

NY9A001A/002A/004A Application Note

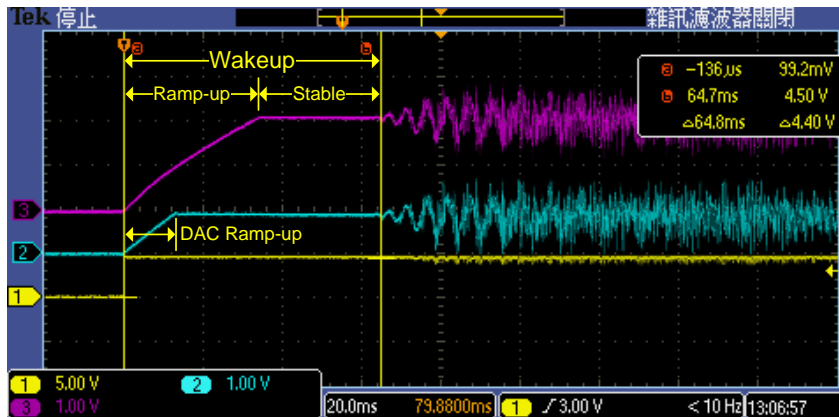
Description: The sequence of the shutdown pin and DAC could work in with the ramp-up/down to avoid the pop sound when user plays voice files through NY9A001A/002A/004A.

Reason: When DAC plays voice files, the ramp-up/down will generate pop sound because the amplifier enlarges the before/after signals of voice files. Users can avoid the pop sound by controlling the sequence of shutdown pin of NY9A001A/002A/004A and the DAC.

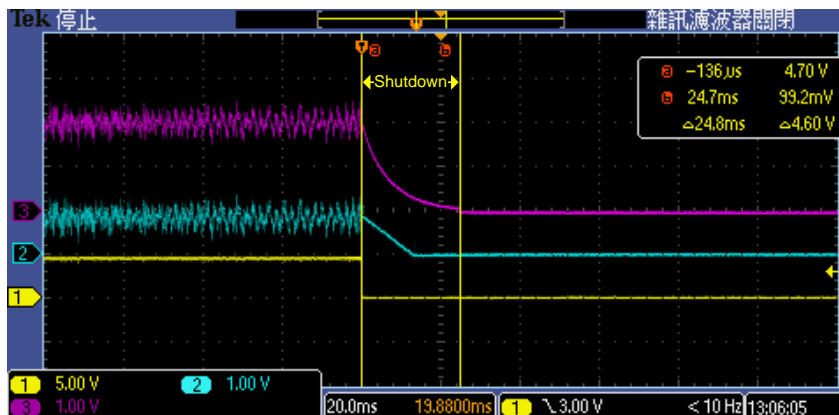
Solution: Take NY9A001A as example. When the shutdown pin is set as High, signals will be restrained in the wakeup time. The pop sound won't be generated if DAC executes the ramp-up in the interval of wakeup time. Since all signals are be restrained in this period, users have to input signals after the wakeup time for avoiding truncating the front voice signals. The pop sound also can be avoided when the shutdown pin is set as Low, and DAC execute the ramp-down in the interval of shutdown time. **Please note that the shutdown pins of NY9A002A/004A and NY9A001A are contrary.**

In the following illustrations, Ch1 is Shutdown input signals, Ch2 is DAC signals and Ch3 is V_{OP} output signals of NY9A001A.

Ramp-up signals of DAC is in the interval of Wakeup time, delay a few time, then input signals.

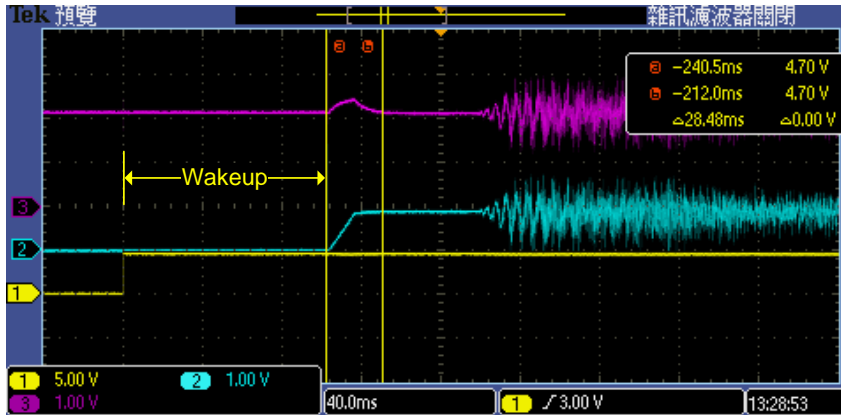


Ramp-down signals of DAC is in the interval of Shutdown time.

