

Renesas Demonstrates Low-cost H8S Solution that Enables High-quality LCD Displays for a Wide Range of Cost-sensitive Markets

Home appliances, fitness equipment, and many other products can incorporate TFT and STN graphics displays up to QVGA size.

SAN JOSE, Calif. — April 2, 2007 — Embedded Systems Conference — Renesas Technology America, Inc. today announced the first 16-bit H8 microcontroller-based evaluation platform that demonstrates an LCD direct drive capability for supporting QVGA size TFT and STN LCD panels. Because it can directly operate LCD panels, this advanced board eliminates the need for a separate LCD controller, decreasing overall system cost and shortening time to market.

The LCD evaluation demo board combines the Renesas H8S/2378 microcontroller and a graphic software/GUI (graphic user interface) package from Segger Microcontroller Systems, providing a low-cost solution that opens vast new markets. The supported Segger software includes library routines for creating any form of high-quality images on the display. When running the Segger software, the demo evaluation board can support full-screen animations at 25 frames per second on a QVGA size panel. This capability can be applied to produce smooth GUI selection menus, as well as custom animated screen images on the display panel.

"The single-chip H8S/2378-based hardware and software solution allows high-quality LCD panels to be incorporated into cost-sensitive applications," said Ritesh Tyagi, director of marketing, system LSI business unit, Renesas Technology America, Inc. "As a result, refrigerators, ovens, thermostats, electronic utility meters, medical monitoring and many other products can offer LCD displays that simplify operation and present data in visually appealing formats."

"Using the Renesas software application programming interface (API), Segger is able to offer its emWin and embOS software products with the H8S/2378 microcontroller for LCD applications. The Segger emWin product allows users to quickly and easily generate complex images with 2D graphics and animation support as well as user defined text font support. The embOS product complements the multi-bus and multiple direct memory access (DMA) architecture of the H8S/2378 device, handling software multi-tasking at minimal cost," said Shane Titus, President at Segger Microcontroller Systems.

Almost no CPU overhead is used to drive the LCD panel

The H8S/2378 microcontroller has ample speed (35MHz) and highly integrated peripherals for performing real-time control tasks. It also removes the requirement of an external LCD controller with a frame buffer, by using the multi-bus architecture and the on-chip external DMA controller to drive data from the external frame buffer to the LCD panel. The control signals are synchronized to data transfer by using a timer pulse unit (TPU). The on-chip functions operate LCD panels in a fully time-deterministic way, imposing virtually no overhead on the device's 16-bit CISC CPU core. Thus, the device is able to perform all other system connection algorithms and functions. In addition, the chip's bus architecture, combined with the single-cycle access capability of the built-in flash memory, allows low clock frequencies for driving LCDs and performing MCU functions. The low clock frequencies reduce electromagnetic interference/electromagnetic susceptibility (EMI/EMS) levels and decrease power consumption.

The Segger software has been optimized for use with the H8S/2378 LCD solution, communicating via the software API. The software allows complex images with graphics, text and animation to be quickly and easily generated on the LCD panel.

Product Name	Part Number	Package	Availability/Price
H8S/2378 MCU	DF2378BVFQ35V	144 pin LQFP 20mm x 20mm 0.5mm pin pitch	NOW/\$8
H8S/2378LCD demo kit	LCD2378KIT	-	Q2/2007*

*For pricing of the LCD demo board, please contact Renesas' local sales representatives.

About Renesas Technology Corp.

Renesas Technology Corp. is one of the world's leading semiconductor system solutions providers for mobile, automotive and PC/AV (Audio Visual) markets and the world's No.1 supplier of microcontrollers. It is also a leading provider of LCD Driver ICs, Smart Card microcontrollers, RF-ICs, High Power Amplifiers, Mixed Signal ICs, System-on-Chip (SoC), System-in-Package (SiP) and more. Established in 2003 as a joint venture between Hitachi, Ltd. (TSE:6501, NYSE:HIT) and Mitsubishi Electric Corporation (TSE:6503), Renesas Technology achieved consolidated revenue of 906 billion JPY in FY2005 (end of March 2006). Renesas Technology is based in Tokyo, Japan and has a global network of manufacturing, design and sales operations in around 20 countries with about 26,200 employees worldwide. For further information, please visit <http://www.renesas.com>

###

Specifications: Renesas Technology H8S/2378 LCD Microcontroller

Item	H8S/2378 Specifications
Product name	H8S/2378
Type name	DF2378BVFQ35V
CPU core	16-bit H8S core
Maximum operating frequency	35MHz
Power supply voltage	3.0V to 3.6V
On-chip flash memory	512 Kbytes
On-chip RAM	32 Kbytes
Address bus space	16 Mbytes
Bus state controller	External data bus width: 8/16 bits
On-chip peripheral functions	Data transfer control (DTC) x 85 channels
	DMA controller (DMAC) x 4 channels
	External DMA (ExDMA) x 2 channels
	Timer pulse unit (TPU) x 6 channels
	8-bit timer (TMR) x 2 channels
	16-bit programmable pulse generator (PPG)
	Watchdog timer (WDT) x 1 channel
	Serial communication interface (SCI) x 5 channels (asynchronous or clocked synchronous serial communication capability)
	I ² C bus interface x 2 channels
	A/D converter (10-bit resolution) x 16 channels
	D/A converter (8-bit resolution) x 6 channels
	Clock pulse generator (CPG)
	On-chip H-User debug interface (E10A-USB compatible)
	I/O pins: 96
Power-down modes	6 modes: Sleep, Software standby, Hardware standby, Module stop, Deep software standby, All modules clock stop
Package	144-pin LQFP (lead-free specification)

###

Item	H8S/2378 LCD Demonstration Kit Specifications
Product name	H8S/2378 LCD Demonstration Kit
Type name	LCD2378KIT
MCU usage	DF2378BVFQ34V
On Board Crystal Frequency	17MHz
External Power supply voltage	5v
LCD Panel Used	QVGA TFT Display
	Physical size : 5.7 inch diagonal
	Display Format : 320 (H) x 240 (V) pixels
	Color resolution: 16bpp (RGB565) driven onto 18bpp (RGB666). Lower bit replication for R and B.
LCD Panel Physical Connectivity	Demonstration Daughter card to Adapter card through flexi cable
Packaging	LCD panel mounted onto board with harness brackets