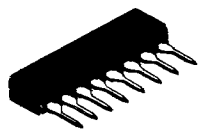
HA12012

2-Channel Audio Preamplifier for Cars and Home Stereo Sets

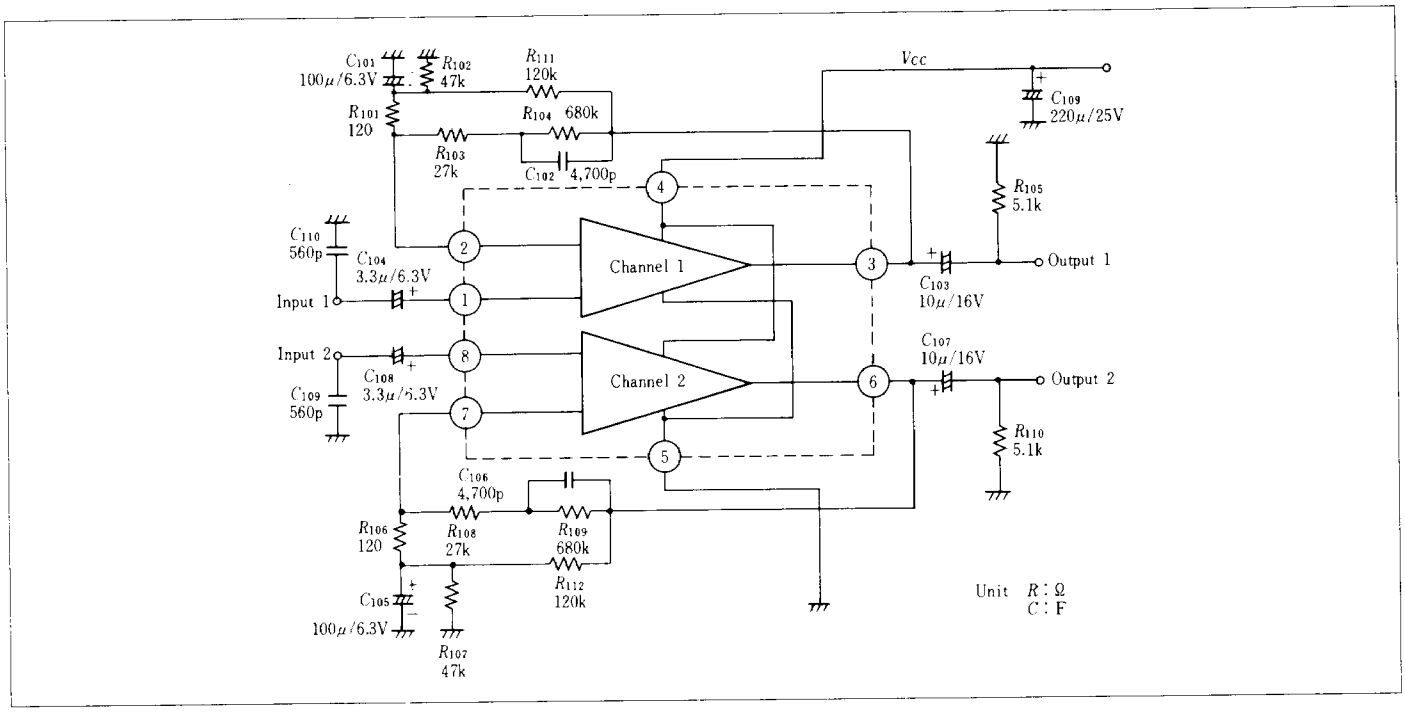
■ **FEATURES**

- High open loop voltage gain ($G_{V(OL)}$= 105dB at f = 1kHz) for being used at high closed loop voltage gain (Gv=51.3dB at f=1kHz).
- High output voltage level (Vout=2.5Vrms at T.H.D=1%).
- Wide range of operating supply voltage.
- Low noise (total equivalent input noise is 0.98μV typ. Using NAB weighting Rg=2.4kΩ, BW=20Hz to 20kHz).
- Low output impedance (Zout=10Ω, f=1kHz)
- Good channel balance (Gv is determined by external components).



