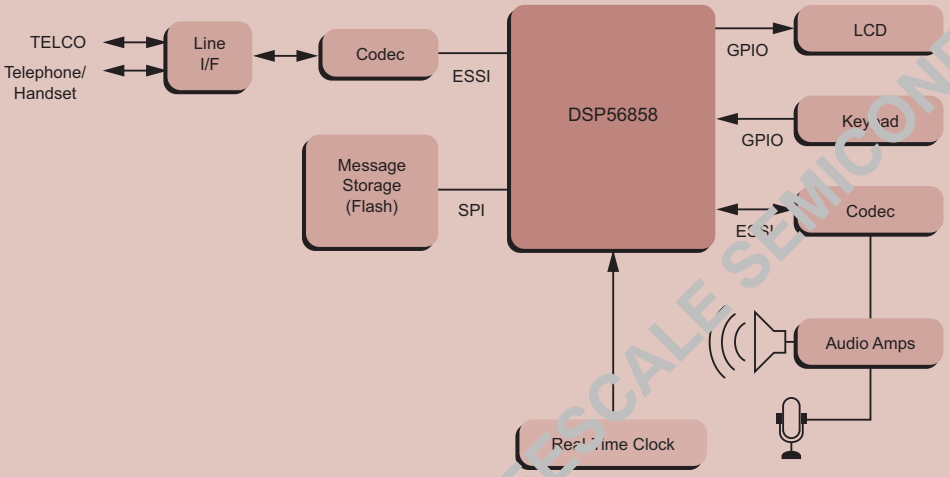
Digital Answering Machine

Overview

A single hybrid-architecture device, incorporating both a microcontroller (MCU) and a digital signal processor (DSP), offers the peripherals needed to produce a digital telephony answering device (DTAD) at a low cost.

SAMPLE DESIGN: DIGITAL TELEPHONY ANSWERING DEVICE



Key Benefits

> Single-device solution combines MCU functionality and DSP processing power

> Inexpensive ESSI connections to Codec/DAA

> GPIO ports for LCD and keyboard connection

> Variety of vocoders and telephony algorithms available

> Integrated real-time clock

> Out-of-the-box software components designed to expedite time-to-market and reduce development costs

Freescale Ordering Information

Part Number	Product Highlights	Additional Information
DSP56853	120MHz, 120MIPS, 2 SCI, SPI, ESSI, HI, EMI, COP, DMA, TOD, Quad Timer and > 1K Boot ROM > 12K Program RAM > 4K Data RAM > Up to 2M program and 8M of data	MCU-friendly instruction set, Enhanced OnCE for debug, 6 channels of DMA, up to 4 programmable chip select signals, up to 41 GPIO available in a 128-pin LQFP.
DSP56854	120MHz, 120MIPS, 2 SCI, SPI, ESSI, HI, EMI, COP, DMA, TOD, Quad Timer and > 1K Boot ROM > 16K Program RAM > 16K Data RAM > Up to 2M program and 8M of data	MCU-friendly instruction set, Enhanced OnCE for debug, 6 channels of DMA, up to 4 programmable chip select signals, up to 41 GPIO available in a 128-pin LQFP.
DSP56855	120MHz, 120MIPS, 2 SCI, ESSI, EMI, COP, DMA, TOD, Quad Timer and > 1K Boot ROM > 24K Program RAM > 24K Data RAM > Up to 2M program and 8M of data	MCU-friendly instruction set, Enhanced OnCE for debug, 6 channels of DMA, up to 4 programmable chip select signals, up to 18 GPIO available in a 100-pin LQFP.
DSP56857	120MHz, 120MIPS, 2 SCI, SPI, 2 ESSI, HI, COP, DMA, TOD, Quad Timer and > 1K Boot ROM > 40K Program RAM > 24K Data RAM	MCU-friendly instruction set, Enhanced OnCE for debug, 6 channels of DMA, up to 4 programmable chip select signals, up to 47 GPIO available in a 100-pin LQFP.
DSP56858	120MHz, 120MIPS, 2 SCI, SPI, 2 ESSI, HI, EMI, COP, DMA, TOD, Quad Timer and > 1K Boot ROM > 40K Program RAM > 24K Data RAM > Up to 2M program and 8M of data	MCU-friendly instruction set, Enhanced OnCE for debug, 6 channels of DMA, up to 4 programmable chip select signals, up to 47 GPIO available in both a 144-pin LQFP and a 144 MAPBGA.

Design Challenges

As telephone systems become more sophisticated, even as costs are often decreasing, consumers expect a wider variety of features when upgrading equipment. Creating a DTAD that can meet these expectations requires components that offer the right combination of peripherals in a compact package at a reasonable cost.

Freescale Semiconductor Solution

Several of Freescale Semiconductor's 56800 devices are appropriate for a DTAD application. For example, as shown in the figure on page 1, the DSP56858 provides the following interfaces:

> SSI or ESSI peripherals for seamless connection to codecs (for user interface and Telco interface)

> A SPI for connection to a Flash card device

> An integrated time-of-day peripheral providing real-time clock

> Additional general purpose input/output (GPIO) ports for LCD and keypad support

Included in Freescale Semiconductor's Embedded Software Development Kit are:

> A wide variety of vocoder algorithms for voice compression.

> A comprehensive set of drivers and framework code, enabling quick completion of software application.

> The out-of-the-box software components for all on-chip peripherals, in combination with software libraries for motor control, communication, and signal processing, make it easy to develop the most demanding real-time embedded applications.

The figure on page 1 shows a sample design featuring the DSP56858 and a real-time clock at the heart of a DTAD. An ESSI connection supports a codec for user and Telco interfaces, and a second ESSI connects to a codec that enables audio amplification. An SPI provides a link to a message storage unit incorporating Flash. A GPIO connects to an LCD and another GPIO connects to a keypad.

Development Tools			
Tool Type	**Product Name**	**Vendor**	**Description**
Software	MSW3SDK000AA	Freescale Semiconductor	Software infrastructure that allows development of efficient, high level software applications that are fully portable and reusable across all DSP56800/DSP56800E family of processors.
Software	CWDSP56800E	Freescale Semiconductor	CodeWarrior Software Development Tools for DSP56800E (Metrowerks)
Hardware	DSP56858EVM	Freescale Semiconductor	Evaluation Module for the DSP56858, DSP56857, DSP56855, DSP56854, and DSP56853
Hardware	TDC1	Freescale Semiconductor	Daughter Card for DSP56858EVM that has Telephone Connector, Display, and Keypad

Disclaimer

This document may not include all the details necessary to completely develop this design. It is provided as a reference only and is intended to demonstrate the variety of applications for the device.

Notes

Learn More: Contact the Technical Information Center at +1-800-521-6247 or +1-480-768-2130.
For more information about Freescale products, please visit **www.freescale.com**.

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