



LA1600

1-Band AM Radio

Overview

The LA1600, being an AM tuner IC placed in a 9-pin SIP, provides the functions of an AM tuner. It is usable in the band range up to SW band and is especially suited for use in low-cost AM radios and radio-controlled receivers.

Functions

- AM : RF amp, MIX, OSC, IF amp, detector, AGC.

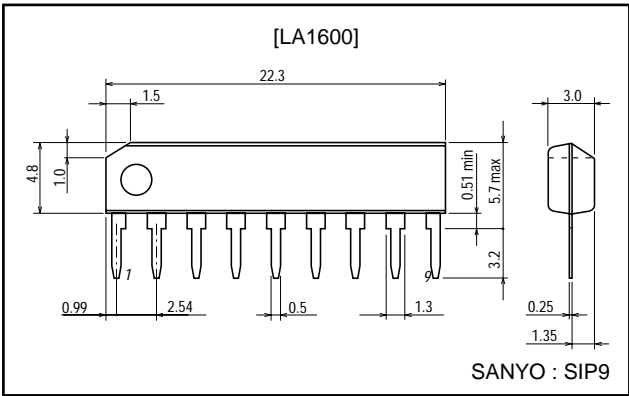
Features

- Minimum number of external parts required.
- Low current drain (3.7mA).
- Low supply voltage (1.8V min).
- Adoption of double-balanced mixer.
- Usable in the band range up to SW band.

Package Dimensions

unit : mm

3017B-SIP9



Specifications

Maximum Ratings at Ta=25°C, See specified Test Circuit.

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V _{CC} max	Pin 3	9	V
		Pin 4	9	V
		Pin 8	7	V
Allowable power dissipation	P _d max	Ta ≤ 70°C	100	mW
Operating temperature	T _{opr}		-20 to +70	°C
Storage temperature	T _{stg}		-40 to +125	°C

Operating Conditions

at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended operating voltage	V _{CC}		3	V
Operating voltage range	V _{CC op}		1.8 to 6.0	V

