



Digital Audio Processor for TV

■ Package

■ General Description

The NJU26103 is a high performance 24-bit digital audio processor for TV that has a QFP 32-pin small package.

The NJU26103 provides an internal delay memory to adjust the output delay time for lip sync. Moreover, the NJU26103 adopts SRS WOW technology.



■ FEATURES

- Variable 2 Channels Audio Delay (16 bit data width).
Maximum Delay 42msec at Fs = 48kHz (46msec at Fs = 44.1kHz)
- SRS WOW audio technology

NJU26103

■ Digital Signal Processor Specification

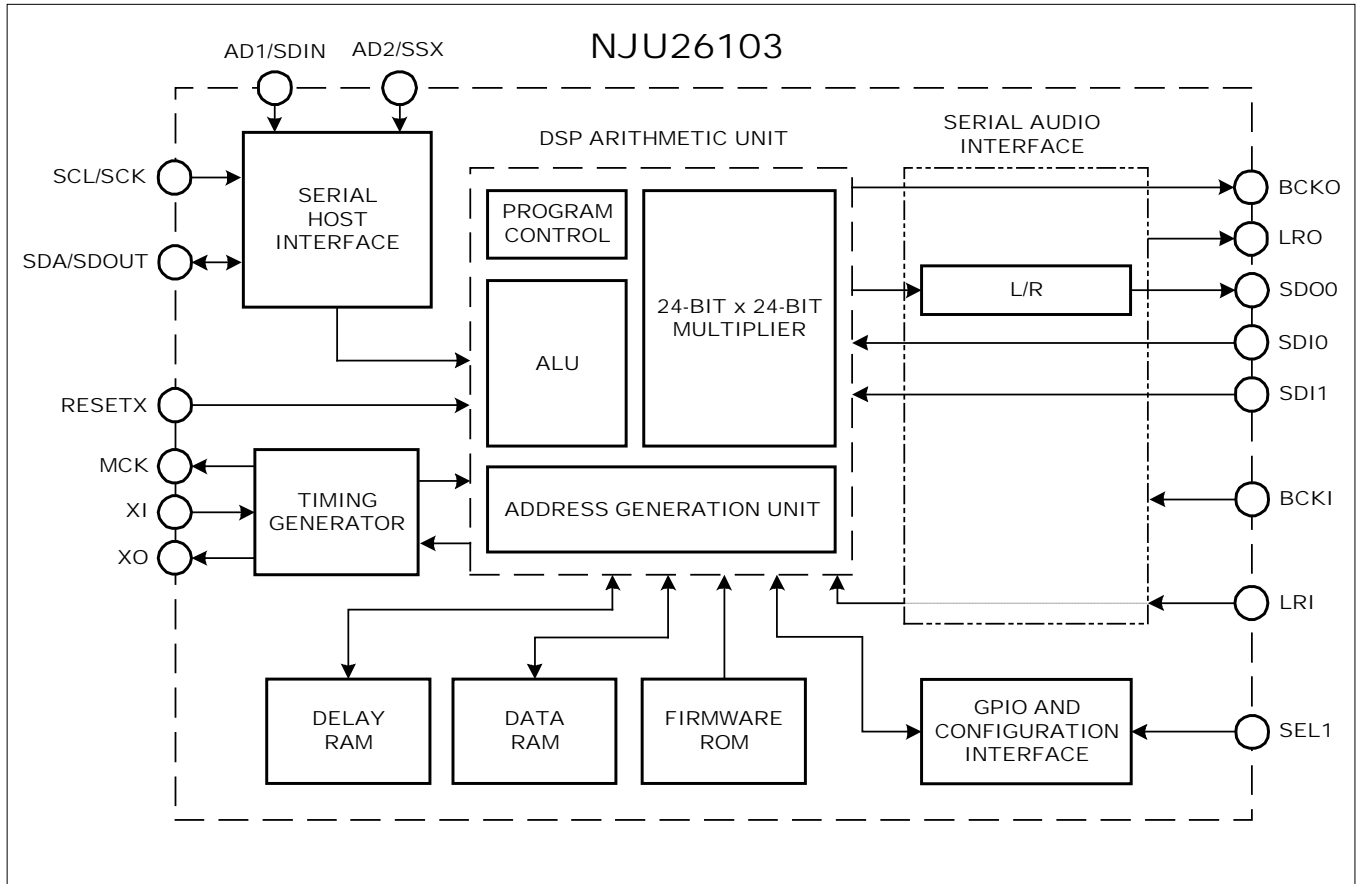
- 24bit Fixed-point Digital Signal Processing
- Maximum Clock Frequency : 38MHz
- Digital Audio Interface : 2 Input ports / 1 Output port
- Digital Audio Format : I²S 24bit, Left-Justified, Right-Justified, BCK : 32Fs / 64Fs
- Master / Slave Mode
- Master Mode MCK : 1/2 fclk, 1/3 fclk
ex. MCK = 384Fs(1/2) or MCK = 256Fs(1/3) at fclk=768Fs
- Two kinds of micro computer interface
 - I²C Bus (standard-mode/100Kbps)
 - 4-Wire Serial Bus (4-Wire: Clock, Enable, Input data, Output data)
- Power Supply : DSP Core : 2.5V I/O interface: 2.5V (+3.3V tolerant)
- Package : QFP 32pin

