

## NJM2177/2177A

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.

At two channel by pass mode, noise and distortion of NJM2177A are lower than that of NJM2177

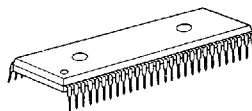
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Licensing and application information may be obtained from Dolby Lab.

### ■ Functions

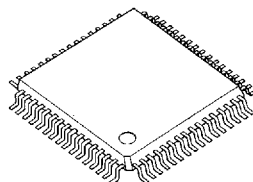
- Auto input balance and buffer
- Noise sequencer; a Noise generator, a sequencer controlled by external two bits
- Adaptive Matrix
- Center mode control; ON/OFF, Normal/Phantom/Wideband
- Modified Dolby B Type Noise Reduction and OP amp. for 7kHz low-pass filter
- Operating mode control; 4ch(L,C,R,S),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



NJM2177L/2177AL

### ■ Features

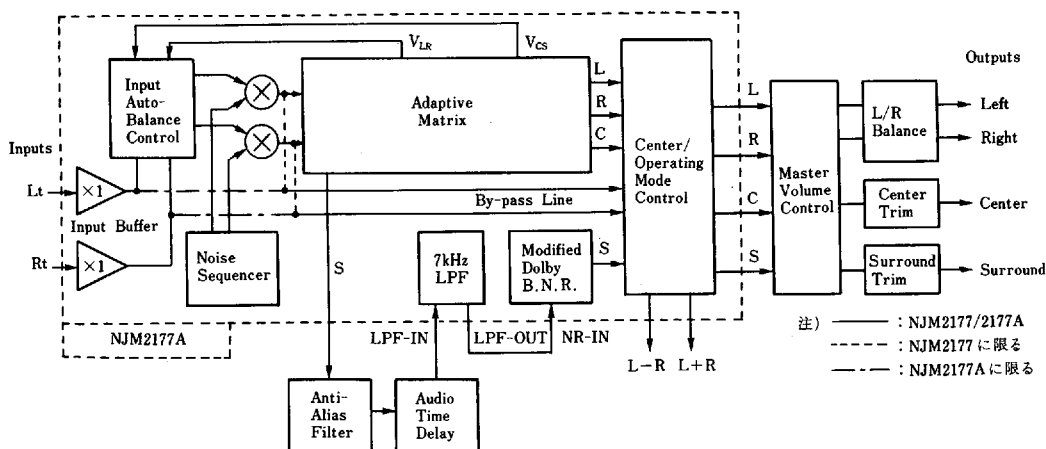
- Package: SDIP-56, QFP-56, QFP-64
- Dolby operating level: 300mVrms
- Operating supply voltage range: 9 to 13V
- Lower supply current: 34mA typ.
- Internal mode control switches



NJM2177FB3/2177AFB3

4

### ■ Active Surround Decoder Block Diagram



## ■ Absolute Maximum Ratings at Ta=25°C

|                       |                         |            |
|-----------------------|-------------------------|------------|
| DC Supply Voltage     | V+                      | 15V        |
| Power dissipation     | P <sub>D</sub> (L-Type) | 700mW      |
|                       | (F-Type)                | 500mW      |
| Operating Temperature | T <sub>opr</sub>        | -20~+75°C  |
| Storage Temperature   | T <sub>stg</sub>        | -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 <sub>OP</sub>      |                                 | 9.0  | —    | 13.0 | V    |
| Supply Current              | I <sub>CC</sub>      | No signal                       | —    | 34.0 | 40.0 | mA   |
| Reference Voltage           | V <sub>ref</sub>     | No signal                       | —    | 4.0  | —    | V    |
| Control SW input voltage    |                      |                                 |      |      |      |      |
| 2ch Mode                    | V <sub>C-2ch</sub>   | MODE-CNT PIN                    | 0.0  | —    | 0.8  | V    |
| 3ch                         | V <sub>C-3ch</sub>   | MODE-CNT PIN                    | —    | Open | —    |      |
| 4ch                         | V <sub>C-4ch</sub>   | MODE-CNT PIN                    | 3.8  | —    | 7.0  | V    |
| Center on                   | V <sub>C-con</sub>   | CENTER-CNT PIN                  | 2.4  | —    | 7.0  | V    |
| Center off                  | V <sub>C-coff</sub>  | CENTER-CNT PIN                  | 0.0  | —    | 0.8  | V    |
| Noise Seq. on               | V <sub>C-nson</sub>  | NOISE-CNT-E PIN                 | 0.0  | —    | 0.8  | V    |
| Noise Seq. off              | V <sub>C-nsoff</sub> | NOISE-CNT-E PIN                 | 3.2  | —    | 7.0  | V    |
| Noise Seq. channel select H | V <sub>C-nssH</sub>  | NOISE-CNT-A and NOISE-CNT-B PIN | 3.2  | —    | 7.0  | V    |
| Noise Seq. channel select L | V <sub>C-nssL</sub>  | NOISE-CNT-A and NOISE-CNT-B PIN | 0.0  | —    | 0.8  | V    |

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

|                   |                  |                                  |      |      |      |    |
|-------------------|------------------|----------------------------------|------|------|------|----|
| Voltage gain      | GV-BNR           | V <sub>in</sub> =0dB, f=100Hz    | —    | 9.0  | —    | dB |
| Decode Response 1 | D <sub>ec1</sub> | V <sub>in</sub> =0dB, f=1.0kHz   | -1.6 | -0.1 | 1.4  | dB |
| 2                 | D <sub>ec2</sub> | V <sub>in</sub> =-15dB, f=1.4kHz | -3.0 | -1.5 | 0.0  | dB |
| 3                 | D <sub>ec3</sub> | V <sub>in</sub> =-20dB, f=1.4kHz | -4.9 | -3.4 | -1.9 | dB |
| 4                 | D <sub>ec4</sub> | V <sub>in</sub> =40dB, f=5.0kHz  | -6.8 | -5.3 | -3.8 | dB |
| T.H.D             | THD-NR           | V <sub>in</sub> =0dB, 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 <sub>no</sub>  |  | -15  | -12.5 | -10 | dB |
| Output Noise Level Accuracy relative to Cch Lch Rch S'ch | ΔV <sub>no</sub> |  | -0.5 | 0.0   | 0.5 | dB |

## ☆ Adaptive Matrix

|                                                    |                  |                         |      |      |     |    |
|----------------------------------------------------|------------------|-------------------------|------|------|-----|----|
| Output Level Accuracy relative to Cch L,R,S'ch out | ΔV <sub>ol</sub> |                         | -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 | ΔV <sub>ol-OP</sub> |                                  | — | 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 <sub>CC</sub> =9V at T.H.D.=1% | — | 17.0 | — | dB |