PRELIMINARY
Notice ; This is not a final specification.
some parametric limits are subject to change.

SRS ( ) ®
everything else is only stereo™
F( )CUS™
BY SRS LABS

MITSUBISHI ELECTRIC

M62436FP

SOUND CONTROLLER WITH SRS FOCUS & SRS SURROUND

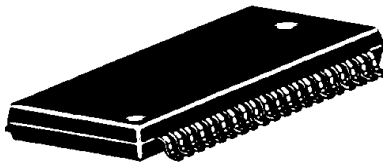
SRS F( )cus, SRS 3D Stereo Sound Controller

DESCRIPTION

- This is an IC for car audio.
- F( )cus system can realize more optimal speaker position.

FEATURE

- Built-in F( )cus (Woofer position can be changed by the outside resisters.)
- Built-in SRS
- SRS ON/OFF mode and FOCUS ON/OFF mode can be controlled by the DC voltage.

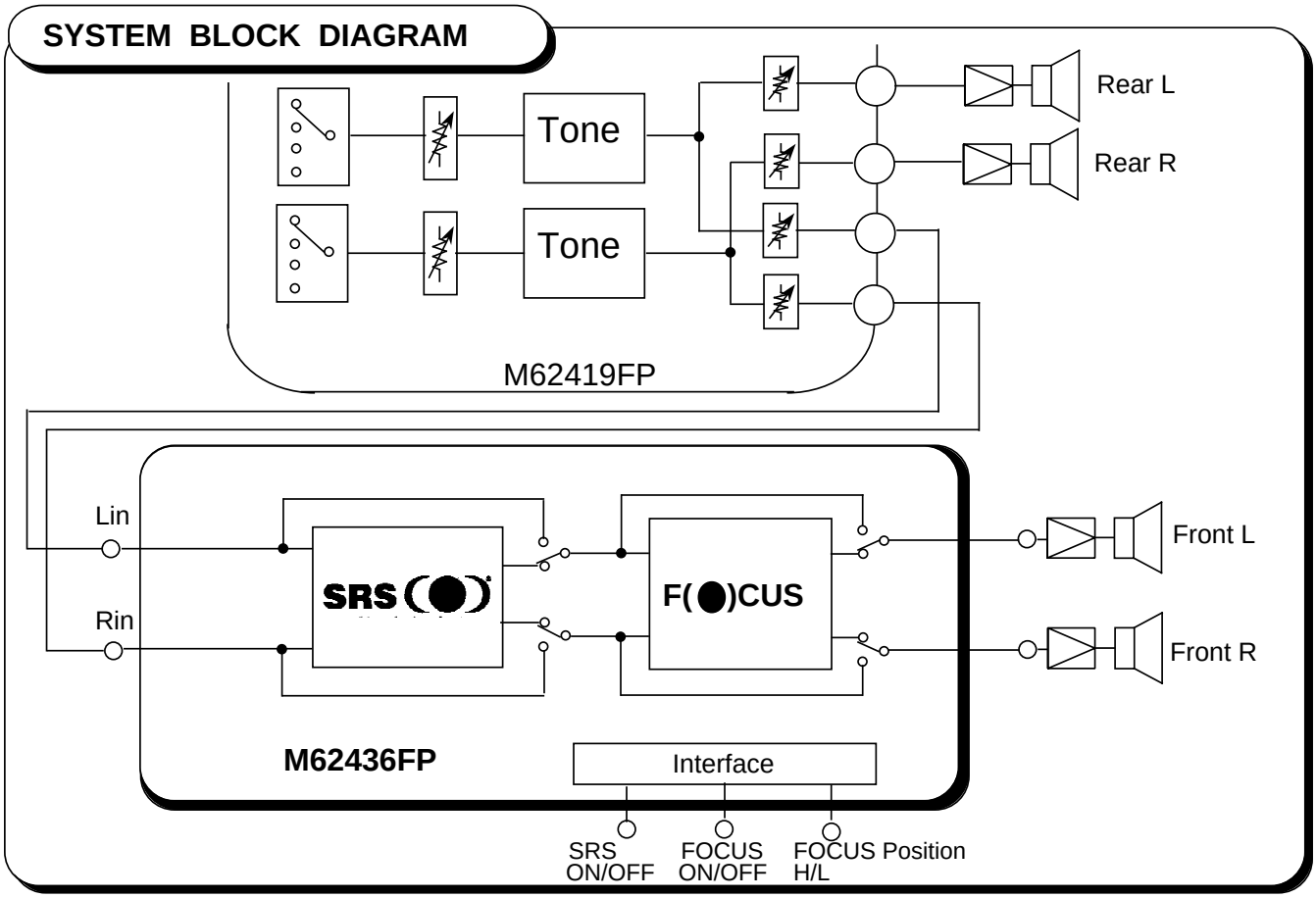


36P2R

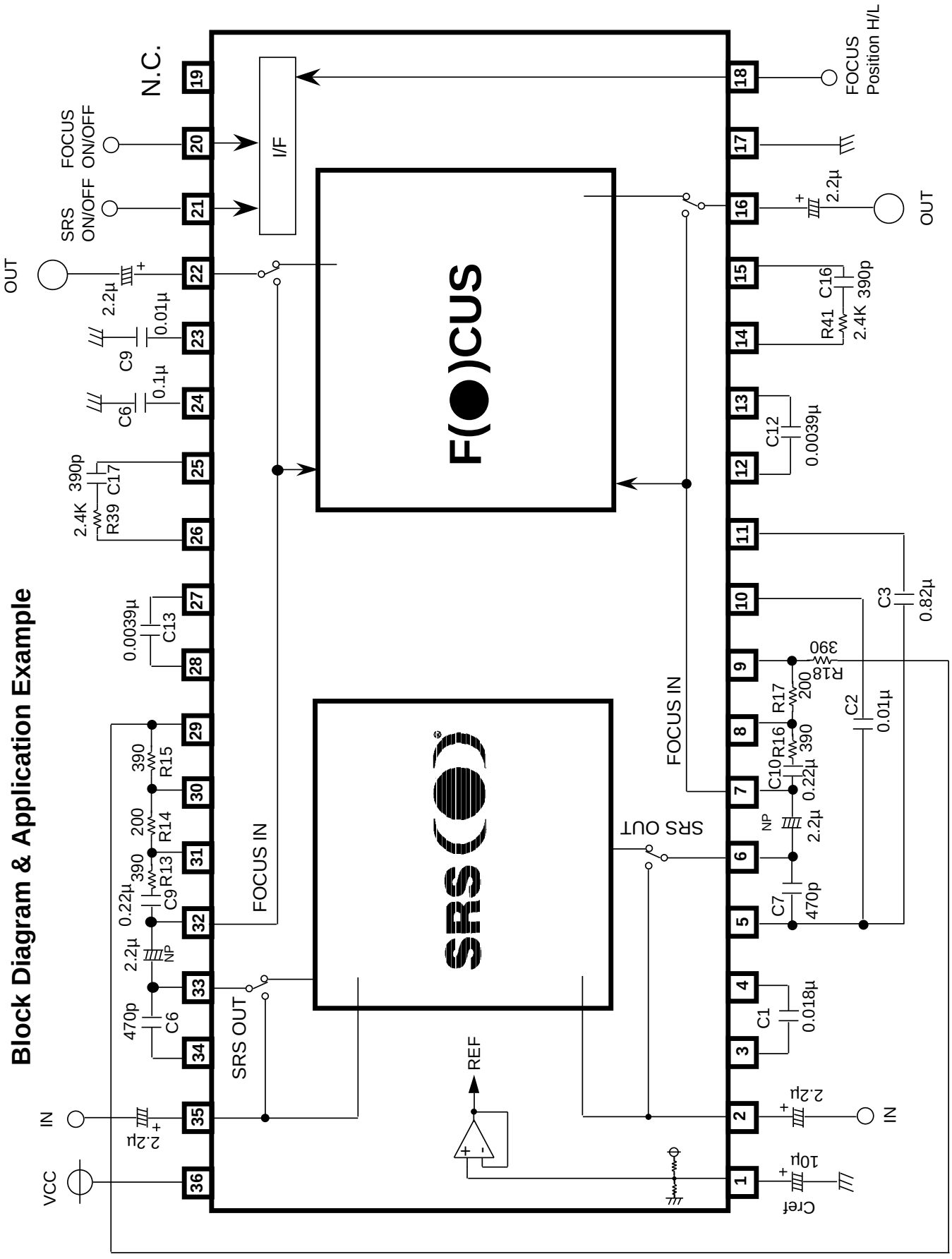
RECOMMENDED OPERATING CONDITION

Supply voltage range••••••••••Vcc=7 ~ 9V
Rated supply voltage••••••••••Vcc=8V

SYSTEM BLOCK DIAGRAM



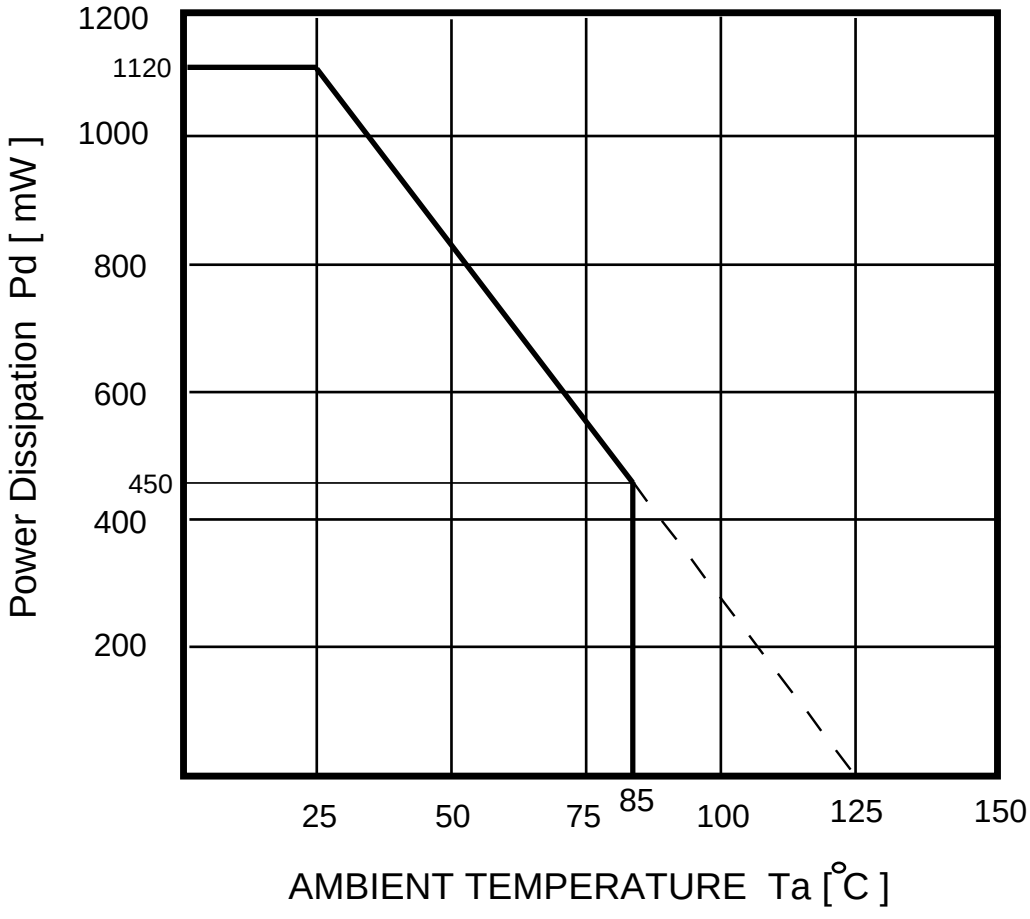
Block Diagram & Application Example



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Conditions	Ratings	Unit
Vcc,Vdd	Supply Voltage		12	V
Pd	Power Dissipation	Ta≤25	1120	mW
Kθ	Thermal Derating	Ta>25	1.12	mW/°C
Topr	Operating Temperature		-20 ~ +75	°C
Tstg	Storage Temperature		-55 ~+ 125	°C

Thermal Derating



ELECTRICAL CHARACTERISTICS

(1) Power Supply Characteristics (Ta=25°C,Vcc=8.0V, f=1kHz)

Parameter	Symbol	Conditions	Limit			Unit
			Min	typ	Max	
Circuit Current	Icc	36pin Icc No Signal	—	22	45	mA

(2) Input / Output Characteristics

(Ta=25°C,Vcc=8.0V, f=1kHz
R13=R16=390,R14=R17=200
R15=R18=390)

