



Surround processor with Dolby Pro Logic Surround Decoder

DESCRIPTION

The NJW1103A is a Dolby Pro Logic Surround processor which contains all of the necessary functions of Pro Logic decoder include time delay.

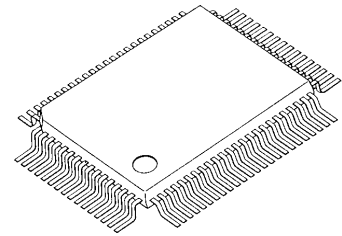
Features include not only Dolby Pro Logic but also other surround such as Matrix, Hall, etc. and echo and mic mixing function for karaoke.

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This device is available only to licensees of Dolby Lab.

Licensing and application information may be obtained from Dolby Lab.

PACKAGE OUTLINE



NJW1103AFC3

FEATURES

- Operating Voltage $V_{CC}=9V(\text{Analog}), V_{DD}=5V(\text{Digital})$
- Digital Delay on Chip
- Cch, Sch Channel Level Trimmer
- Digital Noise Sequencer
- Karaoke Function (Echo, Mic Mixing)
- Serial Data Interface (DATA, REQ, SCK)
- Bi-CMOS Technology
- Package QFP80-C3

FUNCTION

Dolby Pro Logic Surround

- Automatic input balance
- Digital 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

