

# Dolby® Headphone DH1 Reference Design

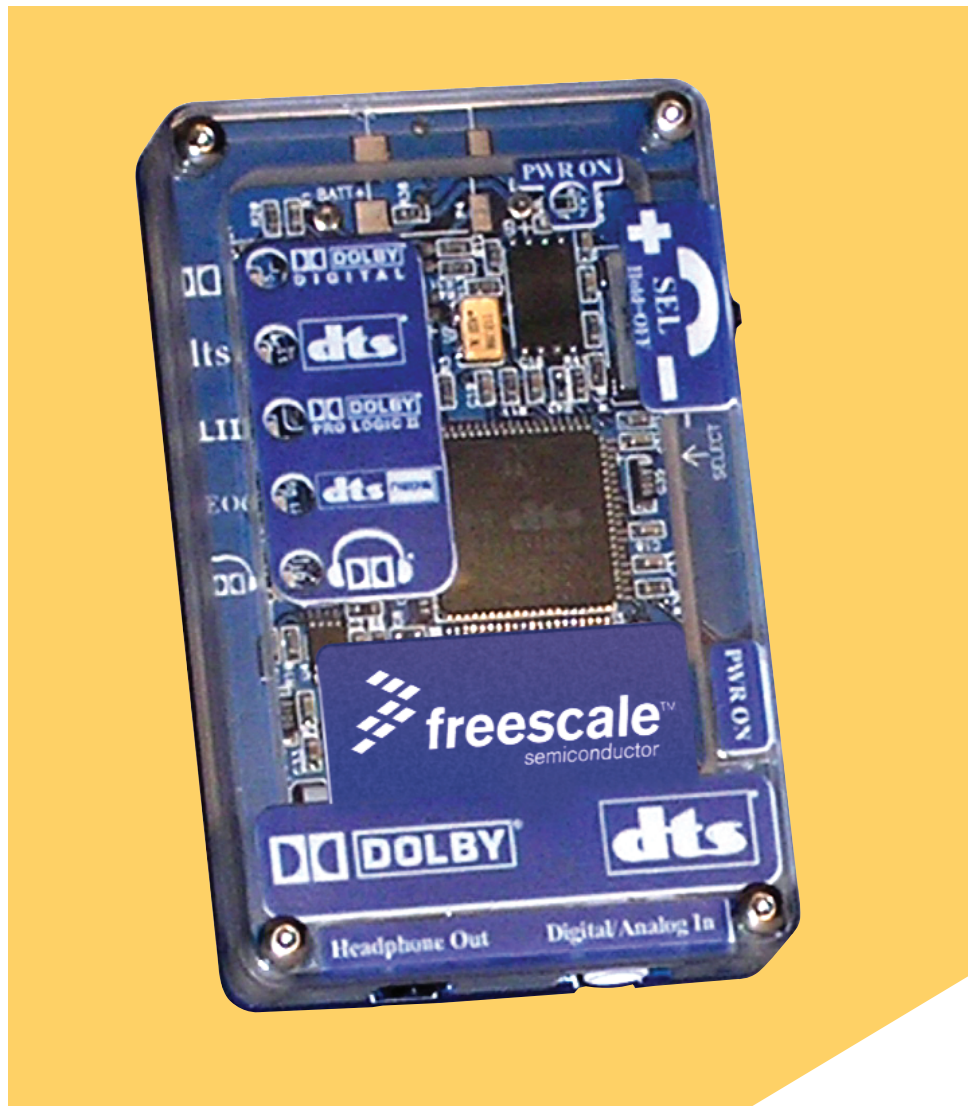
## Adding Dolby® Headphone to Applications Has Never Been Easier!

### Overview

The DH1 is a reference design that supports the popular Dolby® Headphone algorithm. This solution uses Freescale's Symphony™ DSP56371. The DH1 reference design is a cost-effective and space-efficient solution for Dolby Headphone surround sound products. The DH1 design enables manufacturers to build stand-alone accessory devices for products such as game consoles and DVD players at price points extremely competitive with other products on the market today.

The reference design can also be integrated into existing consumer electronics products such as televisions, DVD receivers, audio/video receivers and automotive entertainment products to enable the surround sound experience without the need for multiple speakers.