Parameter	Symbol	Conditions		Limit			Unit
				Min	typ	Max	
Maximum Output Voltage	VOMt	Input; pin2,35 Output; pin16, 22 RL=10KΩ,THD=1%		1.6	1.9	—	Vrms
Maximum Input Voltage	VIM1	Input; pin2,35 /Output; pin16, 22 SRS→ON,FOCUS→OFF THD=1%	f=150Hz	0.32	0.65	—	Vrms
	VIM2	Input; pin2,35 /Output; pin16, 22 SRS→ON FOCUS→Position"H" ON THD=1%	f=1KHz	0.25	0.5	—	
	VIM3		f=20KHz	0.2	0.4	—	
Pass Gain	Gvt	Vi=100mVrms SRS, Focus →OFF Input; pin2,35 /Output; pin16, 22		-2.0	0	2.0	dB
	Gv1	Vi=100mVrms Input; pin2,35 /Output; pin16, 22 SRS→ON,FOCUS→OFF	f=150Hz	7	10	13	
	Gv2	Vi=100mVrms SRS→ON FOCUS→Position"H" ON (2pin,35pin)-(16, 22Pin)	f=1KHz	10	13	16	
	Gv3		f=20KHz	12	15	18	
Output Noise Voltage	Vno1	Rg=0(2,35pin) SRS →OFF ,FOCUS→OFF DIN-AUDIO filter		—	5.0	15	μVrms
	Vno2	Rg=0(2,35pin) SRS→ON ,FOCUS→OFF DIN-AUDIO filter		—	18	40	
	Vno3	Rg=0(2,35pin), SRS→ON, FOCUS→Position"H" ON DIN-AUDIO filter		—	50	90	
Channel Separation	CT	Input Side:f=1KHz,Vi=0.5Vrms Monitor Side:Rg=0, IHF-A filter Focus:OFF, SRS:OFF RL=10KΩ		—	-90	-75	dB

(3) DC Control Characteristic of the Switch Block

Symbol	Parameter	Condition	Limit			Unit
			Min	typ	Max	
V_{IH}	"H" Level Input Voltage	Pin 18,20,21	2.1	~	Vcc	V
V_{IL}	"L" Level Input Voltage	Pin 18,20,21	0	~	0.8	V

Switch Condition and the Mode

(21) SRS 3D Stereo	SRS ON/OFF Switch
SRS ON	H
SRS OFF	L

(20) FOCUS	FOCUS ON/OFF Switch
FOCUS ON	H
FOCUS OFF	L

(18) FOCUS Position	FOCUS H/L Switch
FOCUS position "H"	H
FOCUS position "L"	L

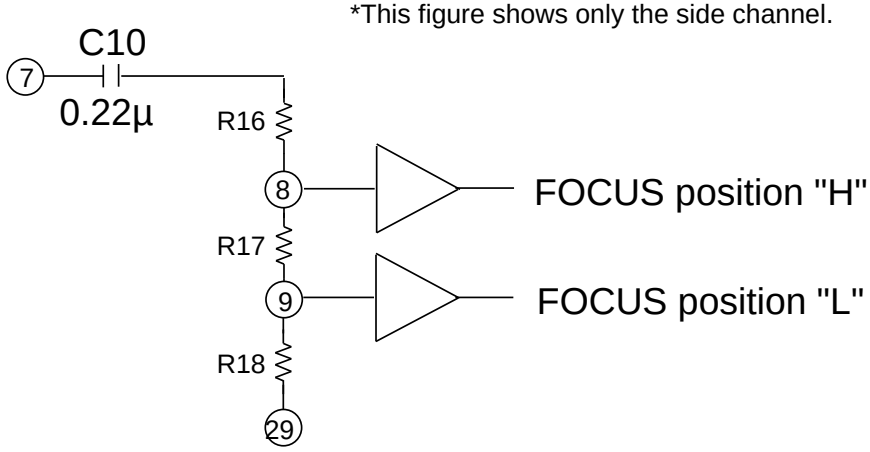
*Bypass mode can be set by both SRS ON/OFF switch and FOCUS ON/OFF switch are set to "L".

Regarding to the outside registers

● R16(R13),R17(R14),R18(R15)

The resisters of R16(R13),R17(R14),R18(R15) can be set the FOCUS position.

