

NJM2177

The NJM2177 is a higher level integration and high quality audio performance monolithic IC designed for use in Dolby Pro Logic Surround System. The NJM2177 provides all the necessary function for a complete Pro Logic processor except time delay; Automatic input balance, noise sequencer, adaptive matrix, center mode control, and modified B-type noise reduction all on chip.

In addition to Dolby Pro Logic function including Dolby 3-stereo, this device provides two channel bypass mode and two special outputs used for other surround conveniently.

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This device available only to licensees of Dolby Lab.

Licensing and application information may be obtained from Dolby Lab.

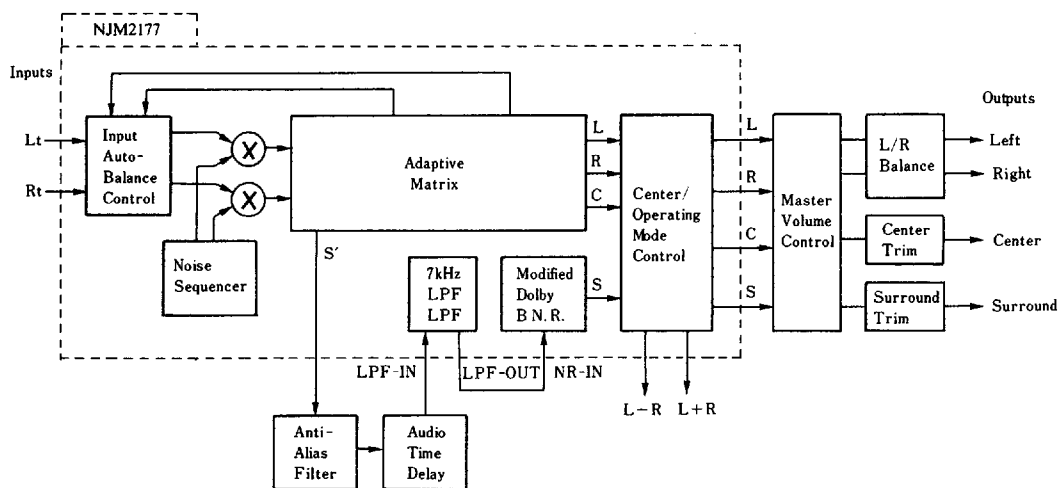
■ Functions

- Auto input balance and buffer
- Noise sequencer; a Noise generator, a sequencer controlled by external two bits
- Adaptive Matrix
- Center mode control; ON/OFF, Normal/Phantom/Wideband
- Modified Dolby B Type Noise Reduction and OP amp. for 7kHz low-pass filter
- Operating mode control; 4ch(L,C,R,S), 3ch(L,C,R), 2ch(no processing)
- L+R and L-R output

■ Features

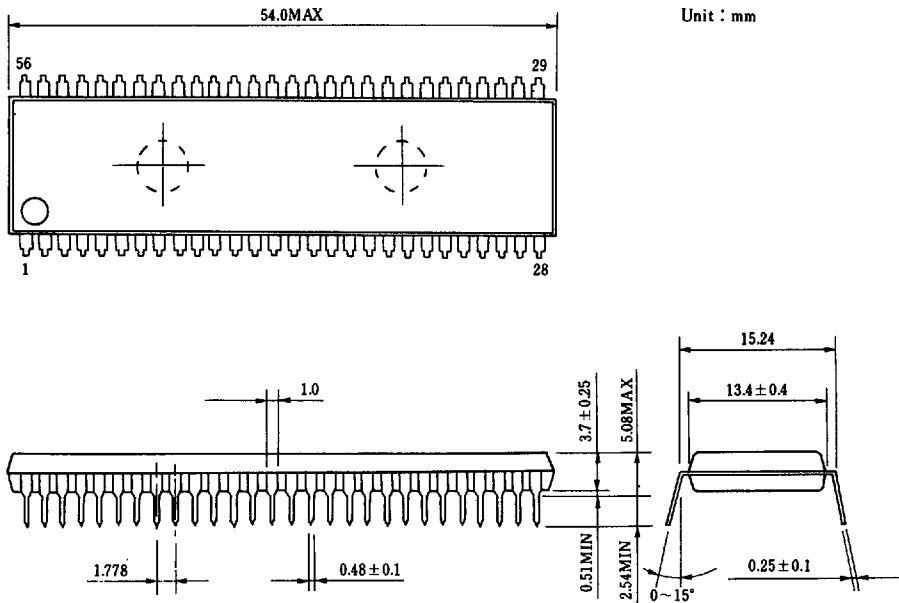
- Package: SDIP-56, QFP-56, QFP-64
- Dolby operating level: 300mVrms
- Operating supply voltage range: 9 to 13V
- Lower supply current: 34mA typ.
- Internal mode control switches