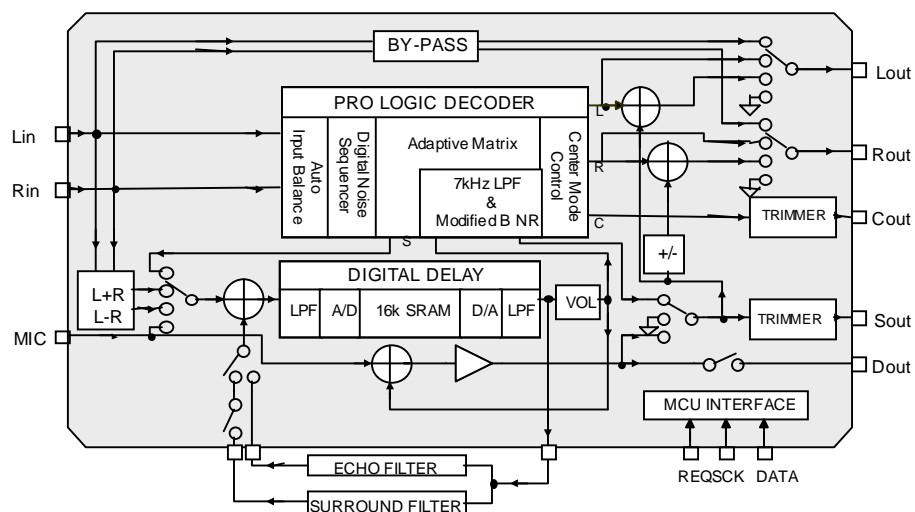
Other Surround

- Sound field control
- Front mixing control
- Digital time delay

Karaoke

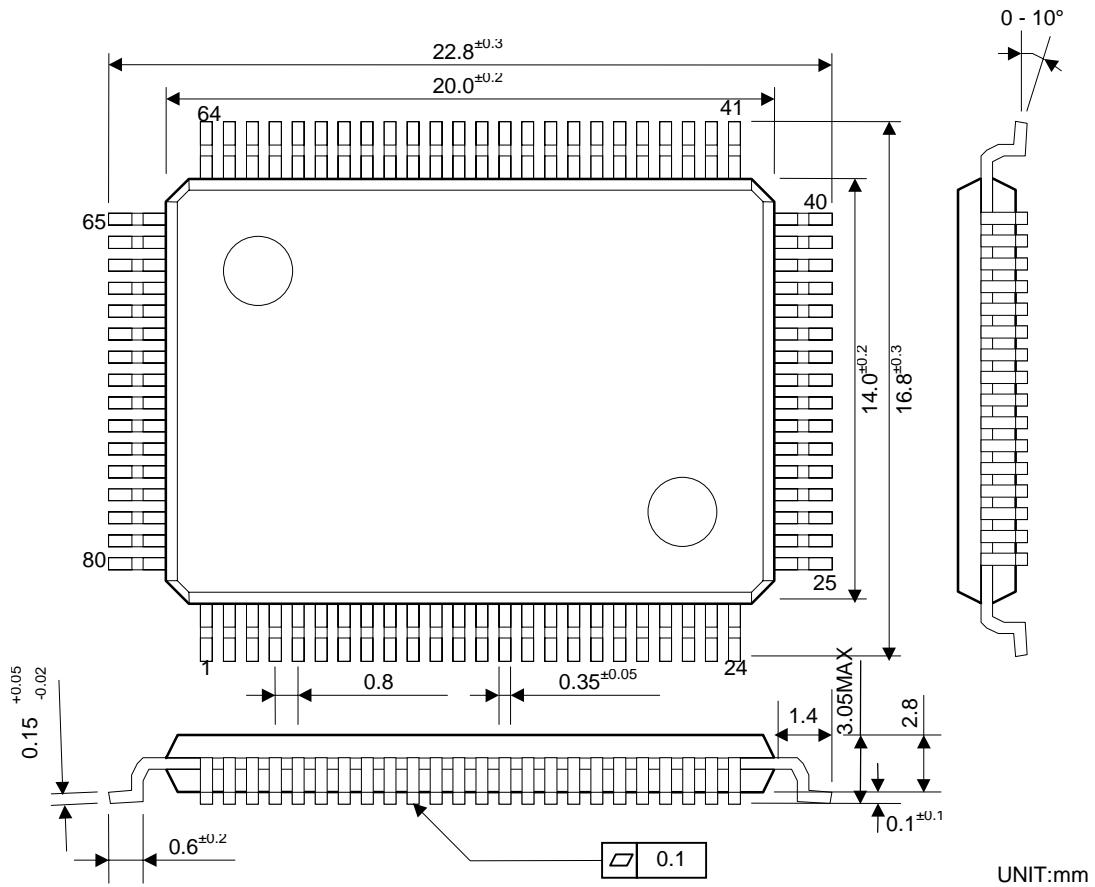
- Echo control
- Mic mixing

BLOCK DIAGRAM



NJW1103A

PACKAGE OUTLINE (QFP80-C3)



Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name
1	FILTER	21	XIN	41	VOL OUT	61	RLC4
2	LOUT	22	XOUT	42	DELAYSIG IN	62	RLC7
3	ROUT	23	DVSS	43	DELAYSIG OUT	63	RLC3
4	CT	24	AVSS	44	FBIN EC	64	RLC8
5	COUT	25	AVDD	45	FBIN SU	65	RLC6
6	ST	26	VREFD	46	S'OUT	66	LLI
7	SOUT	27	MIX OUT	47	DBIN	67	LBPF
8	CMC	28	DELAY IN	48	LPIN	68	RLI
9	SMRO	29	LPF1 IN1	49	DBC1	69	RBPF
10	SMRI	30	LPF1 IN2	50	DBC2	70	LT
11	AGND	31	LPF1 OUT	51	DBC3	71	RT
12	MIC IN	32	AD INT IN	52	PSC3	72	LIN
13	DVDD	33	AD INT OUT	53	PSC6	73	RIN
14	TEST CNT	34	AD CONT	54	PSC2	74	HOLDC
15	DATA	35	DA CONT	55	PSC5	75	AVCC
16	SCK	36	DA INT IN	56	PSC1	76	VREFA
17	REQ	37	DA INT OUT	57	PSC4	77	VREFG
18	LO1	38	LPF2 IN1	58	RLC5	78	IREF
19	LO2	39	LPF2 IN2	59	RLC2	79	REF OUT
20	LO3	40	LPF2 OUT	60	RLC1	80	NSQ

■ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V _{CC}	11	V
	V _{DD}	7	V
Power Dissipation	P _d	1.37	W
Operating Temperature Range	T _{opr}	-20 to +75	°C
Storage Temperature Range	T _{stg}	-40 to +125	°C