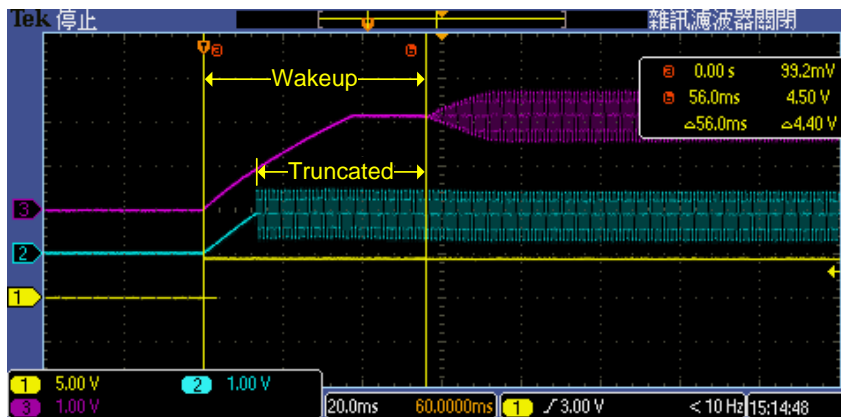


Note: In conclusion, users must put ramp-up / ramp-down signals of DAC is in the interval of Wakeup time / Shutdown time to avoid the pop sound, and have to input signals after the wakeup time for avoiding truncating the voice file. Users can refer to the figures below to see the wrong effect under incorrect operation.

Ramp-up signals of DAC is after Wakeup time. The pop sound is generated.



Input signals in the interval of Wakeup time. The front voice signals during Wakeup time are truncated.



◆ **Wakeup/Shutdown Time VS. C_B**

The Wakeup/Shutdown time changes with the capacitance value of bypass capacitor C_B on circuit board, users must select the suitable C_B value according to different applications. The following tables listed the time of Wakeup and Shutdown of NY9A002A/004A. As for the time of NY9A001A, please refer to the NY9A002A/BTL Mode table.

NY9A002A/ BTL Mode/ 5.0V

C_B	Wakeup	Shutdown
0.1uF	18 ms	5 ms
0.22uF	28 ms	12 ms
0.47uF	45 ms	25 ms
1uF	80 ms	50 ms

NY9A002A/ SE Mode/ 5.0V

C_B	Wakeup	Shutdown
0.1uF	24 ms	25 ms
0.22uF	45 ms	50 ms
0.47uF	80 ms	120 ms
1uF	160 ms	230 ms

NY9A004A/ BTL & SE Mode/ 5.0V

C_B	Wakeup	Shutdown
0.1uF	140 ms	180 ms
0.22uF	180 ms	250 ms
0.33uF	240 ms	380 ms
0.47uF	320 ms	540 ms
1uF	600 ms	1130 ms

◆ Wakeup/Shutdown Time VS. V_{DD}

Except the C_B value, different voltages also can change the time durations. The following tables listed the time of different voltage of NY9A002A/004A. As for the time of NY9A001A, please refer to the NY9A002A/ BTL Mode table.

NY9A002A/ BTL Mode/ 0.47uF

V_{DD}	Wakeup	Shutdown
3.0V	34 ms	22 ms
4.5V	42 ms	24 ms
5.0V	45 ms	25 ms
6.0V	46 ms	27 ms

NY9A002A/ SE Mode/ 0.47uF

V_{DD}	Wakeup	Shutdown
3.0V	75 ms	110 ms
4.5V	79 ms	118 ms
5.0V	80 ms	120 ms
6.0V	84 ms	130 ms

NY9A004A/ BTL & SE Mode/ 0.1uF

V_{DD}	Wakeup	Shutdown
3.0V	115 ms	160 ms
4.5V	135 ms	175 ms
5.0V	140 ms	180 ms
6.0V	160 ms	190 ms

Note:

1. *The above time durations of wakeup and shutdown could have slight difference because of different IC and lot. Normally human ears are not conscious of the difference.*
2. *Wakeup time is equal to NY9A's Ramp-up time plus Stable time.*

◆ **Operation Procedure**

To avoid the pop sound, please refer to the following flowchart for controlling Shutdown pin and the DAC signal time correctly.