*This figure shows only the side channel.



1. The setting of the FOCUS position "H"

$$\frac{R17 + R18}{R16 + R17 + R18}$$

2. The setting of the FOCUS position "L"

$$\frac{R18}{R16 + R17 + R18}$$

*please keep the following formula.

R16+R17+R18 ≒ 1KΩ

(Example)

In the case of R16 = 390Ω,R17 = 200Ω,R18 = 390Ω

FOCUS position "H" ≒ 60%
FOCUS position "L" ≒ 40%

● Between Pin14(26) and Pin15(25)

Add 10K of resistors between Pin14(26) and Pin15(25), can adjust the difference between the sound level of Focus ON and the sound level of Focus OFF.
Also add 10K of resistors between Pin14(26) and Pin15(25),can decrease the Focus gain.
Then the maximum input voltage and the output noise voltage can be improved.

(Reference)

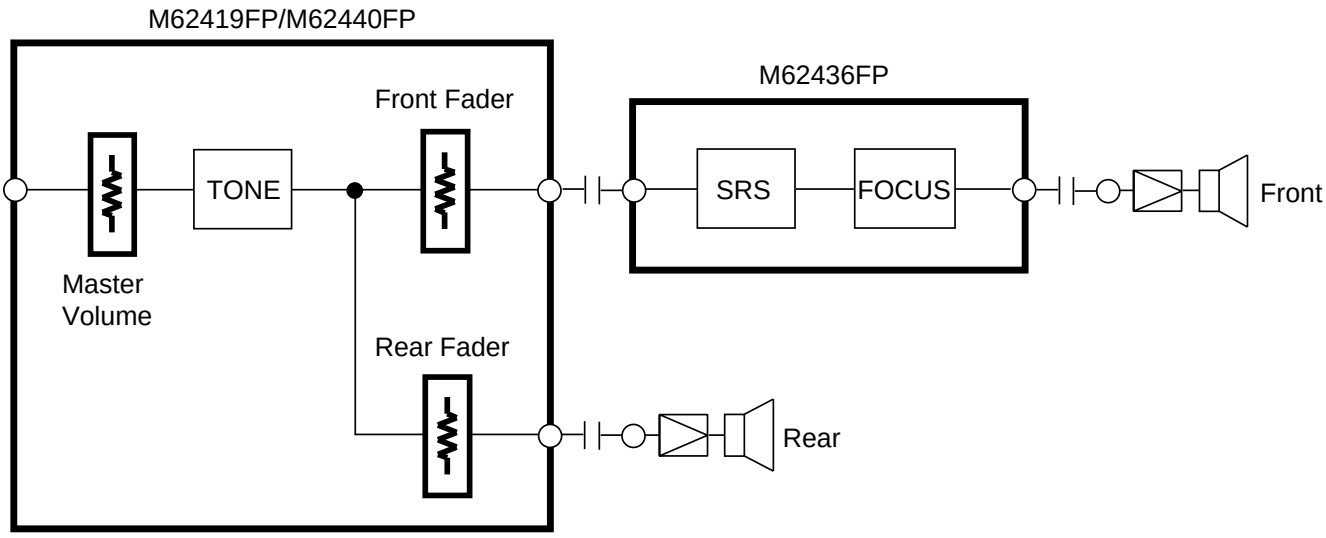
In the case of (R13=R16=390,R14=R17=200,R15=R18=390
Add 10Kof resistors between Pin14(26) and Pin15(25))