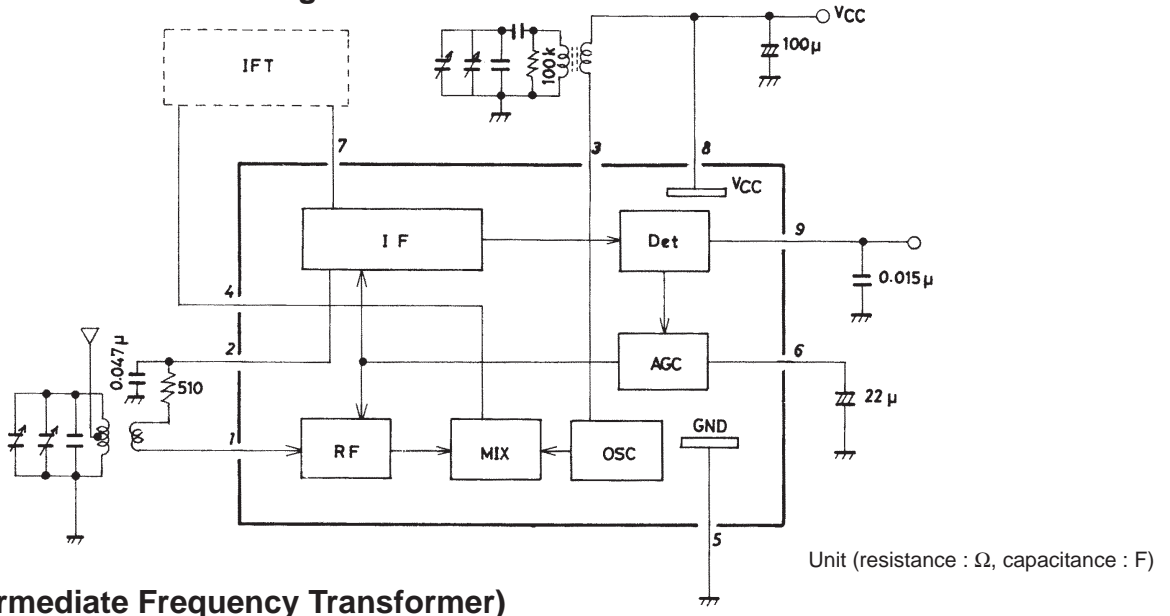
Operating Characteristics

at Ta=25°C, V_{CC}=3V, See specified Test Circuit.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[AM Characteristics/f=1MHz]						
Quiescent current	I _{cco}	V _{IN} =No input		3.7	4.6	mA
Detection output	V _{O1}	V _{IN} =23dBμ, 1kHz-30% mod	-30	-25	-20	dBm
			24	43	78	mV
	V _{O2}	V _{IN} =80dBμ, 1kHz-30% mod	-18	-14	-10	dBm
			97	155	250	mV
S/N	S/N1	V _{IN} =23dBμ	18	21.5		dB
	S/N2	V _{IN} =80dBμ	48	53		dB
Total harmonic distortion	THD1	V _{IN} =80dBμ, 1kHz-30% mod		0.3	1.2	%
	THD2	V _{IN} =100dBμ, 1kHz-30% mod		0.4	1.5	%

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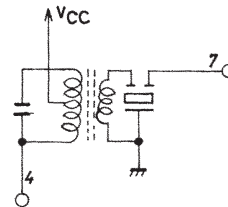
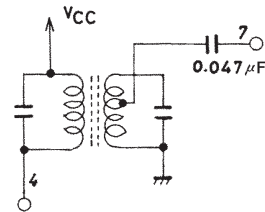
Equivalent Circuit Block Diagram



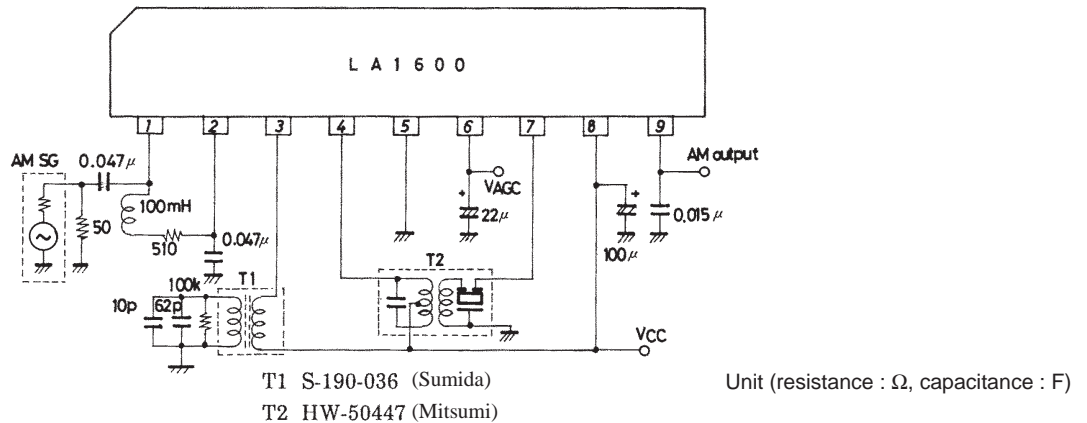
IFT (Intermediate Frequency Transformer)