(SP-8)

■**TYPICAL APPLICATION**



■**ABSOLUTE MUXIMUM RATINGS** (Unless otherwise specified, Ta=25℃)

Item	Symbol	Rating	Unit
Supply Voltage	V_{CC} max	20	V
Power Dissipation*	P_T max	250	mW
Operating Temperature	T_{opr}	−30 to +75	℃
Storage Temperature	T_{stg}	−55 to +125	℃

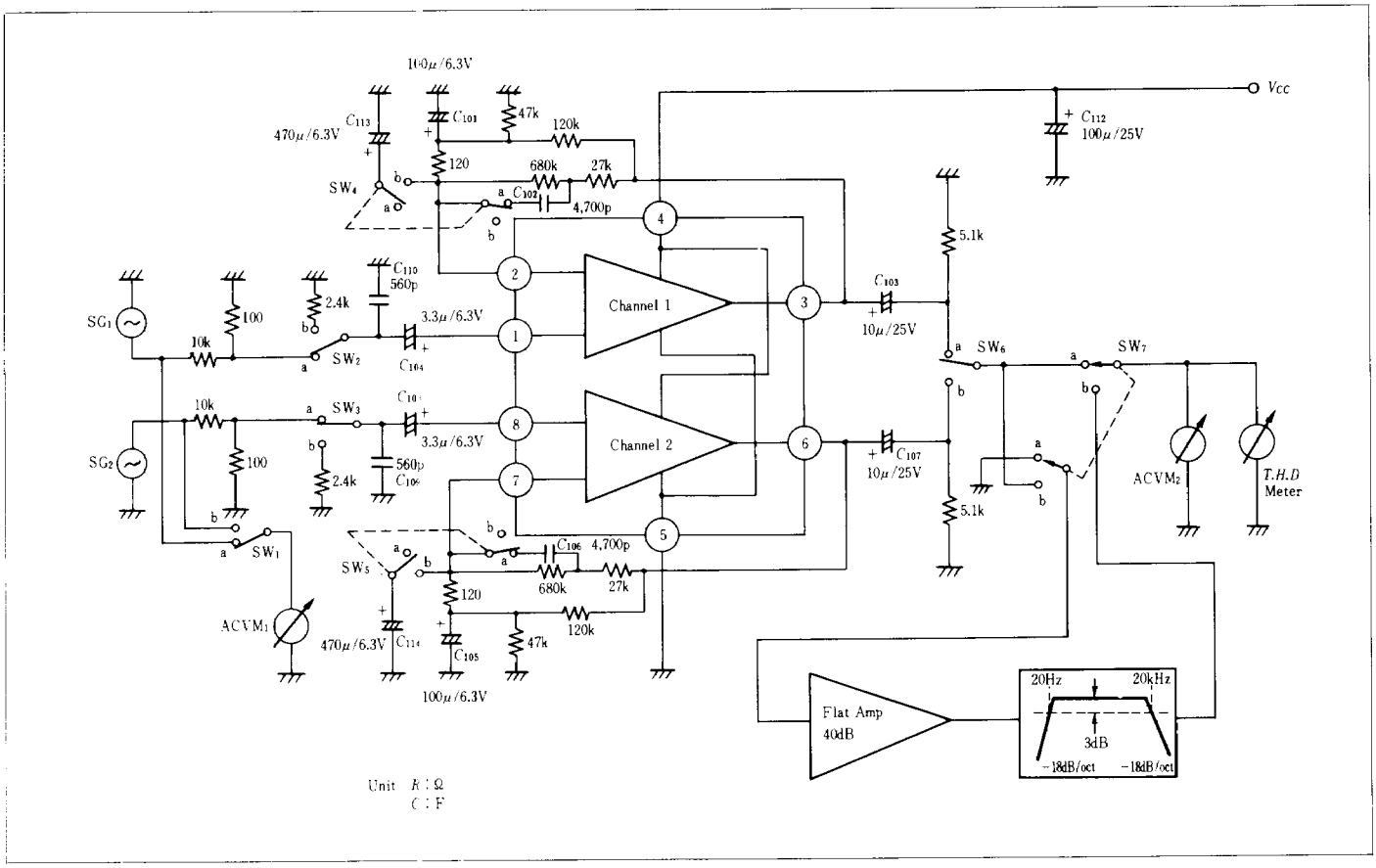
*Value at Ta=75℃ and V_{CC}=20V

■**ELECTRICAL CHARACTERISTICS** (V_{CC}=9V, f=1kHz, G_V=51.3dB, R_L=5.1kΩ, Ta=25℃)

