

## WM8775/6/8 – Two Wire Interface External Configuration

### INTRODUCTION

For the WM8775, WM8776 and WM8778 Wolfson devices there is a design consideration when implementing the two wire interface mode of operation. This is in relation to the pull up resistor which is required for the DI signal line to ensure an acknowledge signal (logic low) from the Wolfson device can be successfully detected. This applications note will detail the basic operation and requirements for the WM8775/6/8 DI signal line when using the two wire mode control interface.

### EXTERNAL CONFIGURATION

The basic operation for two wire mode involves the controller indicating that a device address and data will follow. The Wolfson device will then shift the address data in and if the address matches the device address then it will respond by pulling the DI line low on the next clock pulse to indicate an acknowledge of the address data. Two further acknowledge signals are sent by the Wolfson device after the register address and also to indicate that the register data has been read correctly. For further details on two wire mode operation please refer to the relevant section within the datasheet.

Internal to the Wolfson device the DI pin has an impedance of  $400\Omega$  as shown in Figure 1 DI Signal Output Equivalent Circuit. To allow the acknowledge signal on the DI pin to be driven to a sufficiently low level by the Wolfson device then the external pull up resistor ( $R_{pu}$ ) on the DI line to the digital supply is to have a total resistance value of no less than  $4K7\Omega$ . This will ensure the low level has a value of approximately less than 1/13 of the digital supply.

This consideration is only applicable for two wire mode operation and also only to the DI signal line and not the CE signal line.

Timing simulations have been completed with an external pull up resistor of  $4K7\Omega$  and a total bus capacitance of  $200pF$ . This has shown that no timing issues with respect to the timing diagrams detailed in the WM8775/6/8 datasheets were breached. Bus capacitance will vary between applications but  $200pF$  is a larger than typical value therefore this configuration should not present any timing complications for standard two wire control interfaces.

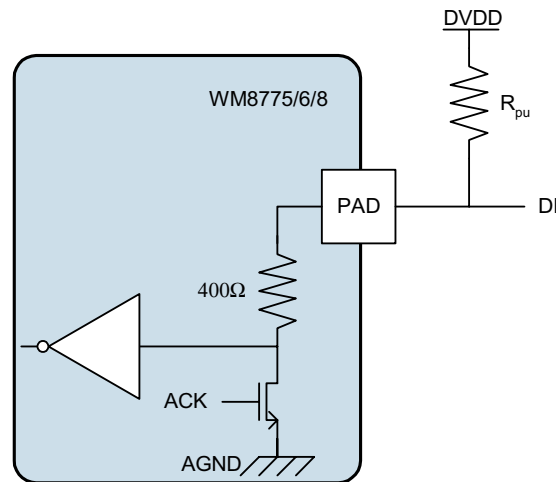


Figure 1 DI Signal Output Equivalent Circuit

## **SUMMARY**

When operating the WM8775, WM8776 or WM8778 in two wire mode operation, to ensure that successful acknowledge signals can be driven by the Wolfson device to the controller, the total pull up resistance should not be less than 4K7Ω.

## **APPLICATION SUPPORT**

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

Email: apps@wolfsonmicro.com  
Telephone Apps: (+44) 131 272 7070  
Fax: (+44) 131 272 7001  
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## ADDRESS:

Wolfson Microelectronics plc  
Westfield House  
26 Westfield Road  
Edinburgh  
EH11 2QB  
United Kingdom

Tel :: +44 (0)131 272 7000

Fax :: +44 (0)131 272 7001

Email :: [sales@wolfsonmicro.com](mailto:sales@wolfsonmicro.com)