1. Using double tuning coil

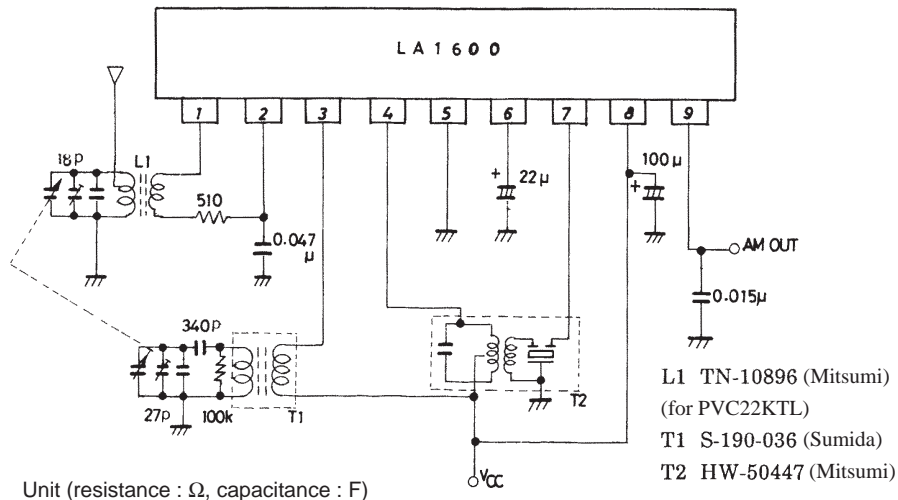
2. Using ceramic filter

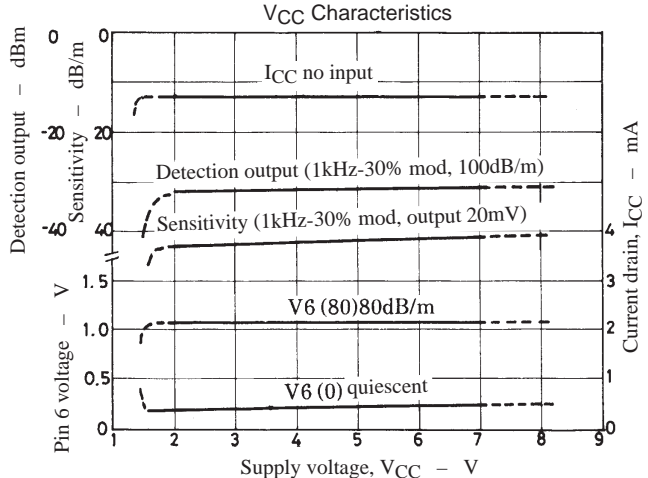
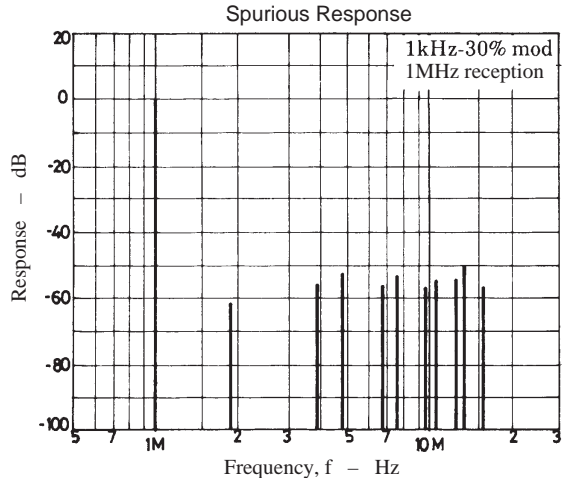
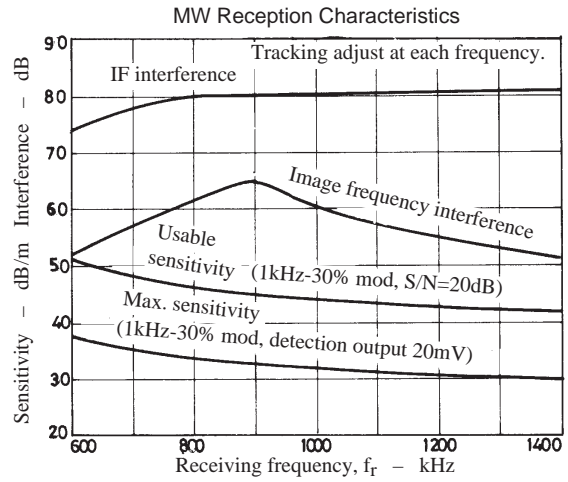
