

Notice for Using PWM Single-Ended on NX1 EF Series ICs

Description: When the NX1 EF series IC uses PWM Single-Ended mode, an additional hardware circuit is required.

The circuit configuration and related recommendations are as follows.

Reason: PWM Single-Ended refers to the NX1 PWM_P single-ended output. The signal is processed through external components and then delivered to the speaker via an operational amplifier. The recommended circuit configuration is shown in Figure 1.

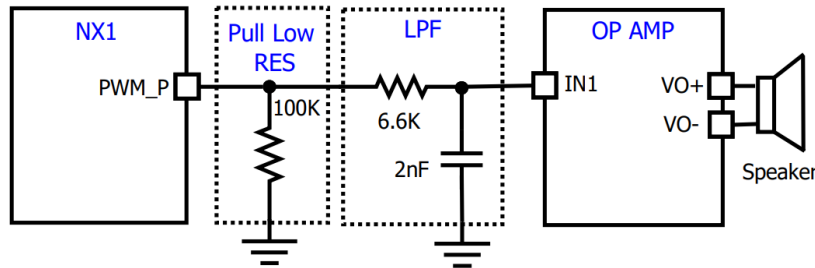


Figure 1

- NX1: NX1 EF series IC bodies.
- Pull Low RES: A 100 kΩ pull-down resistor is recommended. However, ICs with integrated DAC IP (e.g., NX11FS23A and NX12/3FS series) can omit this resistor.
- A 6.6 kΩ resistor and a 2 nF capacitor are recommended for the low-pass filter.
- OP AMP: An operational amplifier used to drive the speaker output.

The setting of software:

- NYIDE: Set AUDIO_OUTPUT_MODE in the .project path)...\src\inx1_config.h to PWM_SE_MODE.

```

75 ///////////////////////////////////////////////////
76 //=====
77 // * Audio Output Mode *
78 //=====
79 ///////////////////////////////////////////////////
80 //=====
81 // Audio Output Mode Parameter Setting
82 //=====
83 #define _AUDIO_OUTPUT_MODE          PWM_SE_MODE          // Select PP_OR_PWM_MODE(0)/DAC_MODE(1)/PWM_SE_MODE(2)
84 #define _AUDIO_RAMP_UP_TIME         8                   // Select 0~n, default:8, unit:ms
85 #define _AUDIO_RAMP_DOWN_TIME       4                   // Select 0~n, default:4, unit:ms
86 #define _AUDIO_AMP_SD_CTL            DISABLE             // ENABLE or DISABLE control shut down pin of AMP.
87 #define _AUDIO_AMP_SD_CTL_PORT       GPIOA               // Select PORT GPIOA/GPIOB/GPIOC(only NX1EV)
88 #define _AUDIO_AMP_SD_CTL_PIN        8                  // Select PIN 0~15 for GPIOA & GPIOB, Select 0~7 for GPIOC(only NX1EV)
89 #define _AUDIO_AMP_SD_CTL_ACTIVE     ACTIVE_LOW         // Select shut down pin of AMP is ACTIVE_LOW or ACTIVE_HIGH
90 #define _AUDIO_AMP_WAKUP_TIME        30                 // Select 0~n, default:30,Unit:ms
91 #define _AUDIO_AMP_SHUTDOWN_TIME     10                 // Select 0~n, default:10,Unit:ms
92 #define _AUDIO_DIGITAL_CMPS          ENABLE             // Enable or Disable DAC Mode Digital compensation, only for NX11FS23A.

```

- Q-Code: Option → Voice Output check the PWM(Single Ended) option.