Item	Symbol	Test Condition		min.	typ.	max.	Unit
Quiescent Current	I_Q	no input		3.0	5.7	10.0	mA
Open Loop gain	$G_{V(OL)}$	f=1kHz		90	105	—	dB
		f=100Hz		—	110	—	
Total Harmonic Distortion	$T.H.D$	V_{out}=1V	f=1kHz	—	0.07	0.2	%
			f=100Hz	—	0.10	—	
Output Voltage	V_{out}	$T.H.D$=1%		1.2	2.5	—	Vrms
Total Equivalent Input Noise	V_n	R_g=2.4kΩ, $B.W$=20Hz to 20kHz		—	0.98	2.5	μV

HITACHI

■TEST CIRCUIT



Item	Position of Switches						
	SW1	SW2	SW3	SW4	SW5	SW6	SW7
$G_{V(OL)}$	a / b	a / b	b / a	b / a	a / b	a / b	a
$T.H.D$	—	a / b	b / a	a	a	a / b	a
V_{out}	—	a / b	b / a	a	a	a / b	a
V_n	—	b	b	a	a	a / b	b

Note 1) Meaning Apparatus

$SG_{1,2}$: Shibasoku 870, $ACVM_{1,2}$: HP400E } or equivalent

Distortion Meter: Shibasoku 870

Note 2) Tolerance of External Parts

R: Less than ± 1 %

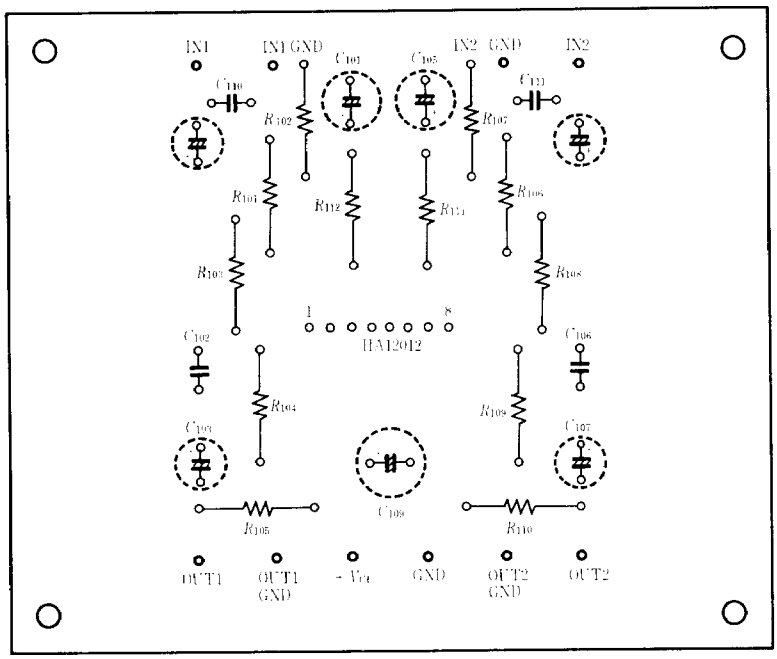
Polyester Film Condenser (C_{106}, C_{102}): Less than ± 2 %

Chemical Condenser: Less than ±10%

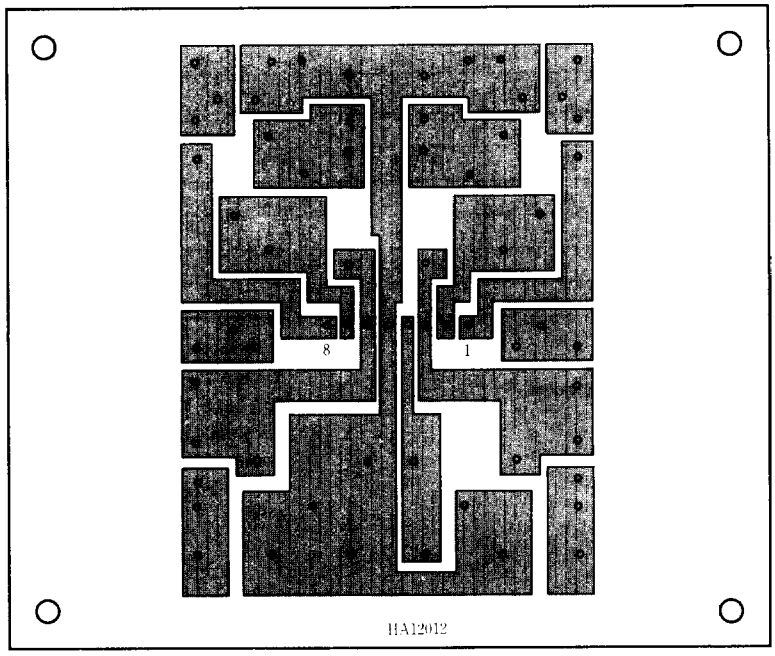
Ceramic Condenser (C_{109}, C_{110}): Less than ± 5 %

Before using these parts, confirm the precision of them by testing.