Parameter	Symbol	Conditions		Typ.	Unit
Maximum Output Voltage	VOMt	Input; pin2,35 Output; pin16, 22 RL =10KΩ,THD=1%		1.9	Vrms
Maximum Input Voltage	VIM1	Input; pin2,35 /Output; pin16, 22 SRS→ON,FOCUS→OFF THD=1%	f=150Hz	0.65	Vrms
	VIM2	Input; pin2,35 /Output; pin16, 22 SRS→ON FOCUS→Position"H" ON THD=1%	f=1KHz	0.85	
	VIM3		f=20KHz	0.67	
Pass Gain	Gvt	Vi=100mVrms SRS, Focus → OFF Input; pin2,35 /Output; pin16, 22		0	dB
	Gv1	Vi=100mVrms Input; pin2,35 /Output; pin16, 22 SRS→ON,FOCUS→OFF	f=150Hz	10	
	Gv2	Vi=100mVrms SRS→ ON FOCUS→Position"H" ON (2pin,35pin)-(16, 22Pin)	f=1KHz	7	
	Gv3		f=20KHz	9	
Output Noise Voltage	Vno1	Rg=0(2,35pin) SRS→OFF ,FOCUS→OFF DIN-AUDIO filter		5.0	μVrms
	Vno2	Rg=0(2,35pin) SRS→ON ,FOCUS→OFF DIN-AUDIO filter		18	
	Vno3	Rg=0(2,35pin), SRS→ ON, FOCUS→ Position"H" ON DIN-AUDIO filter		30	
Channel Separation	CT	Input Side:f=1KHz,Vi=0.5Vrms Monitor Side:Rg=0, IHF-A filter Focus:OFF, SRS:OFF RL=10KΩ		-90	dB

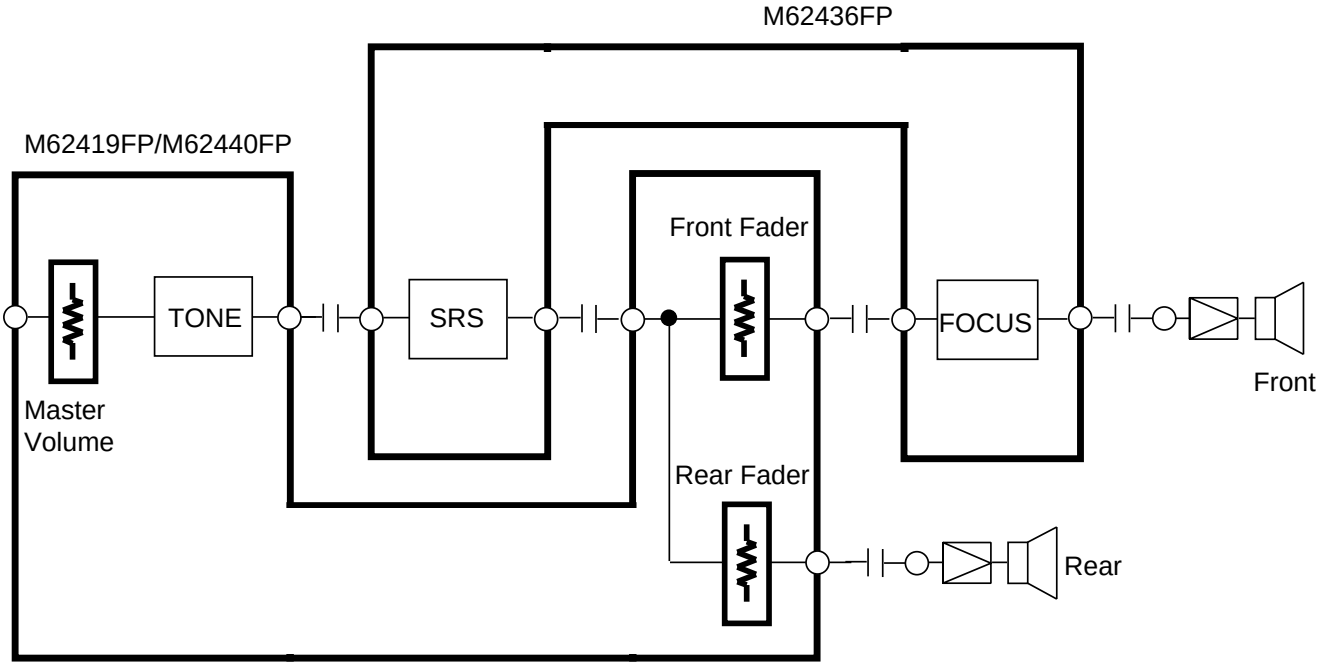
System Circuit Example

(The following figures show only the side channel.)

1. In the case of SRS 3D stereo is effective for the front speakers.



2. In the case of SRS 3D stereo is effective for the front and rear speakers.
(FOCUS is effective for the front speakers.)



NOTE

Each switches (SRS ON/OFF, FOCUS ON/OFF and FOCUS Position H/L Switches) does not have the countermeasure for click noise, so that we recommend outside mute circuit.