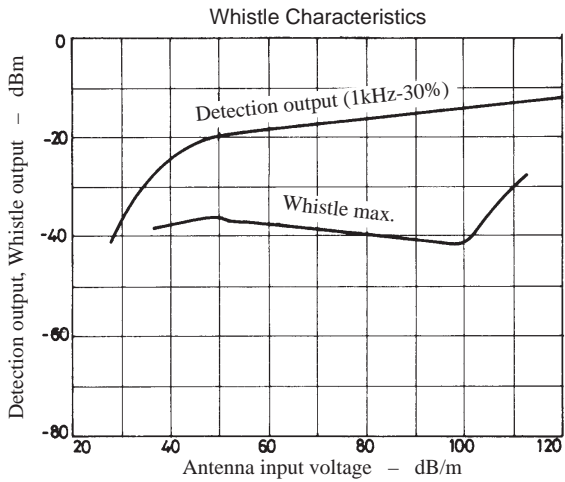
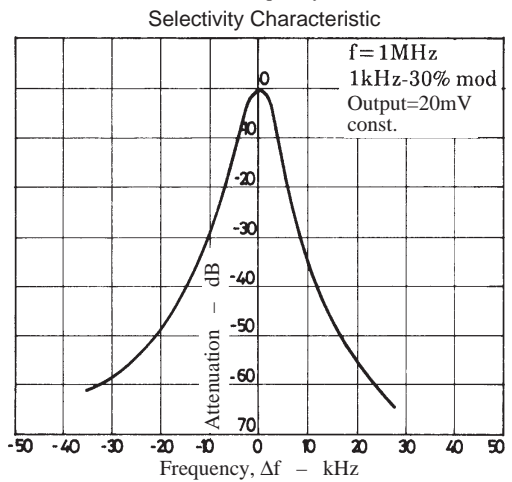
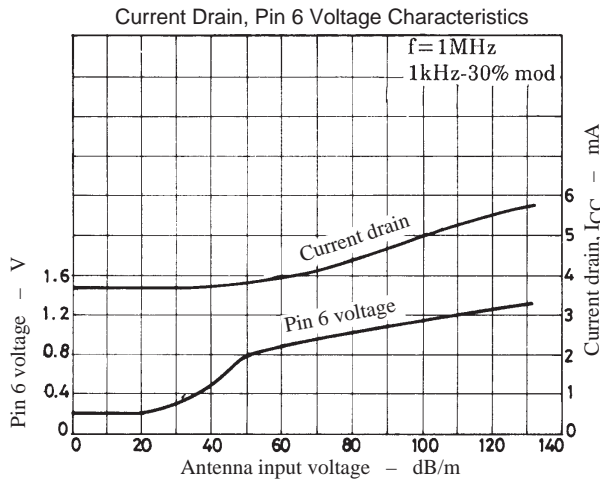
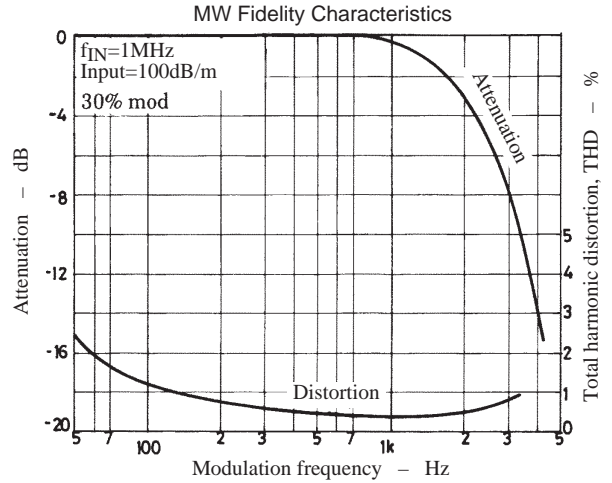
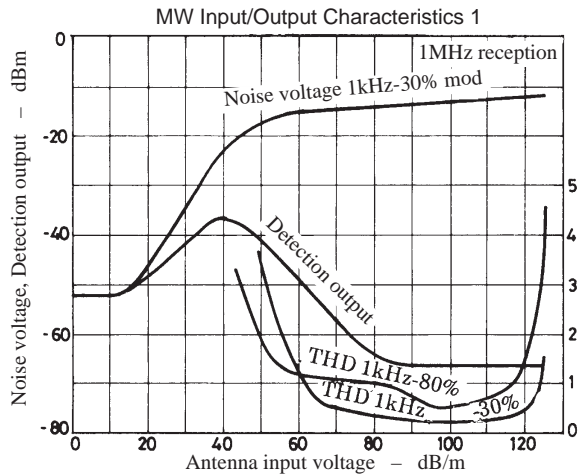


