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Optimizing Design Through ASIC

Product Brief   **TF-331**

TF-331 Web Server Controller

The TF-331 Web Server Controller provides a very low cost, high performance SoC solution for consumer, networking and industrial device manufacturers that require remote monitoring, control and management through the LAN or Internet using a Web browser via broadband or dial-up network.
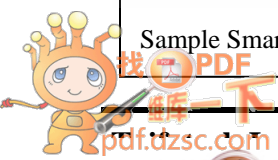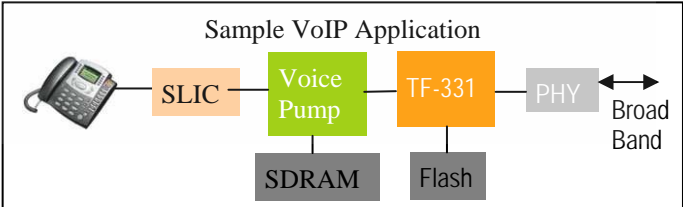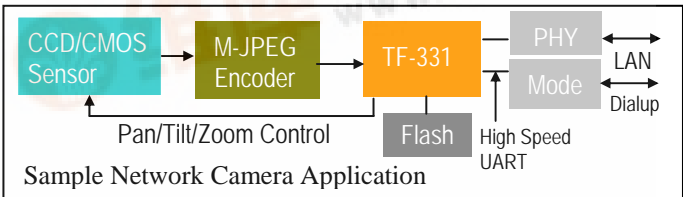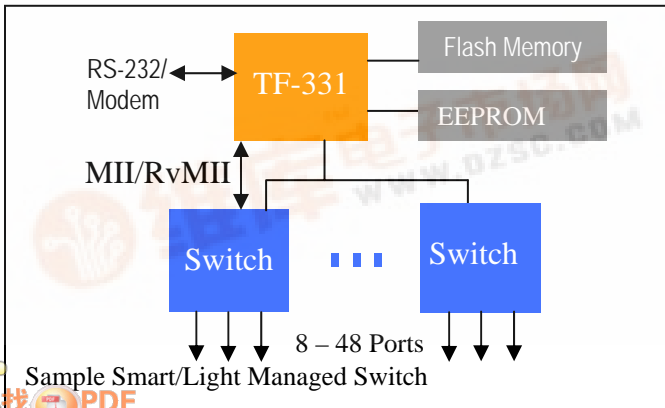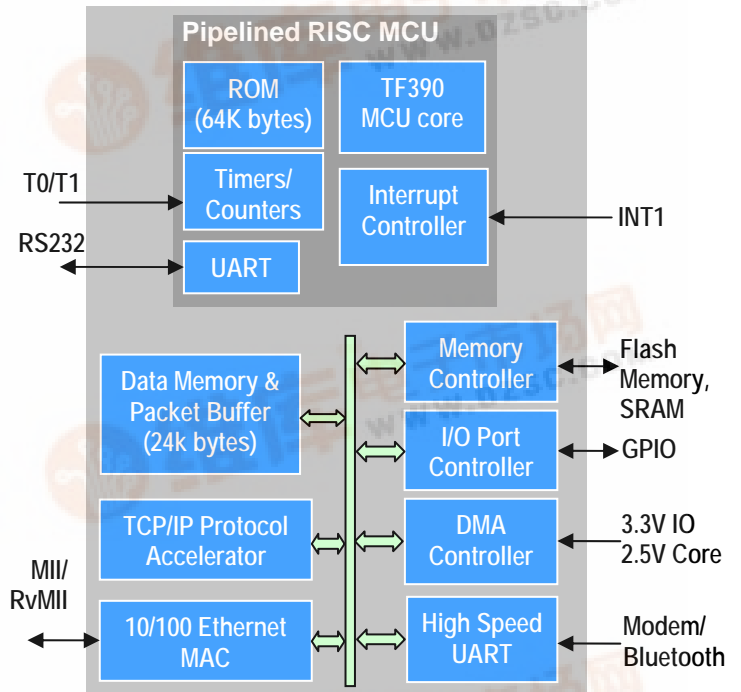
TCP/IP protocol stack and networking utilities are embedded in the internal 64KB ROM which reduces software development efforts and improves performance. The TF-331 includes two UARTs, (one supports high speed, up to 1Mbps), a 10/100M Ethernet MAC and five GPIO ports to connect different devices. The performance of the TF-331 is further improved with the use of hardware Protocol Accelerators and flexible DMA engines.

