

TC90400XBG/FG Single-chip Solutions for Digital TV

Highlights

- Highly integrated system-on-chip (SoC) for digital TV that incorporates a high-performance 64-bit RISC processor and three highly optimized DSP processors
- Support for worldwide TV standards (ATSC, DVB & ARIB)
- Complete reference system with software and middleware support for quick product deployment
- Software and middleware based on Linux OS
- Common API support for middleware and application development
- Decode single- or dual-standard definition streams or single high-definition stream
- Decode up to three audio streams
- Two analog outputs and two digital outputs
- One ITU-R656/R601 input for video capture
- Unified memory architecture for optimum system cost
- Built-in MPEG-2 decoder, high-performance scalar and graphics controller for high-quality video output
- Support for HDD connection
- Low-power SoC with power-down modes

Description

The TC90400XBG and the TC90400FG are the first two members of the TC904XX family of products targeted for digital TV applications. The TC90400XBG/FG devices are highly integrated system-on-chip solutions with comprehensive support for worldwide TV standards. Systems based on the TC90400XBG also support hard-disk drive applications.

With capability to decode multiple standard definition streams or single high-definition streams, the TC90400XBG/FG can display content in standard-definition resolution (720 x 480) or half high-definition resolution (up to 960 x 1080). The TC90400XBG/FG can also output standard 480i analog output to support VCRs. This analog output can also be used to feed CRT TV for display of digital transmission.

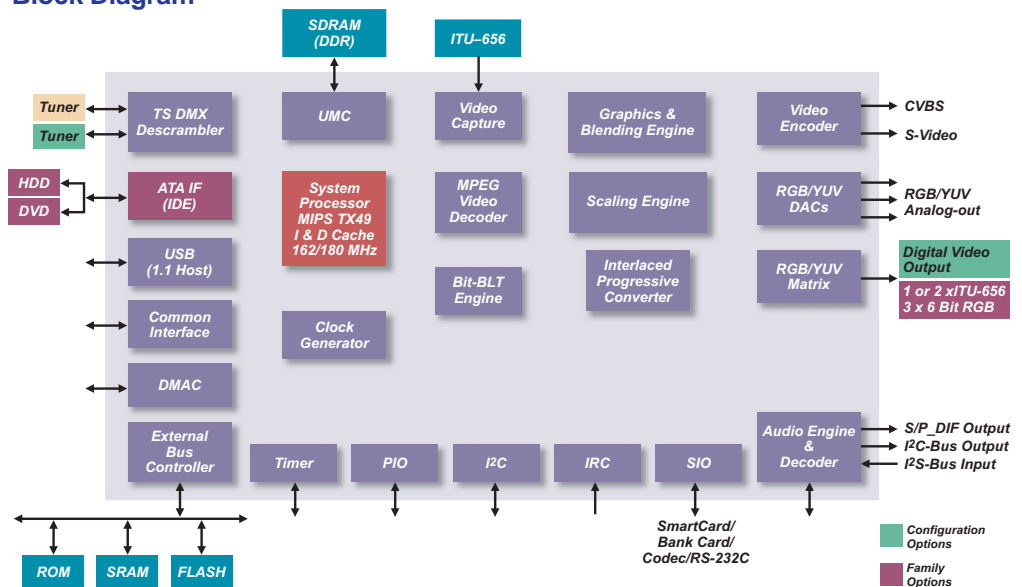
The TC90400XBG/FG devices use multiple DSP engines to perform compute-intensive, multimedia operations to offload

the main CPU for efficient system management of demanding digital TV applications. These devices support a unified 16-bit DDR memory system, as well as a NAND and NOR flash memory controller to reduce overall system cost.

Features

- 180 MHz TX49/L3 64-bit MIPS RISC core
 - 8 KB each I & D cache
 - Unified memory system
 - DDR SDRAM controller (16-bit, 144/162/180 MHz)
 - NAND & NOR Flash support
- Transport Stream Processor
 - Fully compliant to ATSC, ARIB and DVB
 - Supports HDD recording and playback
 - Descrambler (Multi2, DES/TDES, DVB, AES)
- Video Decoder (SD decoding)
 - MPEG-2 decoding (MP@ML and MP@SL) and MPEG-1 decoding
 - Single- or dual-MPEG-2 decoding
- Video Decoder (HD decoding)

Block Diagram



Product Brief

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- MPEG-2 decoding for MP@HL for ATSC and BS-Digital
- HD Decoding
 - Display in HD resolution up to 960 x 1080
 - 720p or 1080i compliant
- HD-to-SD down-conversion
 - Display in SD resolution
- Audio Processor
 - MPEG- Audio, Dolby AC-3, AAC decoding
 - Multi-stream decoding (up to 3 streams)
 - Audio post-processing (firmware options)
 - S/P-DIF Transmitter (IEC-60958/61937)
- Graphics Engine
 - Two planes (YUV/Graphics)
 - Alpha blending and video scaling
 - Progressive scan (I/P conversion by line-interpolation)
- Video output
 - Support two different video signals (from independent sources)
 - Video encoder (PAL, SECAM, NTSC)
 - RGB & YUV output (analog & digital)
 - 5 DACs (CVBS/S-Video, RGB/YUV)
 - 3 x 6-bit RGB-output for LCD display
 - 2 x 4:2:2 YUV Digital-Output (ITU R656/R601)
 - VBI re-insertion (Teletext, WSS, closed-caption, video-ID/CGMS-A)
 - Macrovision copy protection (version 7.1L1 and rev1.2 for progressive)
 - Interlaced or progressive output
- Interfaces and Peripherals
 - 8/16-bit ITU R656/R601 input
 - 8/16-bit local bus for NAND/NOR flash and other I/O devices
- Smart card and DVB-CI interface (2 ch each)
- IDE interface, DMA controller (2 ch), SIO (4 ch), PIO (32), timer/counter (three 24-bit), I²C (2 ch), USB 1.1 host (12 Mb/sec), real-time clock, IR-decoding
- Power-down and standby operations
- Package
 - TC90400XBG – 272-pin PBGA
 - TC90400FG – 208-pin QFP

TC90400XBG/FG Development Tools

Reference Board:

Global DTV Reference System

Operating System:

Monta Vista Software, Inc.: Monta Vista Linux

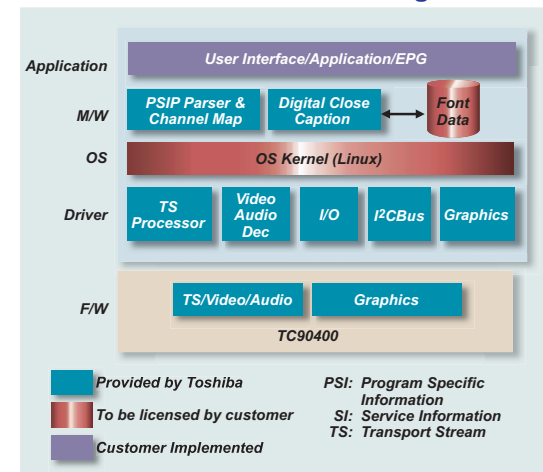
Development Tools:

Compilers, debugger and assemblers

Software Support:

Firmware, Device Drivers, ATSC middleware and Unidirectional Digital Cable Ready (UDCR)

TC90400 Software Structure Diagram



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