Specified Test Circuit Diagram

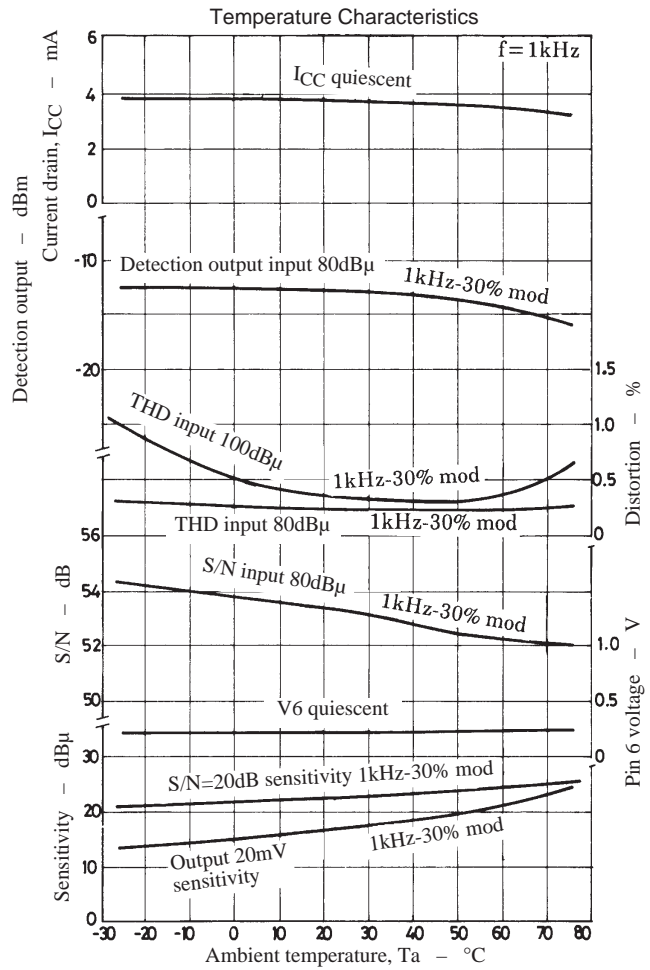


Test Circuit 1 : AM-MW

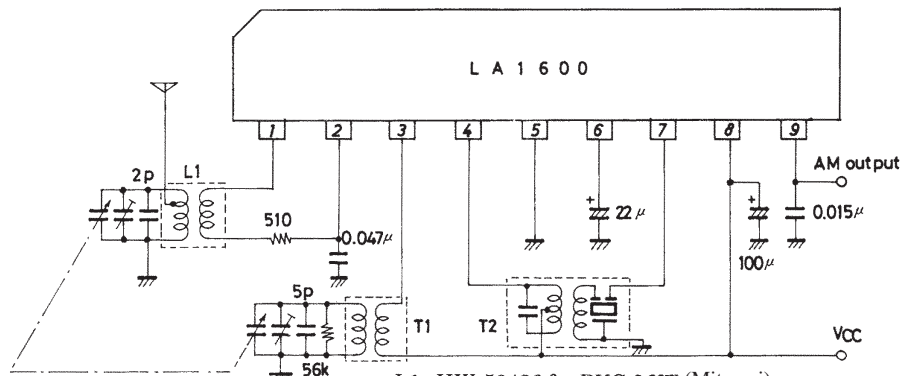




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Test Circuit 2 : AM-MW

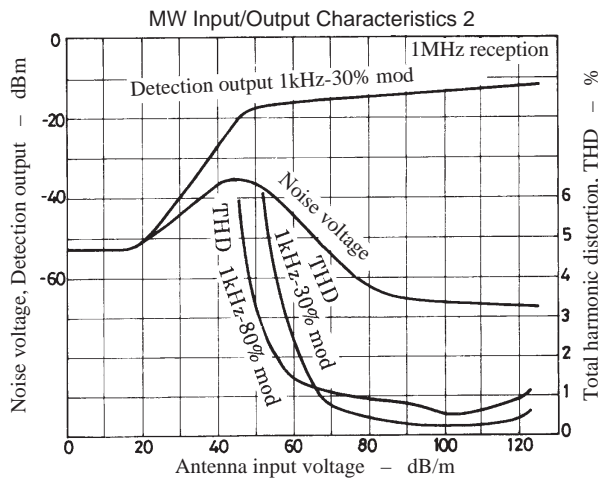


L1 : HW-50426 for PVC-LYT (Mitsumi)

T1 : HW-50425 (Mitsumi)

