ , 30% modulation	85	120	170	mV
AGC figure-of-merit	$V_{AGCFOM}$	Referred to $V_{AM ANT}=74\text{dB}\mu$ , change in input required for output to fall 10dB	52	57	62	dB
Signal-to-noise ratio	$S/N_{AM}$	$V_{AM ANT}=74\text{dB}\mu$ , $f_m=1\text{kHz}$ , 30% modulation	45	50		dB
Total harmonic distortion	$THD_{AM}$	$V_{AM ANT}=74\text{dB}\mu$ , $f_m=1\text{kHz}$ , 80% modulation		0.4	1.0	%
S-meter output voltage	$V_{SM AM}$	No signal		0	0.3	V
		$V_{AM ANT}=100\text{dB}\mu$ , unmodulated	3.3	4.7	7.0	
OSC BUFF output voltage	$V_{OSC BUFF AM}$	No signal	310	370		mV
Wideband-AGC sensitivity	$W-AGC_{SEN}$	$f_{AM ANT}=1.4\text{MHz}$ , $V_{57}=0.7\text{V}$	93	99	105	$\text{dB}\mu$
SD antenna input level sensitivity	$SD_{SEN AM}$	IF count output is ON.	23	30	37	$\text{dB}\mu$
		SD is ON.	23	30	37	$\text{dB}\mu$
Tweet reduction circuit antenna input level sensitivity	$Tweet_{SEN}$	$N_6=0\text{V}$ , AGC ON input	50	56	62	$\text{dB}\mu$
IF BUFF output voltage	$V_{IF BUFF AM}$	$V_{AM ANT}=74\text{dB}\mu$ , unmodulated	200	260		mV

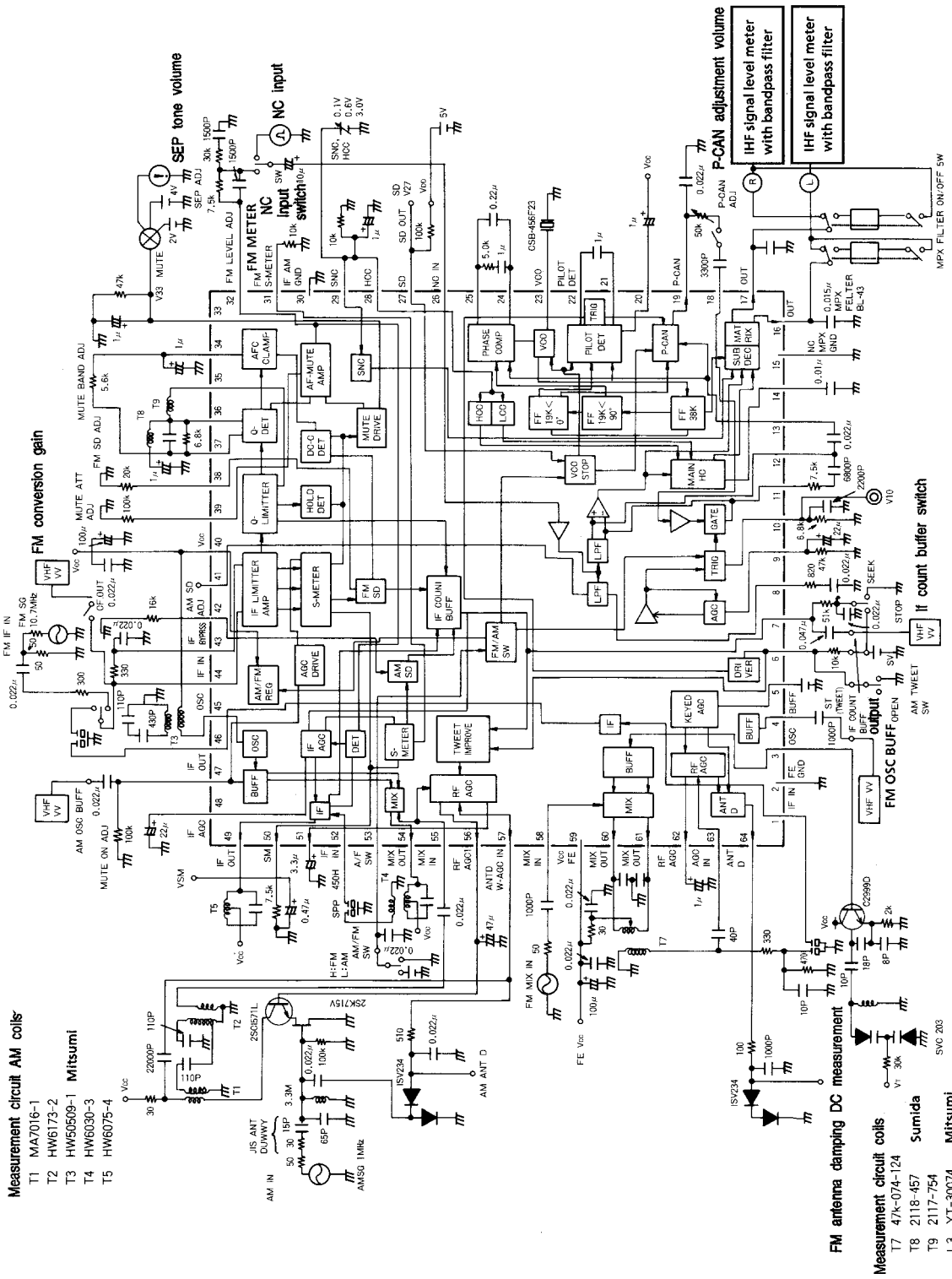
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## Block Diagram



Unit (resistance:  $\Omega$ , capacitance: F)

## Measurement Circuit



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