

Symphony™ DSP56374

Target Applications

- Audio effects
- DVD receivers
- Televisions
- Car radios/amplifiers
- Minisystems
- Virtual headphones
- Virtual speaker system

Overview

The Symphony DSP56374 is designed to support a wide range of digital signal processing applications that require substantial horsepower in a small package. This processor is also tailored to the specific demands of consumer and automotive audio applications. It includes a powerful set of built-in audio peripherals and embedded software modules. The Symphony DSP56374 provides a wealth of audio processing functions, including an operating system, various equalization algorithms, signal generator, tone control, fade/balance, level meter/spectrum analyzer and many more. The Symphony DSP56374 also supports a number of matrix decoders and sound field processing algorithms.

The Symphony DSP56374 combines the high performance, single-clock-per-cycle DSP56300 core family of programmable CMOS digital signal processors (DSPs) with the audio signal processing capability of the Symphony™ DSP Family. This design retains code compatibility with Freescale's popular DSP56000 core family of DSPs but provides twice the level of performance.

Features

High-Performance 24-bit DSP56300 Core

- High-performance 150 million instructions per second (MIPS) using an internal 150 MHz clock at 1.25V
- Object code-compatible with the DSP56000 core
- Data arithmetic logic unit (ALU) with a 24 x 24-bit multiplier accumulator and a 56-bit barrel shifter
- Six-channel DMA controller
- Program control with position independent code support and instruction cache support
- Very low-power, fully static CMOS design with operating frequencies down to DC
- STOP and WAIT low-power standby modes

On-Chip Debug Interface

- Internal address tracing support and On-Chip Emulation (OnCE™)
- JTAG port

On-Chip Memory Configuration

- Various memory switches are available
 - 6K x 24-bit Y-Data RAM and 4K x 24-bit Y-Data ROM
 - 6K x 24-bit X-Data RAM and 4K x 24-bit X-Data ROM
 - 6K x 24-bit Program RAM
- 20K x 24-bit Program and Bootstrap ROM including a PROM patching mechanism

Phase-Locked Loop (PLL)

- PLL allows the processor to operate at a higher internal clock frequency derived from a low-frequency clock input
- Clock generator performs low-power division and internal clock generation

Enhanced Serial Audio Interface (ESAI)

- Two dedicated Tx and four selectable Tx/Rx signals
- Time division multiplexing network compatible with up to 32 words per frame
- Can be configured as a master or a slave
- Supports many programmable protocols such as I²S, Sony, AC97 and network
- Dual ESAI ports available on 80-pin package

Benefits

- Designed to provide the high performance necessary for many audio applications
- Allows easy migration from DSP56000 Family Devices
- Enhances performance by allowing multiple instructions to be executed in a single cycle
- Allows implementation of double-precision (48-bit) arithmetic operations
- Allows for data movement independent from core
- Supports flexibility in code development

- Allows for real-time software development, software download to on-chip or on-board RAM, software running and debug with full-speed operation and breakpoint capability, and the ability to modify all user-accessible registers, memory and peripherals

- Allows flexibility to allocate memory between data memory and program memory depending on the application

- Lower frequency clock input can reduce the overall electromagnetic interference generated by a system
- Ability to oscillate at different frequencies reduces costs by eliminating the need to add additional oscillators to a system

- Glueless connection to industry standard codecs (I²S, left justified, right justified and AC97)
- Full-duplex serial port for serial communications with other DSPs, MPUs and MCUs

Documentation

DSP56300FM	DSP56374 Family Manual
DSP56374	DSP56374 Data Sheet
DSP56374UG	DSP56374 User Guide
DSPDECODERMSC	Audio DSP Part Decoder
SG1004	Digital Signal Processors and Controllers Selector Guide

Package Options

DSPB56374AE	52 LQFP	0° C to 70° C
DSPD56374AE	52 LQFP	0° C to 70° C
DSPB56374AEC	52 LQFP	-40° C to 85° C
DSPD56374AEC	52 LQFP	-40° C to 85° C
DSPB56374AF	80 LQFP	0° C to 70° C
DSPB56374AFC	80 LQFP	-40° C to 85° C