■ELECTRICAL CHARACTERISTICS (V_{CC} = 10V, V_{DD} = 5V, Ta = 25°C, Vin = 300mVrms, f = 1kHz)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
◆OVERALL							
Supply Voltage	V _{CC}		8	9	10	V	
	V _{DD}		4.5	5	5.5		
Supply Current	I _{CC}	No Signal	-	25	-	mA	
	I _{DD}	No Signal	-	25	-		
Reference Voltage	V _{REF}	No Signal	3.5	4.0	4.5	V	
Threshold Voltage	V _{thh}	Digital Input: High	0.7 V _{DD}	-	V _{DD}	V	
	V _{thl}	Digital Input: Low	0.0	-	0.3 V _{DD}		
◆INPUT AUTO BALANCE							
Capture Range	CPR		-	±5	-		
Error Correction	CER		-	±4	-		
◆ADAPTIVE MATRIX							
Output Level Accuracy Relative to Cch	ρVol	L,R,S'ch Output	-0.5	0	0.5	dB	
Matrix Rejection Relative Headroom	MR	L,R,S'ch Output	25	40	-	dB	
Total Harmonic Distortion	HR-AM	V _{CC} = 9V, THD=1%	15	17	-	dB	
	THD-AM	L,R,C,S'ch Output at 4ch Mode	-	0.05	0.2	%	
Signal to Noise Ratio	SN-AM	L,R,ch Output at 2ch Mode	-	0.002	0.05	%	
		Rg=0, wt:CCIR/ARM, 4ch L,R,ch Output, at 2ch Mode	75	80	-	dB	
			93	100	-	dB	
◆NOISE SEQUENCER							
Output Noise Level	Vno		-15.0	-12.5	-10.0	dB	
Output Noise Level Accuracy relative to Cch	ρVno	L,R,S'ch Output	-0.5	0.0	0.5	dB	
◆MODIFIED B-TYPE NOISE REDUCTION							
Voltage Gain	GV-NR	vin=0dBd, f=100Hz	-	9.2	-	dB	
Decode Response	DEC1	vin=0dBd, f=1kHz	-1.6	-0.1	1.4	dB	
	2	DEC2	vin=-15dBd, f=1.4kHz	-3.0	-1.5	0.0	dB
	3	DEC3	vin=-20dBd, f=1.4kHz	-4.9	-3.4	-1.9	dB
	4	DEC4	vin=-40dBd, f=5kHz	-6.8	-5.3	-3.8	dB
Total Harmonic Distortion	THD-NR	vin=0dBd, f=1kHz	-	0.07	0.3	%	
Headroom	HRNR	V _{CC} =9V, THD=1%	15	17	-	dB	
Signal to Noise Ratio	SNNR	Rg=0, weightted:CCIR/ARM	73	78	-	dB	

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■ELECTRICAL CHARACTERISTICS ($V_{CC} = 10V$, $V_{DD} = 5V$, $T_a = 25^{\circ}C$, $V_{in} = 300mV_{rms}$, $f = 1kHz$)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
◆OTHER SURROUND							
Total Harmonic Distortion	THD-OS	$v_{in}=0dBd$, $f=1kHz$ L+R,L-R Output	-	0.05	0.2	dB	
Headroom	HR-OS	$V_{CC}=9V$, THD=1% L+R,L-R Output	15	17	-	dB	
Signal to Noise Ratio	SN-OS	$R_g=0$, weighted:CCIR/ARM L+R,L-R Output	85	90	-	dB	
◆Cch, Sch TRIMMER							
Full Scale	FS	Digital Input = -31dB	-25	-31	-37	dB	
Trimmer Step	NL	Digital Input = -1, -2, -4, -8, -16dB	-0.6	1.0	1.4	dB	
◆DIGITAL TIME DELAY							
Delay Time	Td		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	Gv		-3.0	0.0	3.0	dB	
Total Harmonic Distortion	THD	30kHz LPF	Td=15.4ms	-	0.3	0.6	%
			Td=20.0ms	-	0.3	0.6	%
			Td=28.6ms	-	0.5	1.0	%
			Td=41.0ms	-	0.6	1.2	%
			Td=49.2ms	-	0.7	1.4	%
			Td=147.5ms	-	1.5	3.0	%
			Td=196.6ms	-	2.0	4.0	%
Maximum Output Voltage	Vomax	30kHz LPF, THD=10%	0.7	1.0	-	Vrms	
Output Noise Voltage	No	$R_g=620\Omega$ $v_{in}=0V_{rms}$ JIS-A	Td=15.4ms	-	-92	-80	dBV
			Td=20.0ms	-	-92	-80	dBV
			Td=28.6ms	-	-92	-80	dBV
			Td=41.0ms	-	-90	-75	dBV
			Td=49.2ms	-	-90	-75	dBV
			Td=147.5ms	-	-82	-67	dBV
			Td=196.6ms	-	-77	-62	dBV
◆ DELAY VOLUME							
Total Gain	Gv	Vol. = Max	0	3	6	dB	
Maximum Attenuation	ATTmax	Delay Off Mode, Vol=Min, JIS-A	0	-70	-60	dB	

[CAUTION]
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