

WM8731 Suggested Power-On/Off Sequence

INTRODUCTION

As with any consumer audio product, it is important that any on/off power noise be kept to a minimum. Generally, this is done with some sort of external mute circuit at the output socket of the application. Although effective, this does increase the BOM (Bill Of Material) cost, which in many cases is a critical factor.

With this in mind, the WM8731 DAC signal path may be powered-on in such a way that power on/off noise is kept to a minimum with no need for an external muting circuit, reducing the BOM cost.

The information contained within this application note explains the power-on and off sequence that is required to achieve the best performance.

The plots shown in this application note were measured using the WM8731-EV1 evaluation board at the Headphone output. All measurements were carried out using the WM8731-EV1S software to set the DAC signal path. All WM8731 supplies (DCVDD, DBVDD, HPVDD and AVDD) on the evaluation board were set to +3V.

POWER-ON SEQUENCE

Figure 1 shows a plot of the output if the DACPD, OUTPD, and POWEROFF bits are set to '0' (active) and submitted through software to the WM8731 at the same time. If this is done, a 'pop' sound can be heard through the headphones. As can be seen from the plot, the cause of this 'pop' sound is the steep change in DC level before the slow rise to AVDD/2 (midrail).

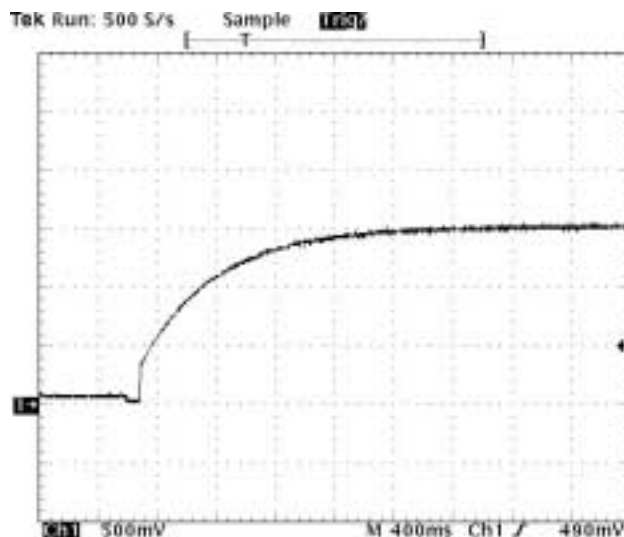


Figure 1 Headphone Output at Power-On with 'OUTPD' set to '0'

Figure 2 shows the plot measured at the output if DACPD and POWEROFF are set to '0' (active) and OUTPD is left at its default value of '1' (power-down). If OUTPD is then set to '0' (active), there is no 'pop' sound heard through the attached headphones. This delay in setting active the output stage of the WM8731 allows the DC level at the output to get above the level where setting OUTPD active will have an effect, allowing a slow rise before settling at midrail. It can be seen from Figure 2 and more clearly from Figure 3 that the steep change in DC level is removed.

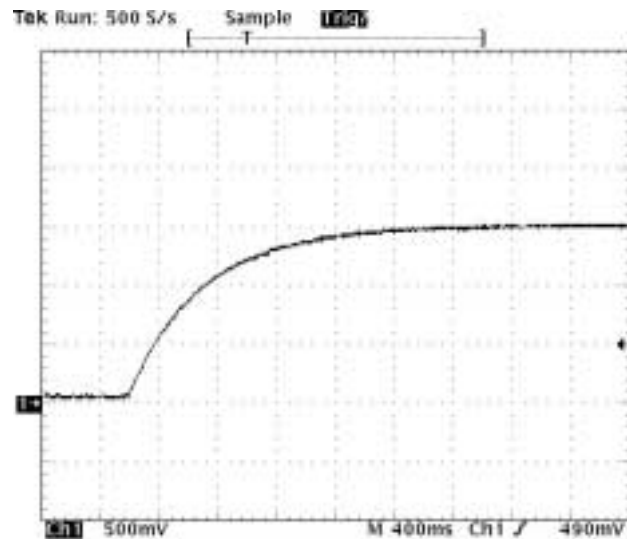


Figure 2 Headphone Output at Power-On with 'OUTPD' set to '1'

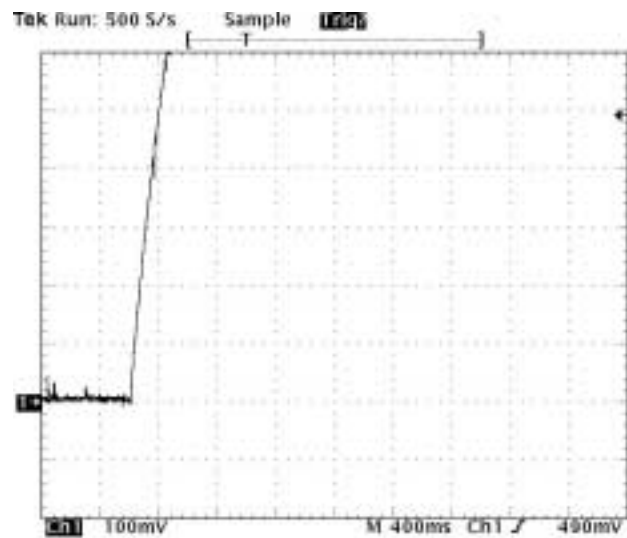


Figure 3 Zoom in of Headphone Output at Power-On with 'OUTPD' set to '1'

To achieve minimal output noise at power-on, it is recommended that the following write sequence to the WM8731 be followed:

- Set all required bits in the Power Down register (0Ch) to '0'; EXCEPT the OUTPD bit, this should be set to '1' (default).
- Set required values in all other registers except 12h (Active).
- Set the 'Active' bit in register 12h.
- The last write of the sequence should be setting OUTPD to '0' (active) in register 0Ch, enabling the DAC signal path, free of any significant power-up noise.

POWER-OFF SEQUENCE

Following the recommended write sequence noted below may reduce power-off noise:

- Set the OUTPD bit to '1' (power-down).
- Remove WM8731 supplies.

The noise at power-off is not usually as big an issue as at power-on, especially in portable applications. Setting the OUTPD bit before removing the supplies will ensure that any noise will be kept to a minimum.

APPLICATION SUPPORT

If you require further information or require technical support please contact Wolfson Microelectronics Applications group through the following channels:

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