The hardware Protocol Accelerator in the TF-331 accelerates the handling of TCP, IP, UDP and ICMP protocols. Nine DMA channels are used for data transfer, no CPU intervention is required to serve these functions. The pipelined RISC CPU in the TF-331 is used for handling high-level protocol layer applications. Up to 4MB of SRAM and Flash memory can be addressed by the TF-331.

The HTTP server software and most applications can be run using the embedded 24KB of SRAM without adding any external memory.

The high speed UART interface can be used for connecting to devices such as Bluetooth or modem. The built-in 10/100Mbps Ethernet MAC on the TF-331 allows easy connection to the LAN. When connected to the LAN, the external flash write access capability can be used for online firmware update.

With the bundled HTTP Server software and the low memory requirements, the TF-331 is the most cost effective solution for implementing an embedded web server design.

Sample Smart/Light Managed Switch

Sample Network Camera Application

Sample VoIP Application

TF-331 Web Server Controller

HARDWARE FEATURES

- **MCU**
  - 8 bit pipelined RISC TF390 core, 60MHz operating frequency, single cycle per instruction
  - Software compatible with standard 8051 and 80390
  - Supports up to 4M bytes Flash and 4MB SRAM without bank select
  - Five 8-bit GPIO ports
  - Two timers
- **Build-in 10/100Mbps MAC**
  - Selectable MII or Reverse MII interface
  - 802.3x flow control for full duplex mode and Jamming flow control for half duplex mode
- **High speed (up to 1Mbps) UART**
- **Embedded 24K bytes SRAM for packet buffer and data memory**
  - Adjustable 4K~24K bytes for Ethernet packet buffer
  - Selectable 0K/4K/8K/16K bytes for zero-wait state program mirror execution
- **Built-in Internet Protocol Accelerator**
  - ✓ Flexible L2, L3 filters to increase efficiency
  - ✓ BPDU handling for SPT protocol
- **Embedded 64K bytes ROM for high speed program execution and production burn-in test**
- **Supports 16 bit IO**
- **Dedicated 16/22 bit address and 8-bit data bus for external program, data memory and extended IO**
- **Supports external flash write access, and external flash and external SRAM swap for online firmware upgrade**
- **Supports 9 DMA channels, one active at a time, up to 32K bytes for each DMA session**
- **Supports 256 bytes/Auto (4K bytes) linear access window**
- **Supports 5 transmit descriptors for MAC**

- **Supports WDT for Hardware and Software fatal error protection**
- **Power saving mode**
- **Customer IDs support**
- **0.25um CMOS technology, 2.5V internal operation, 3.3V IOs**
- **100-pin LQFP package**
- **TF-331-ACL complies with RoHS.**

SOFTWARE FEATURES
  - Embedded TCP/IP Protocol Stack
  - Bundled HTTP Server Software
  - IP, UDP, TCP and ICMP Protocol Accelerator support
  - Supports SNMP and Spanning Tree for light managed switch
  - telnet, SMTP, UPnP support

BENEFITS
- **Ability to manage devices via Web Browser over LAN, Internet or dial-up modem**
- **Enables a new generation of light managed switch with lower cost and better performance**
- **Provides software utilities which is stored in internal 64K ROM to reduce software development time and improve performance**
- **4MB addressing space allows larger programs**
- **Supports various packet filtering function for increased performance**
- **Embedded 64K ROM for high speed program execution**
- **Wide spectrum of applications**
  - Smart Switch SNMP switch
  - Internet appliances
  - Lighting Management
  - Network cameras
  - Security systems, cameras and gates
  - Projectors and monitor walls
  - UPS and remote hardware monitoring
  - Industrial controllers and machines

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