Embedded System Design: A Unified HardwareSoftware Introduction

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Synopsis: This book introduces a modern approach to embedded system design, presenting software design and hardware design in a unified manner. It covers...
An embedded system example -- a digital camera

- Microcontroller
- CCD preprocessor
- Pixel coprocessor
- A2D
- D2A
- JPEG codec
- DMA controller
- Memory controller
- ISA bus interface
- UART
- LCD ctrl
- Display ctrl
- Multiplier/Accum

Digital camera chip
- Lens
- CCD
- Single-functioned -- always a digital camera
- Tightly-constrained
- Low cost, low power, small, fast
- Reactive and real-time -- only to a small extent

This book introduces a modern approach to embedded system design, presenting software design and hardware design in a unified manner. It covers trends and challenges, introduces the design and use of single-purpose processors ("hardware") and general-purpose processors ("software"), describes memories and buses, illustrates hardware/software tradeoffs using a digital camera example, and discusses advanced computation models, controls systems, chip technologies, and modern design tools. In today's world, embedded systems are everywhere - homes, offices, cars, factories, hospitals, planes, and consumer electronics. Their huge numbers and new complexity calls for a new design approach, one that emphasizes high-level tools and