

# Wireless Dolby® Headphone DH3 Reference Design

## Eliminate Wires With the Wireless Dolby Headphone Reference Design

Freescale was one of the first to create a reference design to support the popular Dolby Headphone algorithm using the Symphony™ DSP56371. The popular DH1 reference design is a cost-effective and space-efficient solution for Dolby Headphone surround sound products. The design enables manufacturers to build a stand-alone accessory device for products such as game consoles and DVD players at an extremely competitive price point with other products on the market today.

Following the success of the DH1, Freescale has teamed up with STS to expand the DH1 reference design by including a 2.4GHz wireless audio transceiver to eliminate the need for headphone wires. The advanced reference design is called the DH3.

The figure below shows the high-level diagram of how the DH3 works. The DH3 accepts either an optical S/PDIF input for Dolby Digital, DTS or PCM bit stream or an analog input. The DSP decodes the bit stream and then applies the Dolby Headphone algorithm through post processing to create a virtualized stereo signal. The DSP can also take a stereo input and expand the signal from two channels to 5.1 channels using Dolby Pro Logic® II before virtualizing the signal. The virtualized stereo signal is then output to the STS DWAM79 module which takes the audio signal and handles the 2.4GHz wireless transmission to the wireless headphones (wireless receiver in the headphone).

The heart of this reference design is the Symphony DSP56371. In order to serve the specific needs of consumer and automotive applications, the DSP56371 includes a powerful set of built-in audio peripherals and embedded software modules, plus a wealth of audio

processing functions, including a plug and play software architecture system, various equalization algorithms, compression, signal generator, tone control, fade/balance, level meter/spectrum analyzer and many more.

- Size:
  - 3 x 3 inches, plus STS DWAM79 module
- Key Features:
  - Dolby Digital Decoder
  - DTS Decoder
  - Dolby Pro Logic II Post Processing
  - Dolby Headphone Post Processing
  - DTS Neo6 Post Processing
  - Entire user interface handled by Symphony™ DSP56371 (No MCU)
  - STS DWAM79 2.4GHz wireless audio transceiver
  - Integrated S/PDIF transceiver

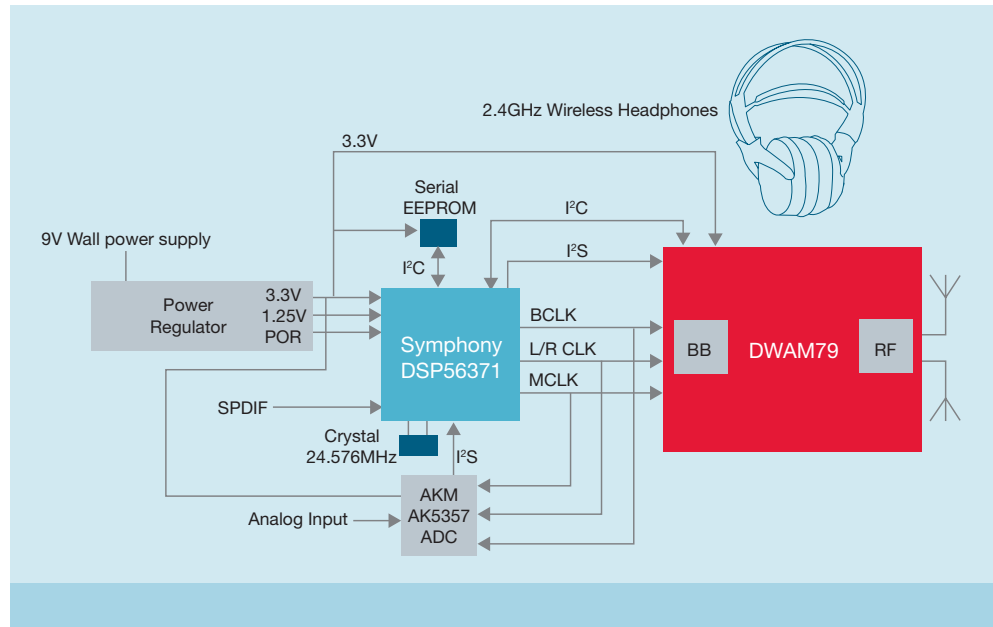
## For Further Information

For additional information about Freescale's Symphony DSP portfolio or the audio technology supported by the DH3, visit the following web sites:

- [www.freescale.com/symphony](http://www.freescale.com/symphony)
- [www.dolby.com](http://www.dolby.com)
- [www.dts.com](http://www.dts.com)
- [www.sts.sg](http://www.sts.sg)



## Block diagram



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

You can also find more information about Fast Track, Freescale's online support services center, at [www.freescale.com/fasttrack](http://www.freescale.com/fasttrack).



## DARR 79 / 80

# Digital Wireless Audio Module

The **DARR 79/80 audio baseband chip**, is the heart of the new generation of STS wireless audio solutions. It provides up to 8 channels of low latency, uncompressed 16 bit, 44.1Ksps or 48Ksps digital audio, improved interference robustness and co-existence supporting a radical extension to the boundaries of wireless audio applications. The DARR 79/80 works in tandem with a standard 802.11 front-end radio in the worldwide license exempt 2.4GHz ISM band. It is unparalleled co-existence with other 2.4GHz products like WiFi, Bluetooth and microwave ovens

The bandwidth is available in the 11/ 22 Mbps range, with real time sniffer to ensure optimal co-existence at all times.

The module is available operating from a single 3.3V supply. It is completed with radio and antennas. The module is pre-qualified for FCC and ETSI requirements and allows for easy and fast design-in.



## Applications

- Wireless 8 Channel Audio System
- Wireless Stereo System
- Wireless Transmitter System
- Wireless Microphone System
- Wireless Headphone System

- High quality, stereo audio link with multi-room, multi-receiver functionality
- Bi-directional data traffic, low power consumption receiver and transmitter
- Supports 1stereo, 1 mono and 2 stereo, 2 mono
- Wireless Stereo, Headset (Stereo plus Mono)
- Dolby Headphone™
- 5.1 Dolby Surround Sound™ Headphone

### ABOUT STS

The STS platform delivers streaming uncompressed CD quality audio in the worldwide license-exempt 2.4 GHz ISM band. A one stop investment in a true wide-platform technology: multi channel for surround, tight end-to-end delay and multi channel synchronization for stereo, low power for headphones, mobile applications and extended indoor range for multiroom applications. All with low latency and industry leading QoS- robustness and co-existence. A bi directional data channel is available for implementing user controls and intelligence to the system.

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