■PC-BOARD LAYOUT PATTERN

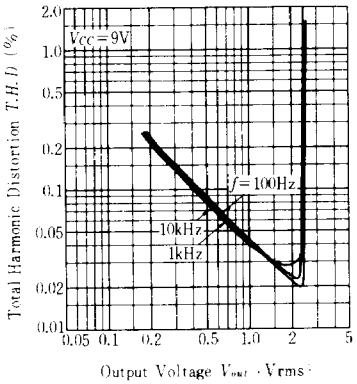


(Top View)

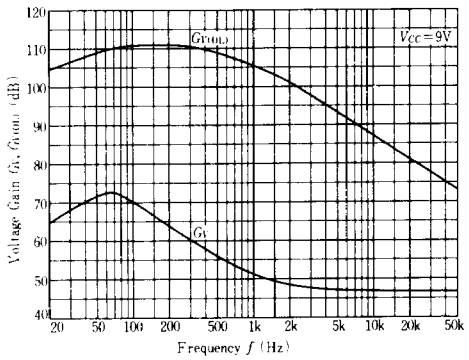


(Bottom View)

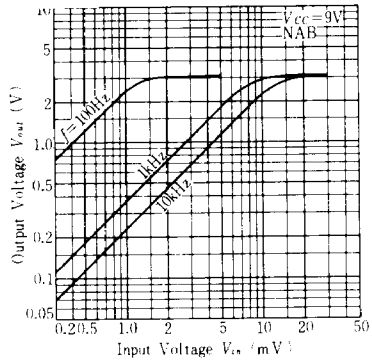
TOTAL HARMONIC DISTORTION VS. OUTPUT VOLTAGE



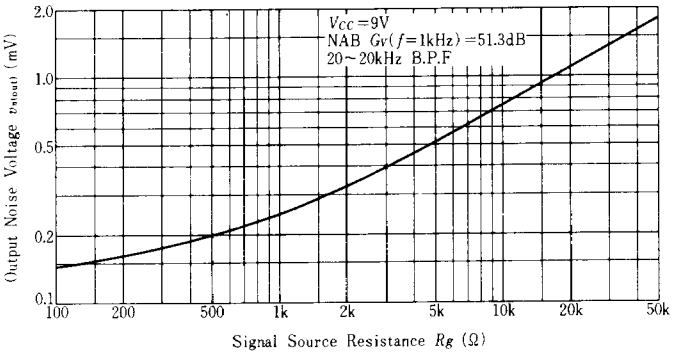
VOLTAGE GAIN VS. FREQUENCY



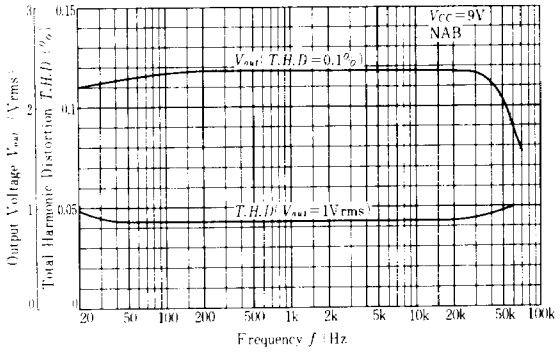
OUTPUT VOLTAGE VS. INPUT VOLTAGE



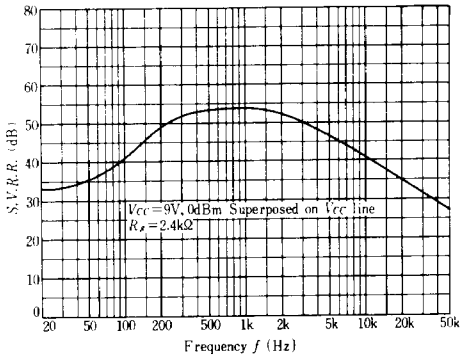
OUTPUT NOISE VOLTAGE VS. SIGNAL SOURCE RESISTANCE



OUTPUT VOLTAGE AND TOTAL HARMONIC DISTORTION VS. FREQUENCY



SUPPLY VOLTAGE REJECTION RATIO VS. FREQUENCY



CROSS-TALK VS. FREQUENCY