SHARP

LH77790

Product Brief — Microcontroller with LCD Interface

FEATURES

- Highly Integrated Single Chip CPU and System Logic
- 25 MHz, 5 V ARM7DI™ CPU (16.7 MHz, 3.3 V)
  - Ideal for Low Power, Low Cost Applications
  - Small 32-Bit High-Performance CPU Core (Approximately 40,000 Transistors)
  - On-Chip Hardware Debugging and Emulation
  - On-Chip 2K Byte Cache, 4-Way Associative, Write-Back Optimizes Performance
  - Very Fast Interrupt Response
    Uses FIQ Registers set as 'Shadow' Registers
    No Need to Push Registers to Stack
  - On-Chip 2K Byte SRAM (5.5K Byte Without Cache) for Fast Access to Critical Data or Code
- Programmable Clock and Power Management
- Hardware Watchdog Timer
- Three Programmable Pulse Width Modulator Channels
- Three 16-Bit Counter/Timer Channels
- Programmable Peripheral Interface (PPI)
  - Three 8-Bit Ports
  - Basic I/O
  - Strobed I/O
  - Strobed Bidirectional I/O
- Three UARTs
  - Programmable Baud Rate
  - Modem Support
- Monochrome LCD Controller
  - Programmable Resolution: up to 1024(V) × 2048(H)
  - Four Gray Shades
  - Horizontal/Vertical Scrolling
  - Single/Dual Scan
- Infrared Interface
  - IrDA Protocol, Up to 115.2Kbps
  - SHARP DASK, Up to 57.6Kbps
- On-Chip Interrupt Controller
  - Supports Internal and External Sources
- Simplified No-Glue Memory Interface
  - 26-Bit Address Bus
  - 16-Bit Data Bus (Reduces External Memory Cost)
  - Six Programmable Chip Selects
  - Supports Single/Dual ×8 EPROM (Reduces Cost and Complexity)
  - Supports DRAM (Normal/Page Modes), SRAM, and Flash in Mixed Mode
- External Bus Master Support
  - Allows External Control of Memory Interface
  - Allows Access to On-Chip Memory, Peripherals, and SRAM/DRAM Controllers

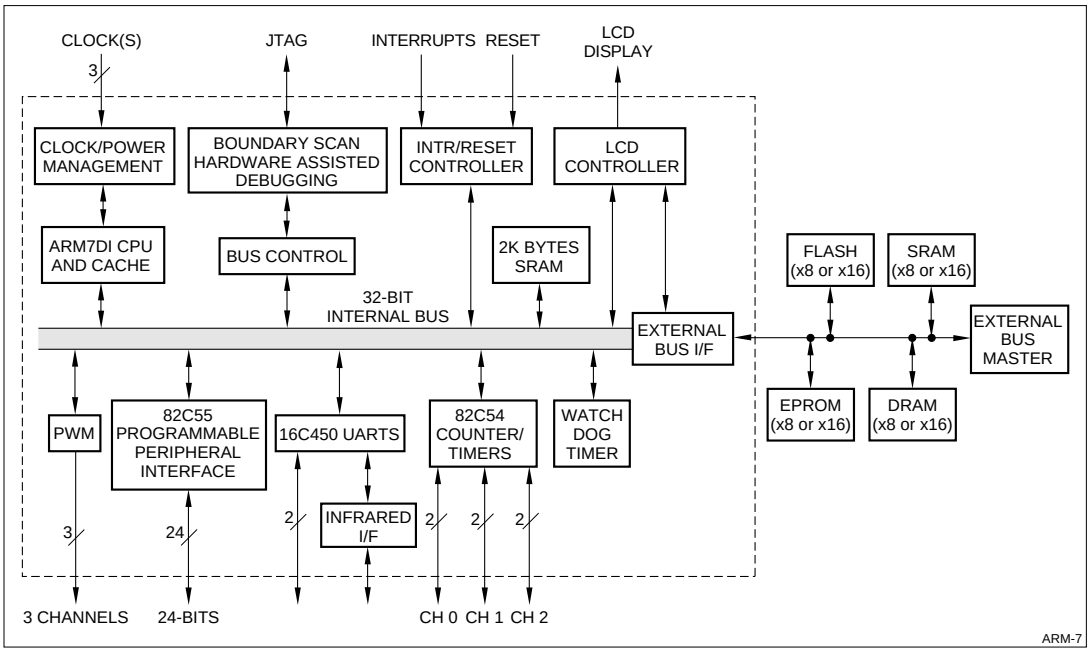

Figure 1. LH77790 Block Diagram

FUNCTIONAL DESCRIPTION

SHARP's LH77790 Microcontroller has features that make it ideal for advanced portable systems that display information on LCDs and require a high level of integration. The Microcontroller is housed in a 160-pin plastic TQFP (Thin Quad Flat Pack). Real-time operations are supported by a 2K byte (expandable to 5.5K byte) scratch pad SRAM where interrupt service and other general-purpose routines/data can be stored. Three on-board UARTs facilitate serial interfaces to modems and other subsystems requiring baud-rate generators. One of the UARTs supports IrDA infrared communications.

