

DOLBY PRO LOGIC SURROUND DECODER

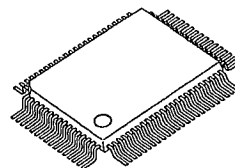
■ GENERAL DESCRIPTION

The NJW1103 is a surround processor including all of the necessary circuits of Dolby Pro Logic Surround decoder and digital delay.

In addition to Dolby Pro Logic Surround function, it performs easily other surround function such as Hall, Live, Disco and others.

It also includes echo and microphone mixing functions for Karaoke.

■ PACKAGE OUTLINE



NJW1103FC3

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This device is available only to licensees of Dolby Lab.

Licensing and application information may be obtained from Dolby Lab.

■ FEATURE

- Operating Voltage :  $V_{CC}=9V$ (Analog Block),  $V_{DD}=5V$ (Digital Block)
- Digital Delay on chip
- Center and Surround Channel Level Trimmer : -31 TO 0dB / 1dB step (0dB = Dolby Level)
- Karaoke Function(Echo, Mic.mixing)
- Serial Data Interface(3-wire) DATA, REQ, SCK
- Bi-CMOS Technology
- Package Outline QFP80

■ FUNCTION

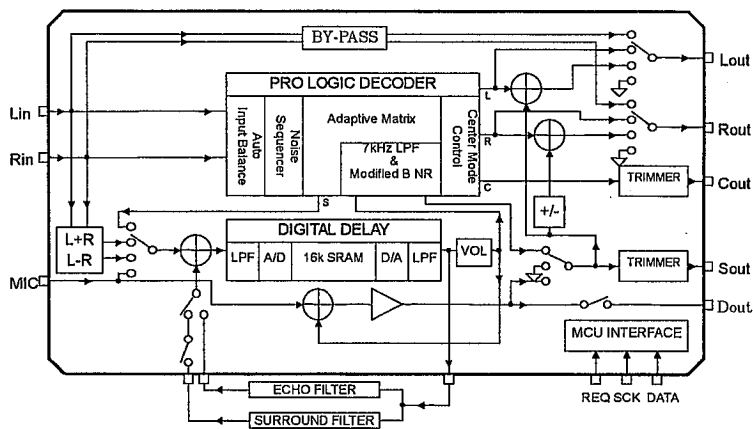
【Dolby Pro Logic Surround】

- Automatic input balance
- Noise sequencer
- Adaptive matrix
- Center channel control (wideband, normal, phantom)
- Modified B-type noise reduction
- 7kHz low-pass filter
- Dolby 3 stereo mode
- Digital time delay

【Other Surround】

- Sound field control
  - Front mixing control
  - Digital time delay
- 【Karaoke】
- Echo control
  - Mic mixing

■ BLOCK DIAGRAM



## ■ ABSOLUTE MAXIMUM RATINGS (T<sub>a</sub>=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sub>CC</sub>	11	V
	V <sub>DD</sub>	7	V
Power Dissipation	P <sub>D</sub>	1.37	W
Operating Temperature Range	T <sub>OPR</sub>	-20~+75	°C
Storage Temperature Range	T <sub>STG</sub>	-40~+125	°C