■ Active Surround Decoder Block Diagram



■ Package Outline and Pin Configuration

NJM2177L

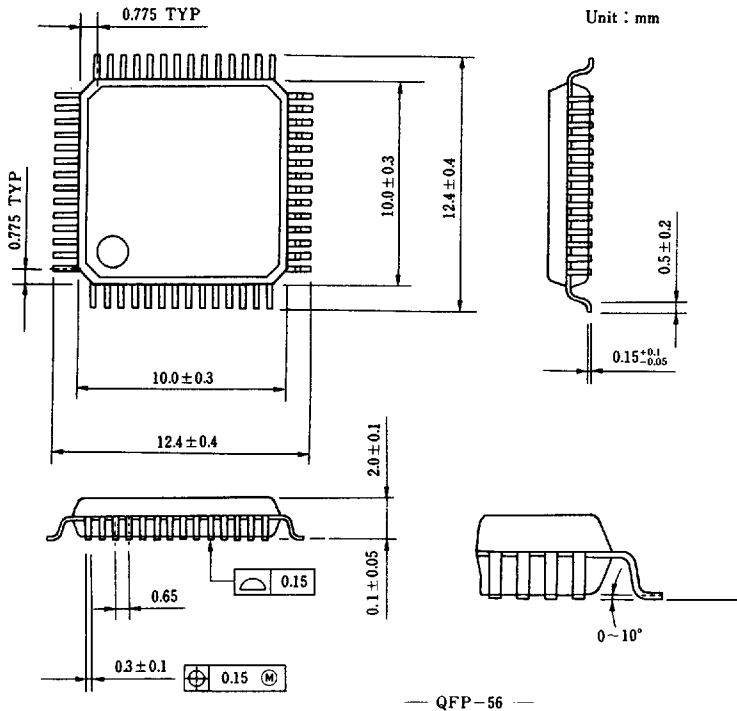


— SDIP-56 —

PIN No.	Pin Name	PIN No.	Pin Name	PIN No.	Pin Name	PIN No.	Pin Name
1	C-RECT-OUT	15	L-AB-IN	29	S-OUT	43	VREF
2	R-RECT-OUT	16	L-AB-OUT	30	CENTER-CNT	44	VREF
3	L-RECT-OUT	17	L-IN	31	MODE-CNT	45	NR-WT
4	S-RECT-TC	18	L-INBUF-OUT	32	L-OUT	46	LPF-OUT
5	C-RECT-TC	19	R-INBUF-OUT	33	R-OUT	47	LPF-INV-IN
6	L-BPF-OUT	20	R-IN	34	L+R-OUT	48	LPF-NINV-IN
7	L-BPF-IN	21	R-AB-OUT	35	L-R-OUT	49	NR-TC
8	L-RECT-TC	22	R-AB-IN	36	CENTER-MODE	50	VLR-TC3
9	R-BPF-OUT	23	NOISE-CNT-E	37	V+	51	VCS-TC3
10	R-BPF-IN	24	NOISE-CNT-A	38	C-OUT	52	VCS-TC2
11	R-RECT-TC	25	NOISE-CNT-B	39	S'-OUT	53	VCS-TC1
12	GND	26	NOISE-REF	40	IREF	54	VLR-TC1
13	AB-GATE	27	NOISE-HPF	41	NR-VCF	55	VLR-TC2
14	AB-HOLD-TC	28	NOISE-LPF	42	NR-IN	56	S-RECT-OUT

■ Package Outline and Pin Configuration

NJM2177FA1



PIN No.	Pin Name
1.	L-RECT-TC
2.	R-BPF-OUT
3.	R-BPF-IN
4.	R-RECT-TC
5.	GND
6.	AB-GATE
7.	AB-HOLD-TC
8.	L-AB-IN
9.	L-AB-OUT
10.	L-IN
11.	L-INBUF-OUT
12.	R-INBUF-OUT
13.	R-IN
14.	R-AB-OUT