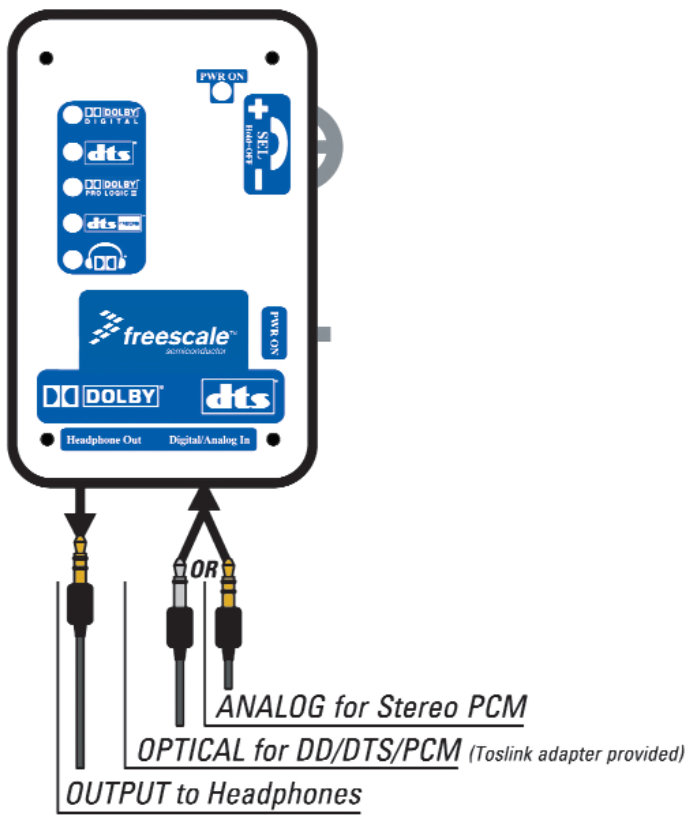
Freescale will supply schematics, layout files, bill of materials and system software for this reference design free of charge to licensees of Dolby and DTS® technologies.





# Connecting the DH1

The DH1 can accept input from either a line level analog stereo audio source or a digital audio source with optical output. The DH1 outputs decoded audio to stereo headphones through the HEADPHONE OUT connector. The figure below shows a detail of the DH1 illustrating the input and output connectors. The DH1 DIGITAL/ANALOG IN connector accepts an optical miniplug; an adaptor is provided to allow connection of a standard optical cable.



## Volume Control

Headphone volume may be adjusted up or down using the SELECT switch. The DH1 preserves its volume setting when powered down, so music plays at the same volume when it is again powered up.



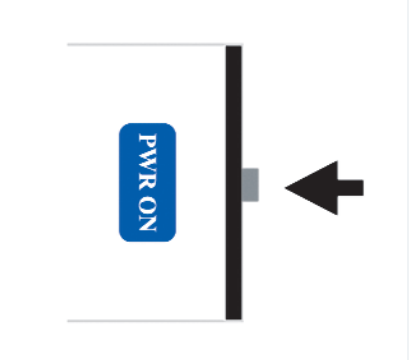
Adjust volume higher by rotating the toward the "+" marking.



Adjust volume lower by rotating the switch down toward the "-" marking

## Operating the DH1

Power up the DH1 by pressing the PWR ON switch once. The system will take approximately four seconds to initialize, after which the LEDs marked DH and PLII will illuminate. All other control functions are now actuated by the three-position SELECT switch.





## Pro Logic® II Mode Select



Pro Logic II may be switched on and off by the following sequence of inputs: Rotate the SELECT switch up toward the “+” marking, release, then quickly press the SELECT switch directly inward. Pro Logic II and DTS® Neo:6™ are mutually exclusive, so that activating Pro Logic II will automatically deactivate Neo:6 if it is currently active.

## DTS® Neo:6™ Mode Select



DTS Neo:6 may be switched on and off by the following sequence of inputs: Rotate the SELECT switch down toward the “-” marking, release, then quickly press the SELECT switch directly inward. Pro Logic II and Neo:6 are mutually exclusive, so that activating Neo:6 will automatically deactivate Pro Logic II if it is currently active.

## Changing the Batteries

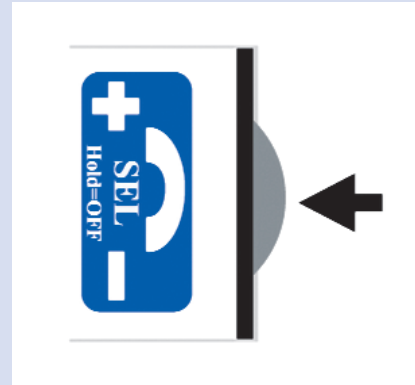
The DH1 is designed to accept two standard AA batteries in a housing on its underside. The batteries provided will give over 10 hours listening time. When battery voltage falls below the minimum threshold of operation, the DH1 will flash the DH LED for 10 seconds and then power off. At this time, the batteries must be replaced. When installing new batteries, be certain to observe the correct polarity marked on the battery housing.