Development Tools

DSPAUDIOEVMM1 \$750*

Generic motherboard that is used (along with a specific daughterboard) to demonstrate the abilities of the Symphony DSP5636x and DSP5637x families and provide a hardware tool to allow development of applications that use these devices

DSPD374DB1 \$250*

Daughterboard for DSPD56374 used with the DSPAUDIOEVMM1

DSPB374DB1 \$250*

Daughterboard for DSPB56374 used with the DSPAUDIOEVMM1

SUITE56 Free**

Robust tool suite for DSP56300 family of digital signal processors (DSPs) that includes an assembler, linker, simulator, debugger and several utilities

SDI Debugger Free**

Symphony™ Debugger Interface

*Prices indicated are MSRP

**Subject to license agreement and registration

Features

Serial Host Interface (SHI)

- Serial peripheral interface protocol
- Inter-integrated circuit (I²C) protocol
- Multimaster capability in I²C mode
- 10-word receive FIFO
- Support for 8-, 16- and 24-bit word

Triple Timer Module

- Programmable mode of operation
- Timer mode, measurement mode, PWM mode and watchdog mode
- Common prescaler
- Software polled or interrupt driven
- Three timers

Hardware Watchdog Timer

- Based on a 16-bit free-running down counter
- Timeout period is user specified
- Used to recover from runaway code

General Purpose Input/Output (GPIO)

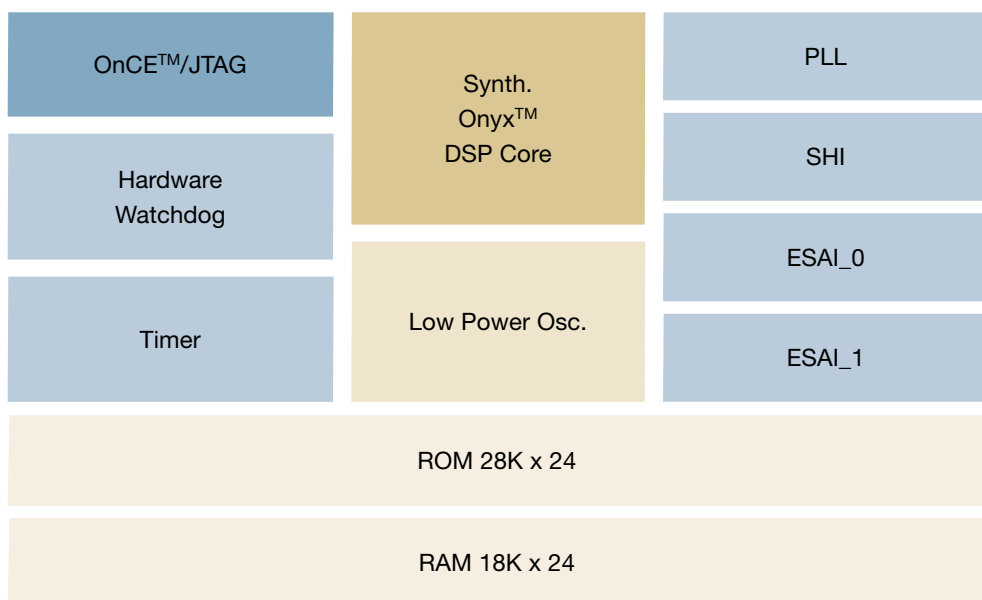
- Most unused peripheral pins may be programmed as GPIO
- Up to 47 GPIO on 80-pin package
- Up to 20 GPIO on 52-pin package
- Can be used for an array of functions in customers' systems

Benefits

- High-speed synchronous communication between multiple DSPs or between DSP and MCU or between DSP and serial peripherals
- Designed to provide a simple, efficient method of data exchange between devices

- Flexible, programmable timer system

Symphony DSP56374



Learn More: For current information about Freescale products and documentation, please visit www.freescale.com/symphony.