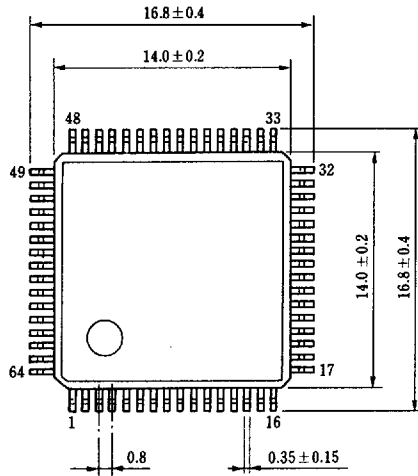
PIN No.	Pin Name
15.	R-AB-IN
16.	NOISE-CNT-E
17.	NOISE-CNT-A
18.	NOISE-CNT-B
19.	NOISE-REF
20.	NOISE-HPF
21.	NOISE-LPF
22.	S-OUT
23.	CENTER-CNT
24.	MODE-CNT
25.	L-OUT
26.	R-OUT
27.	L+R-OUT
28.	L-R-OUT

PIN No.	Pin Name
29.	CENTER-MODE
30.	V+
31.	C-OUT
32.	S'-OUT
33.	IREF
34.	NR-VCF
35.	NR-IN
36.	VREF
37.	VREF
38.	NR-WT
39.	LPF-OUT
40.	LPF-INV-IN
41.	LPF-NINV-IN
42.	NR-TC

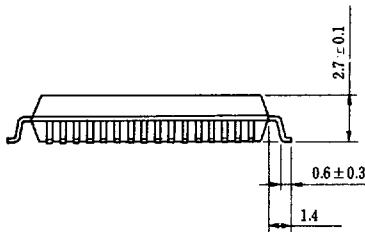
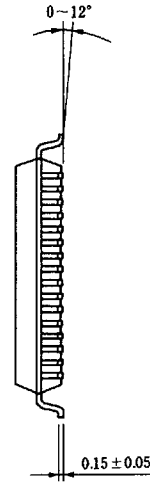
PIN No.	Pin Name
43.	VLR-TC3
44.	VCS-TC3
45.	VCS-TC2
46.	VCS-TC1
47.	VLR-TC1
48.	VLR-TC2
49.	S-RECT-OUT
50.	C-RECT-OUT
51.	R-RECT-OUT
52.	L-RECT-OUT
53.	S-RECT-TC
54.	C-RECT-TC
55.	L-BPF-OUT
56.	L-BPF-IN

■ Package Outline and Pin Configuration

NJM2177FB4



Unit: mm



— QFP-64 —

PIN No.	Pin Name
1.	NC
2.	L-RECT-TC
3.	R-BPF-OUT
4.	R-BPF-IN
5.	R-RECT-TC
6.	GND
7.	AB-GATE
8.	AB-HOLD-TC
9.	L-AB-IN
10.	L-AB-OUT
11.	L-IN
12.	L-INBUF-OUT
13.	R-INBUF-OUT
14.	R-IN
15.	R-AB-OUT
16.	NC

PIN No.	Pin Name
17.	NC
18.	R-AB-IN
19.	NOISE-CNT-E
20.	NOISE-CNT-A
21.	NOISE-CNT-B
22.	VREF
23.	NOISE-HPF
24.	NOISE-LPF
25.	S-OUT
26.	CENTER-CNT
27.	MODE-CNT
28.	L-OUT
29.	R-OUT
30.	L+R-OUT
31.	L-R-OUT
32.	NC

PIN No.	Pin Name
33.	NC
34.	CENTER-MODE
35.	V+
36.	C-OUT
37.	S'-OUT
38.	IREF
39.	NR-VCF
40.	NR-IN
41.	VREF
42.	VREF
43.	NR-WT
44.	LPF-OUT
45.	LPF-INV-IN
46.	LPF-NINV-IN
47.	NR-TC
48.	NC

PIN No.	Pin Name
49.	NC
50.	VLR-TC3
51.	VCS-TC3
52.	VCS-TC1
53.	VCS-TC1
54.	VLR-TC2
55.	VLR-TC2
56.	S-RECT-OUT
57.	C-RECT-OUT
58.	R-RECT-OUT
59.	L-RECT-OUT
60.	S-RECT-TC
61.	C-BPF-OUT
62.	L-RECT-TC
63.	L-BPF-IN
64.	NC