The detail hardware specification of the NJU26103 is described in the "NJU26100 Series Hardware Data Sheet". In respect to software commands, request NJR.

NJU26103

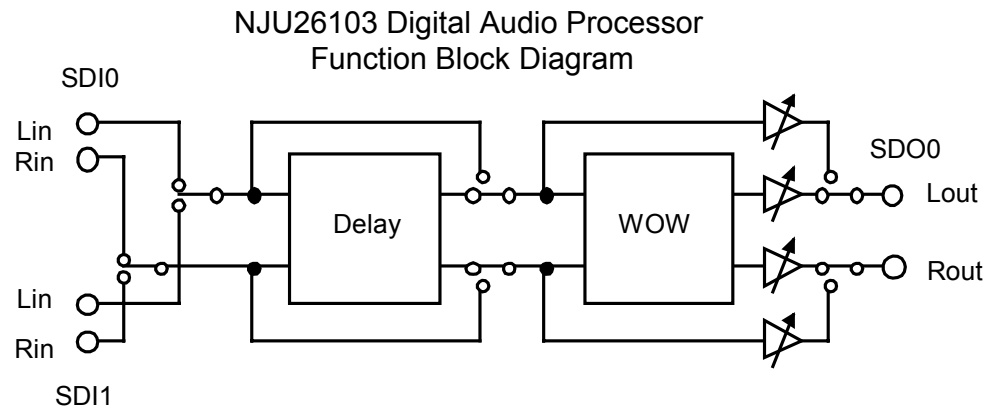
DSP Block Diagram

Fig.1 NJU26103 Block Diagram

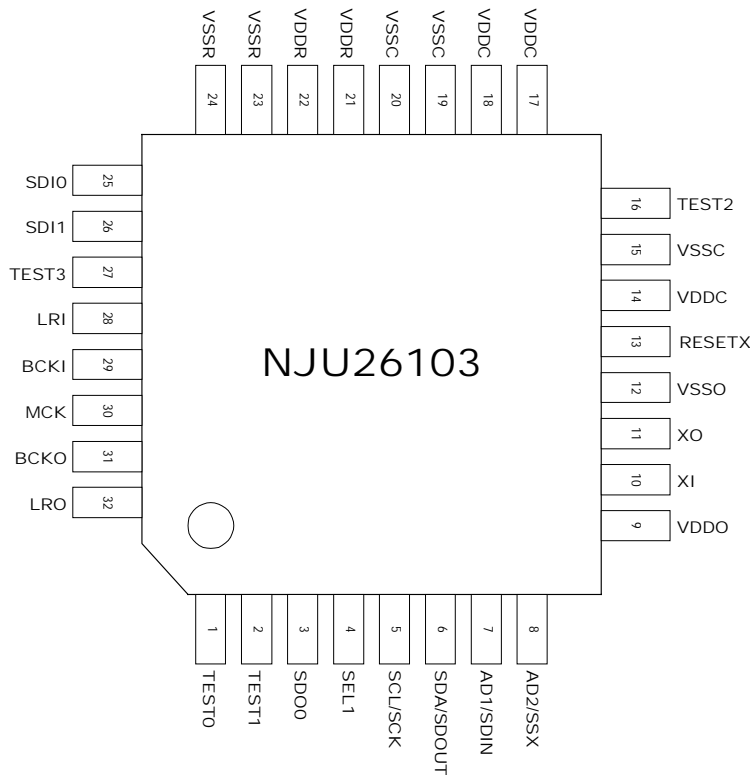


DSP Function Diagram

Fig.2 NJU26103 Function Diagram



Pin Configuration



Pin Description

Table1 Pin Description

No.	Symbol	I/O	Description	No.	Symbol	I/O	Description
1	TEST0	O	OPEN	17	VDDC	P	Core Power Supply +2.5V
2	TEST1	O	OPEN	18	VDDC	P	Core Power Supply +2.5V
3	SDO0	O	Audio Data Output L / R	19	VSSC	G	Core GND
4	SEL1	I	Select I ² C(L) or Serial bus(H)	20	VSSC	G	Core GND
5	SCL/SCK	I	I ² C Clock / Serial Clock	21	VDDR	P	I/O Power Supply +2.5V
6	SDA/SDOUT	IO	I ² C I/O / Serial Output	22	VDDR	P	I/O Power Supply +2.5V
7	AD1/SDIN	I	I ² C Address / Serial Input	23	VSSR	G	I/O GND
8	AD2/SSX	I	I ² C Address / Serial Enable	24	VSSR	G	I/O GND
9	VDDO	P	OSC Power Supply +2.5V	25	SDI0	I	Audio Data Input 0 L / R
10	XI	I	X'tal Clock Input	26	SDI1	I	Audio Data Input 1 L / R
11	XO	O	X'tal Clock Output	27	TEST 3	I	GND
12	VSSO	G	OSC GND	28	LRI	I	LR Clock Input
13	RESETX	I	RESET	29	BCKI	I	Bit Clock Input
14	VDDC	P	Core Power Supply +2.5V	30	MCK	O	Master Clock Output
15	VSSC	G	Core GND	31	BCKO	O	Bit Clock Output
16	TEST2	IO	OPEN	32	LRO	O	LR Clock Output

※ I : Input, O : Output, IO : Bi-directional, P : +Power, G : GND

■ Audio Data Interface

The NJU26103 audio interface provides Industry standard serial data formats of I²S, MSB-first left-justified or MSB-first right-justified. The NJU26103 audio interface provides two data inputs, SDI0 and SDI1, and one data output, SDO0. The input serial data is selected by the firmware command.

Table 2 Serial Audio Input Pin