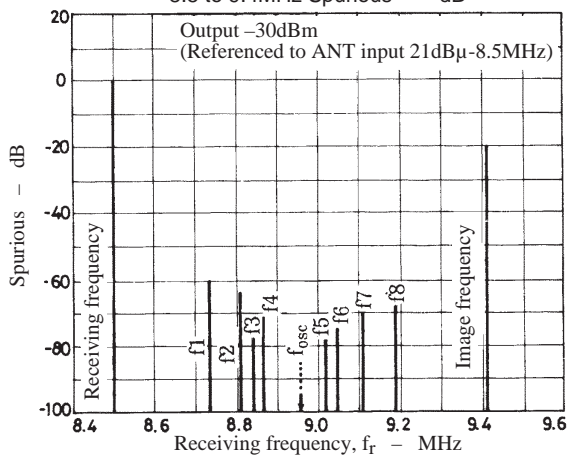
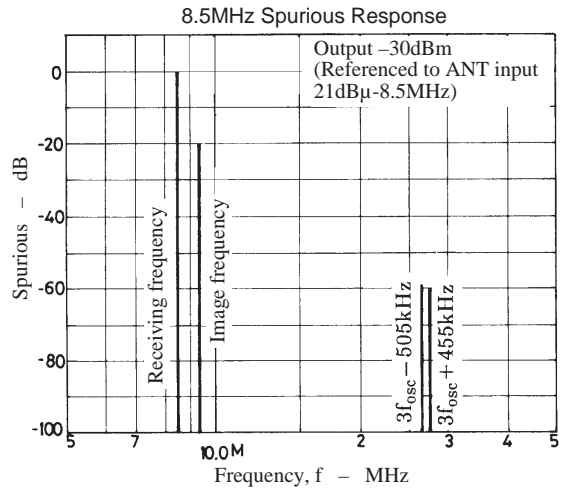
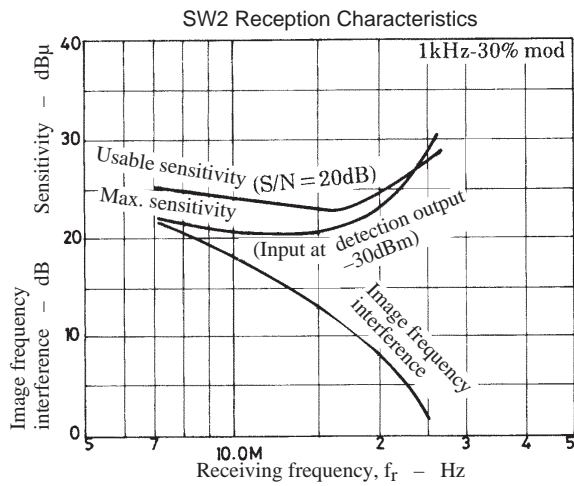
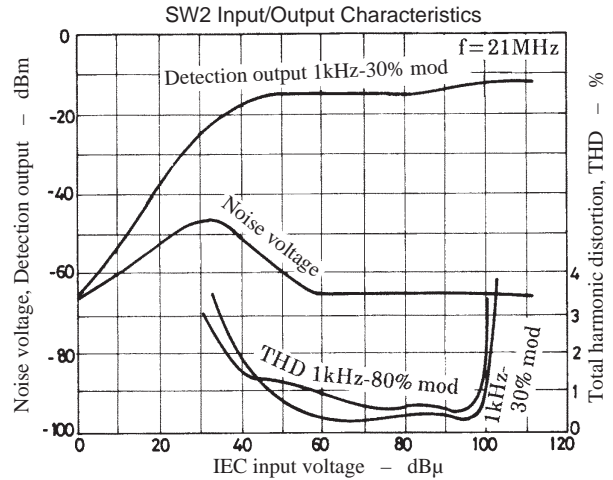
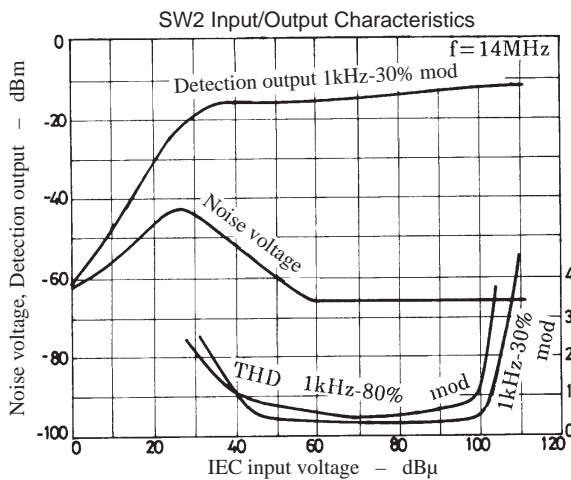
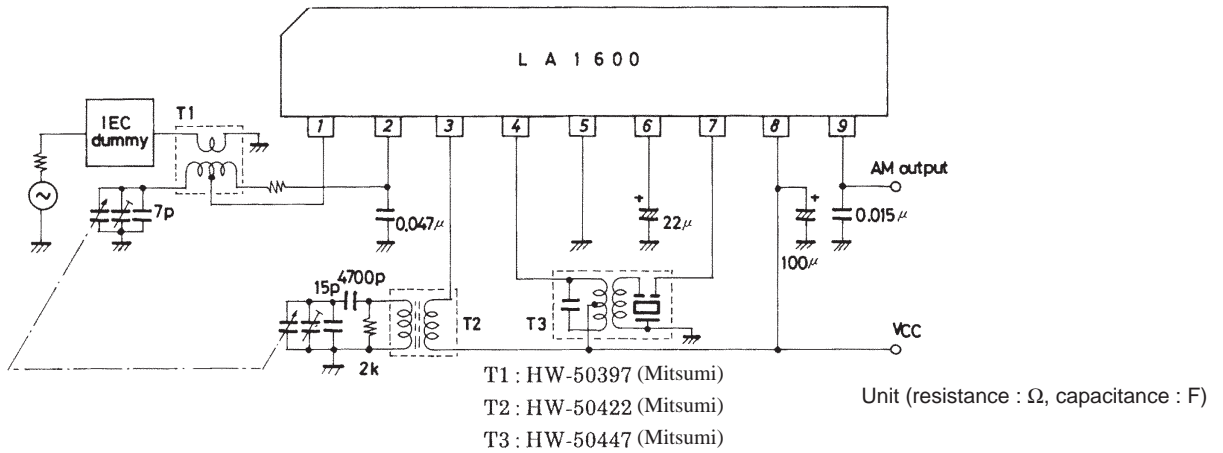
T2 : HW-50447 (Mitsumi)