A programmable resolution LCD controller connects directly to monochrome LCD panels. The controller is flexible, fully programmable, and supports up to four shades of gray scaling. Three counter/timers allow control of critical time-dependent functions. These counter/timers are fully programmable. Fully programmable Interrupt Controller supports internal and external sources.

The external memory interface allows access to 8-bit, 16-bit DRAMs, SRAMs, Flash, and EPROMs, or other non-volatile memories, which reduces overall system cost. The memory interface is comprised of a 16-bit Data bus, 26-bit Address Bus, Write Enable, Output Enable, Six Chip Selects (64M byte address space per chip select), RAS and CAS controls. An External Bus Master can take control of the memory interface as well as use the on-chip SRAM/DRAM controller to access external memory and on-chip memory and peripherals. Three pulse-width modulators allow precise DC motor control, LCD gain/contrast, sound generation and other control functions. A 24-bit, programmable, parallel input/output port ensures flexible interfacing to practically any system.

APPLICATIONS

- Point-of-sale and inventory applications such as bar-code scanners and portable inventory controllers.
- Industrial instrumentation such as portable oscilloscopes, logic analyzers, and spectrum analyzers.
- Medical equipment such as portable cardiometers, EKG/EEG, advanced exercise machines, and patient monitors.
- Ideal for handheld personal equipment such as digital assistants, GPS, handheld communication devices, and games.

FOR MORE INFORMATION CONTACT:

- Len Elias – (360) 834-8966, Fax: (360) 834-8984
- Mike Roberts – (360) 834-8791, Fax: (360) 834-8611
- Raed Sabha – (360) 817-8426, Fax: (360) 834-8611

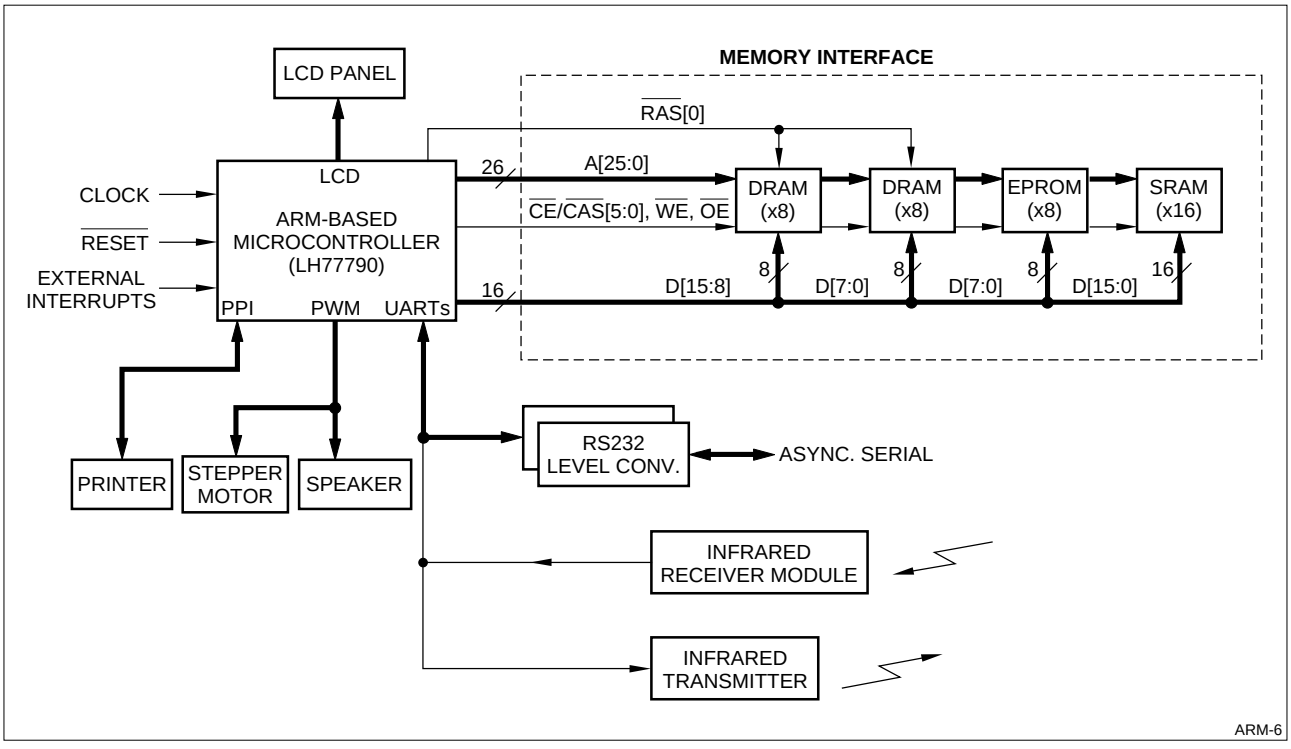

Figure 2. Application Example

ARM7DI is a trademark for Advanced RISC Machine.

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