■ Absolute Maximum Ratings at Ta=25°C

Operating Supply Voltage	V+	13V
DC Supply Voltage	V+	15V
Power dissipation	P _D	700mW
Operating Temperature	T _{opr}	-20~+75°C
Storage Temperature	T _{stg}	-40~+125°C

■ Electrical Characteristics (Ta=25°C, V+=12V, 0dB Reference is 300mV/1kHz at C-OUT. Unless otherwise specified.)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
☆ Overall						
Supply Voltage Range	V _{OP}		9.0	—	13.0	V
Supply Current	I _{CC}	No signal	—	34.0	40.0	mA
Reference Voltage	V _{ref}	No signal	—	4.0	—	V
Control SW input voltage						
2ch Mode	V _{C-2ch}	MODE-CNT PIN	0.0	—	0.8	V
3ch	V _{C-3ch}	MODE-CNT PIN	—	Open	—	
4ch	V _{C-4ch}	MODE-CNT PIN	3.8	—	7.0	V
Center on	V _{C-con}	CENTER-CNT PIN	2.4	—	7.0	V
Center off	V _{C-coff}	CENTER-CNT PIN	0.0	—	0.8	V
Noise Seq. on	V _{C-nson}	NOISE-CNT-E PIN	0.0	—	0.8	V
Noise Seq. off	V _{C-nsoff}	NOISE-CNT-E PIN	3.2	—	7.0	V
Noise Seq. channel select H	V _{C-nssH}	NOISE-CNT-A and NOISE-CNT-B PIN	3.2	—	7.0	V
Noise Seq. channel select L	V _{C-nssL}	NOISE-CNT-A and NOISE-CNT-B PIN	0.0	—	0.8	V

☆ Modified B Noise Reduction (0dBd Reference is input level at NR-IN when adjust to 300mV/100Hz at S-OUT)

Voltage gain	GV-BNR	V _{in} =0dBd, f=100Hz	—	9.0	—	dB
Decode Responce 1	D _{ec1}	V _{in} =0dBd, f=1.0kHz	-1.6	-0.1	1.4	dB
2	D _{ec2}	V _{in} =-15dBd, f=1.4kHz	-3.0	-1.5	0.0	dB
3	D _{ec3}	V _{in} =-20dB, f=1.4kHz	-4.9	-3.4	-1.9	dB
4	D _{ec4}	V _{in} =40dBd, f=5.0kHz	-6.8	-5.3	-3.8	dB
T.H.D	THD-NR	V _{in} =0dBd, f=1.0kHz	—	0.07	—	%
Headroom	HR-NR	V+=9V AT T.H.D.=1%	15.0	17.0	—	dB
SN Ratio	SN-NR	Rg=0, weighted CCIR/ARM	76	82	—	dB

☆ Noise sequencer

OUTPUT Noise level	V _{no}		-15	-12.5	-10	dB
Output Noise Level Accuracy relative to Cch Lch Rch S'ch	ΔV _{no}		-0.5	0.0	0.5	dB

☆ Adaptive Matrix

Output Level Accuracy relative to Cch L,R,S'ch out	ΔVol		-0.5	0.0	0.5	dB
Matrix Rejection relative L,R,C,S'ch out	Mr		25.0	40.0	—	dB
T.H.D L,R,C,S'ch out	THD-AM		—	0.02	—	%
Headroom L,R,C,S'ch out	HR-AM	V+=9V at T.H.D.=1%	15.0	15.7	—	dB
Signal to Noise Ratio L,R,C,S' ch out	SN-AM	Rg=0, weighted CCIR/ARM	78	83	—	dB

☆ Auto Balance

Capture Range	CPR		—	±5	—	dB
Error collection	CER		—	±4	—	dB
T.H.D Lt, Rt OUT	THD-AB		—	0.03	—	%
S/N Lt, Rt OUT	SN-AB	Rg=0, weighted CCIR/ARM	78	83	—	dB
Headroom Lt,Rt OUT	HR-AB	V+=9V at T.H.D.=1%	15.0	17.0	—	dB

☆ L+R & L-R OUTPUT

Output Level Accuracy relative to Cch L+R, R-L ch	ΔVol-OP		—	0.0	—	dB
T.H.D	THD-OP		—	0.02	—	%
S/N	SN-OP	Rg=0, weighted CCIR/ARM	—	92	—	dB
Headroom	HR-OP	V _{CC} =9V at T.H.D.=1%	—	17.0	—	dB