Unit (resistance : Ω, capacitance : F)



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Test Circuit 3 : SW2 (7.2 to 24.0MHz)



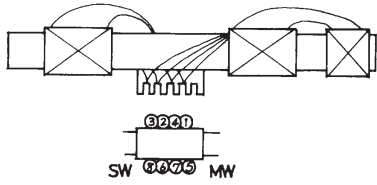
- $f_1 : 8.7336\text{MHz} \rightarrow 2f_{OSC} - 2f_1 = 455\text{kHz}$
- $f_2 : 8.8097\text{MHz} \rightarrow 3f_{OSC} - 3f_2 = 455\text{kHz}$
- $f_3 : 8.8478\text{MHz} \rightarrow 4f_{OSC} - 4f_3 = 455\text{kHz}$
- $f_4 : 8.8702\text{MHz} \rightarrow 5f_{OSC} - 5f_4 = 455\text{kHz}$
- $f_5 : 9.0263\text{MHz} \rightarrow 5f_5 - 5f_{OSC} = 455\text{kHz}$
- $f_6 : 9.0525\text{MHz} \rightarrow 4f_6 - 4f_{OSC} = 455\text{kHz}$
- $f_7 : 9.1130\text{MHz} \rightarrow 3f_7 - 3f_{OSC} = 455\text{kHz}$
- $f_8 : 9.1888\text{MHz} \rightarrow 2f_8 - 2f_{OSC} = 455\text{kHz}$

Coil Specifications

MW antenna

Bar antenna (for PVC22KTL)

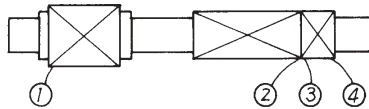
- TN-10896 (Mitsumi)



- ①-② 22T + 49T, ③-④ 10T
Tight solenoid direct winding
- ⑤-⑥ 17T 0.5φ space winding
- ⑦-⑧ 4T tight solenoid winding
- ①-② L = 260μH, Q₀ = 330 (≥ 200)
- ⑤-⑥ L = 15μH, Q₀ = 250 (≥ 150)

Bar antenna (for PVC-LYT)

- HW-50426 (Mitsumi)

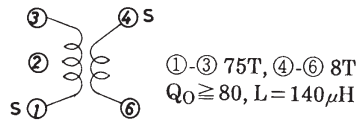


- ①-② 21T + 100T
- ③-④ 30T
- ①-② L = 604μH, Q₀ ≥ 120

MW OSC

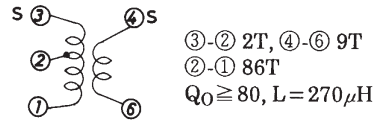
- S-190-036 (Sumida)

For PVC22KTL



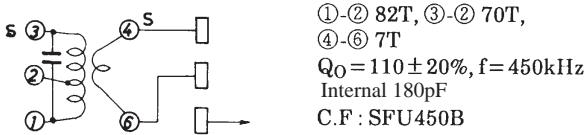
- HW-50426 (Mitsumi)

For PVC-LYT



AM-IFT

- HW-50447 (Mitsumi)