## For Further Information

For additional information about Freescale’s DH1 reference design or the audio technology supported by the DH1, visit the following web sites:

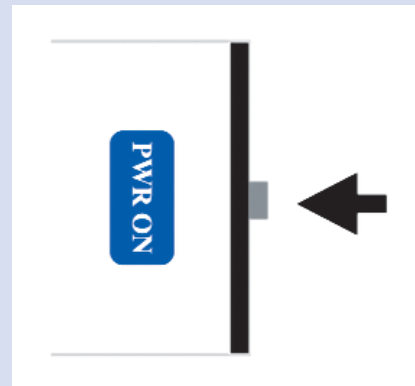
- [www.freescale.com](http://www.freescale.com)
- [www.dolby.com](http://www.dolby.com)
- [www.dtsonline.com](http://www.dtsonline.com)

## Dolby Headphone Select



Dolby Headphone processing may be switched on or off by quickly pressing and releasing the SELECT switch. The DH LED will not be illuminated when Dolby Headphone is disabled, and will be illuminated when Dolby Headphone is active.

## Power Off



The DH1 is powered down by pressing the SELECT switch and holding until all LEDs are extinguished. Be certain to power down the DH1 when finished listening, as no automatic power down capability is provided. The DH1 will eventually exhaust its batteries unless manually powered down.



## How to reach us:

### **Worldwide Access:**

Internet: [www.freescale.com](http://www.freescale.com)

e-Mail: [support@freescale.com](mailto:support@freescale.com)

### **Quick References:**

Technical Support—[www.freescale.com/support](http://www.freescale.com/support)

For Technical or Literature questions or comments, you may select "Technical Support", log in and use the "Service Request" feature.

### **Telephone, Fax and e-Mail Contacts:**

#### **North and South America:**

Phone: +1-800-521-6274 or +1-480-768-2130

Fax: +1-480-768-2131

e-Mail: [support@freescale.com](mailto:support@freescale.com)

For fastest response, use the Worldwide Internet access listed above.

#### **Europe, Middle East and Africa:**

Phone: +44 1296 380 456 (English)

+46 8 52200080 (English)

+49 89 92103 559 (German)

+33 1 69 35 48 48 (French)

Fax: +49 89 92103 466 (German and English)

e-Mail: [support@freescale.com](mailto:support@freescale.com)

#### **Asia/Pacific:\***

Phone: +800 2666 8080\* (Toll Free within Asia/Pacific)

+000 800 852 1155 (Toll Free within India)

Fax: +852 2661 7736 (Chinese and English)

e-Mail: [support.asia@freescale.com](mailto:support.asia@freescale.com)

#### **Japan:**

Phone: 0120 191 014 (Toll Free: Domestic only)

Fax: 0120 191 060 (Toll Free: Domestic only)

e-Mail: [support.japan@freescale.com](mailto:support.japan@freescale.com)

Internet: [www.freescale.co.jp](http://www.freescale.co.jp)

\*Countries covered within Asia/Pacific are China, Taiwan, South Korea, Macau, Malaysia, Singapore, Thailand, Australia and New Zealand.

"Dolby," "Pro Logic" and the double-D symbol are trademarks for Dolby Laboratories. Use of these symbols does not constitute an endorsement of this product by Dolby Laboratories.

Consumer implementation of the DTS technologies embodied within requires a license from DTS. To obtain a DTS license, and for further information on DTS technologies, contact Digital Theater Systems, Inc., 5171 Clareton Drive, Agoura Hills, California 91301, Attention: Consumer Licensing; [consumerlicensing@dtsonline.com](mailto:consumerlicensing@dtsonline.com); (818) 706-3525. For demonstration purposes only. Manufactured under license from Digital Theater Systems, Inc. U.S. Pat. Nos. 5,451,942; 5,956,674; 5,974,380; 5,978,762; 6,487,535 and other U.S. and worldwide patents issued and pending. "DTS" and "Neo:6" are trademarks of Digital Theater Systems, Inc. © Copyright 1996, 2005 Digital Theater Systems, Inc. All rights reserved.

Information in this document is provided solely to enable system and software implementers to use Freescale products. There are no express or implied copyright licenses granted hereunder to design or fabricate any integrated circuits or integrated circuits based on the information in this document.

Freescale reserves the right to make changes without further notice to any products herein. Freescale makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Freescale assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters that may be provided in Freescale data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals", must be validated for each customer application by customer's technical experts. Freescale does not convey any license under its patent rights nor the rights of others. Freescale products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Freescale product could create a situation where personal injury or death may occur. Should Buyer purchase or use Freescale products for any such unintended or unauthorized application, Buyer shall indemnify and hold Freescale and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Freescale was negligent regarding the design or manufacture of the part.

**Learn More:** For more information about Freescale products, please visit [www.freescale.com](http://www.freescale.com).

Freescale™ and the Freescale logo are trademarks of Freescale Semiconductor, Inc. All other product or service names are the property of their respective owners. Dolby Digital is a registered trademark of Dolby Laboratories; Dolby Digital is manufactured under license from Dolby Laboratories.

© Freescale Semiconductor, Inc. 2005

Document Number: DH1

REV 1