Symbol	Pin No.	Description
SDI0	25	Sound Data Input 0 L / R
SDI1	26	Sound Data Input 1 L / R

Table 3 Serial Audio Output Pin

Symbol	Pin No.	Description
SDO0	3	Sound Data Output 0

■ I²C address

AD1 and AD2 pins are used to configure the seven-bit SLAVE address of the serial host interface. These pins offer additional flexibility to SLAVE address. 4 addresses could be chosen by AD1 and AD2-pin. The AD1 and AD2-pin addresses are decided by the connections of AD1 and AD2-pin. The AD1 and AD2 addresses should be the same level as AD1 and AD2-pin connections.

Table 4 I²C Bus SLAVE Address

bit7	bit6	bit5	bit4	Bit3	bit2	bit1	bit0
0	0	1	1	1	AD2* ¹	AD1* ¹	R/W

*1 AD1 or AD2 address is 0 when AD1 or AD2-pin is "L". AD1 or AD2 address is 1 when AD1 or AD2-pin is "H".

The detail I²C bus timing of the NJU26103 is described in the "NJU26100 Series Hardware Data Sheet".


■ Firmware Command Table

The NJU26103 can be controlled by host processor via I²C bus or 4-Wire serial bus interface. The following table summarizes the available user commands.

Table 5 NJU26103 Command List

No.	Command	Command Description
1	Fs	Select the sampling frequency : 32/ 44.1/ 48KHz
2	Input Select	Select digital audio input
3	Mode Select	Select mode : Mute, Thru, WOW
4	WOW	Select WOW parameters : Bit rate, Focus, Input mode
5	TruBass	Select TruBass Speaker size
6	Delay Time	Set Delay time
7	Program Mode	Select mode : Stereo, TruBass, Focus, Delay
8	Through Output	Trim Through output level
9	WOW Output Trim	Trim WOW output level
10	TruBass	TruBass Control
11	Stereo Width	Stereo Width Control
12	System State	Set System parameters : Digital Audio Format
13	Firmware Version	Check Firmware Version
14	NOP	Check DSP condition

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