## ■ ELECTRICAL CHARACTERISTICS (T<sub>a</sub>=25°C, V<sub>CC</sub>=10V, V<sub>DD</sub>=5V, V<sub>IN</sub>=300mV<sub>rms</sub>/1kHz)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
◆ OVERALL						
Supply Voltage Range	V <sub>CC</sub>		8	9	10	V
	V <sub>DD</sub>		4.5	5	5.5	V
Supply Current	I <sub>CC</sub>	No Signal	—	25	—	mA
	I <sub>DD</sub>	No Signal	—	25	—	mA
Reference Voltage	V <sub>REF</sub>	No Signal	3.5	4.0	4.5	V
Threshold voltage	V <sub>THH</sub>	Digital input high level	0.7V <sub>DD</sub>	—	V <sub>DD</sub>	V
	V <sub>THL</sub>	Digital input low level	0.0	—	0.3V <sub>DD</sub>	V
◆ INPUT AUTO BALANCE						
Capture Range	CPR		—	±5	—	dB
Error Correction	CER		—	±4	—	dB
◆ ADAPTIVE MATRIX						
Output Level Accuracy relative to Cch.	ΔV <sub>OL</sub>	L, R, S' ch. out	-0.5	0	0.5	dB
Matrix Rejection relative Headroom	MR	L, R, C, S' ch. out	25	40	—	dB
Total Harmonic Distortion	HR-AM	V <sub>CC</sub> =9V at THD=1%	15	17	—	dB
	THD-AM	L, R, C, S' ch. out at 4ch. mode	—	0.05	0.2	%
Signal to Noise Ratio	SN-AM	L, Rch. out at 2ch. mode	—	0.002	0.05	%
		Rg=0, wt:CGIR/ARM 4ch	75	80	—	dB
Signal to Noise Ratio	SN-AM	L, Rch. out at 2ch. mode	93	100	—	dB
◆ NOISE SEQUENCER						
Output Noise Level	V <sub>NO</sub>		-15.0	-12.5	-10.0	dB
Output Noise Level Accuracy relative to Cch.	ΔV <sub>NO</sub>	L, R, S' ch. out	-0.5	0.0	0.5	dB
◆ MODIFIED B-TYPE NOISE REDUCTION						
Voltage Gain	GV-NR	V <sub>IN</sub> = 0dBd, f=100Hz	—	9.2	—	dB
Decode Response 1	DEC1	V <sub>IN</sub> = 0dBd, f=1.0kHz	-1.6	-0.1	1.4	dB
Decode Response 2	DEC2	V <sub>IN</sub> =-15dBd, f=1.4kHz	-3.0	-1.5	0.0	dB
Decode Response 3	DEC3	V <sub>IN</sub> =-20dBd, f=1.4kHz	-4.9	-3.4	-1.9	dB
Decode Response 4	DEC4	V <sub>IN</sub> =-40dBd, f=5.0kHz	-6.8	-5.3	-3.8	dB
Total Harmonic Distortion	THD-NR	V <sub>IN</sub> = 0dBd, f=1kHz	—	0.07	0.3	%
Headroom	HR-NR	V <sub>CC</sub> =9V, THD=1%	15	17	—	dB
Signal to Noise Ratio	SN-NR	Rg=0, wt:CGIR/ARM	73	78	—	dB

■ ELECTRICAL CHARACTERISTICS (T<sub>a</sub>=25°C, V<sub>cc</sub>=10V, V<sub>DD</sub>=5V, V<sub>IN</sub>=300mV<sub>rms</sub>/1kHz)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT				
◆ OTHER SURROUND										
Total Harmonic Distortion	THD-OS	V <sub>in</sub> =0dB, f=1kHz, L+R, L-R output	—	0.05	0.2	%				
Headroom	HR-OS	V <sub>cc</sub> =9V, THD=1%, L+R, L-R output	15	17	—	dB				
Signal to Noise Ratio	SN-OS	R <sub>g</sub> =0, wt:CGIR/ARM L+R, L-R output	85	90	—	dB				
◆ G, S CHANNEL TRIMMER										
Full Scale	FS	Digital Input = -31dB	-25	-31	-37	dB				
Trimmer Steps	NL	Digital Input = -1, -2, -4, -8, -16dB	-0.6	1.0	1.4	dB				
◆ DIGITAL TIME DELAY										
Delay Time	T <sub>d</sub>		12.4	15.4	18.4	ms				
			17.0	20.0	23.0	ms				
			25.6	28.6	31.6	ms				
			38.0	41.0	44.0	ms				
			46.2	49.2	52.2	ms				
			137.5	147.5	157.5	ms				
			186.6	196.6	206.6	ms				
Total Gain	G <sub>v</sub>		-3.0	0.0	3.0	dB				
			30kHz LPF	T <sub>d</sub> =15.4ms	—	0.3	0.6	%		
				T <sub>d</sub> =20.0ms	—	0.3	0.6	%		
				T <sub>d</sub> =28.6ms	—	0.5	1.0	%		
				T <sub>d</sub> =41.0ms	—	0.6	1.2	%		
				T <sub>d</sub> =49.2ms	—	0.7	1.4	%		
				T <sub>d</sub> =147.5ms	—	1.5	3.0	%		
				T <sub>d</sub> =196.6ms	—	2.0	4.0	%		
				Maximum Output Voltage	V <sub>omax</sub>	30kHz LPF THD=10%	0.7	1.0	—	V <sub>rms</sub>
							Output Noise Voltage	No	T <sub>d</sub> =15.4ms	—
T <sub>d</sub> =20.0ms	—	-92							-80	dB
R <sub>g</sub> =620Ω	T <sub>d</sub> =28.6ms	—	-92						-80	dB
V <sub>i</sub> =0mV <sub>rms</sub>	T <sub>d</sub> =41.0ms	—	-90	-75	dB					
Output Noise Voltage	No	JIS-A	T <sub>d</sub> =49.2ms	—	-90	-75	dB			
			T <sub>d</sub> =147.5ms	—	-82	-67	dB			
			T <sub>d</sub> =196.6ms	—	-77	-62	dB			
			◆ DELAY VOLUME							
Total Gain	G <sub>v</sub>	Vol.=Max	0	3	6	dB				
Maximum Attenuation	ATTmax	Delay OFF mode, Vol.=min., JIS-A	0	-70	-60	dB				

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## MEMO

[CAUTION]

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