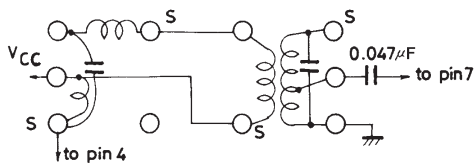


AM-IFT

Application where a double tuning coil is used

HW-50475

HW-50498



HW-50475
(Mitsumi)

- ①-② 80T
- ④-③ 70 1/2T
- Internal 180pF
- Q₀ = 120 ± 20%

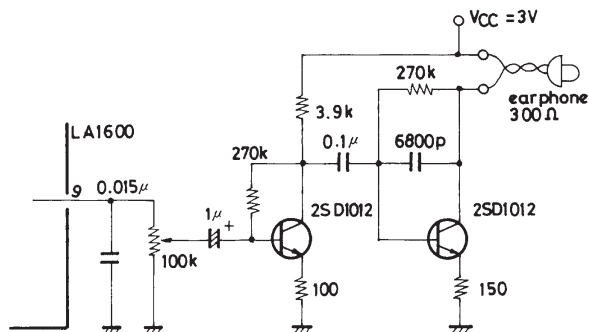
HW-50498
(Mitsumi)

- ①-② 134T
- ④-③ 3T
- ②-③ 18T
- Internal 180pF
- Q₀ = 70 ± 20%

Sample Application Circuit 1

Earphone

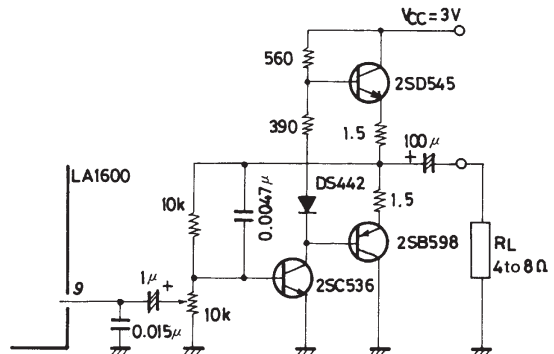
Transistor rank=G280 to 560



Sample Application Circuit 2

Power amp using 3 discrete devices

Transistor rank=E100 to 200

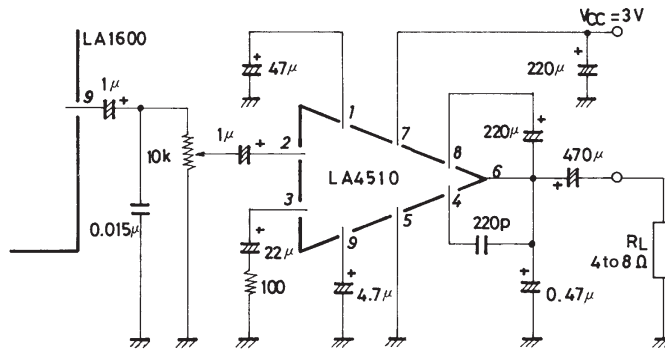


Unit (resistance : Ω, capacitance : F)

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Sample Application Circuit 3

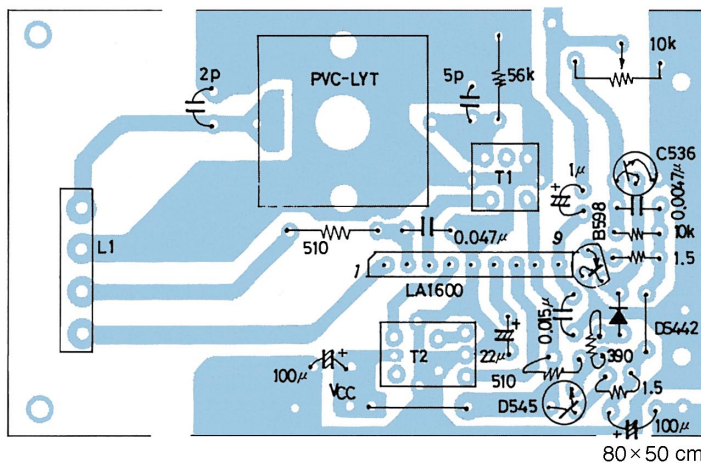
Using the LA4510



Unit (resistance : Ω , capacitance : F)

Sample Printed Circuit Pattern : LA1600 + Power amp using 3 discrete devices

(For the circuit diagram, refer to Test Circuit 2 and Sample Application Circuit 2.)



L1 : HW-50426 (Mitsumi)
 L1 : HW-50425 (Mitsumi)
 T2 : HW-50447 (Mitsumi)

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