

# Grain Media GM7020 RISC Platform

RISC CPU Platform for Various/Multimedia Applications

AUDIO SOLUTION

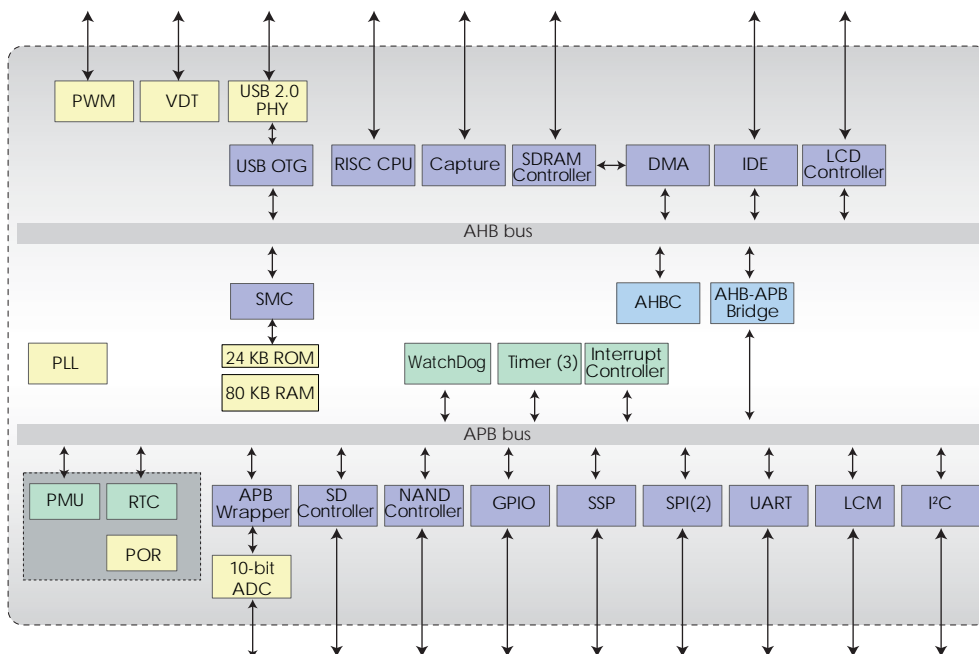
## Overview

GM7020 is an SoC platform which integrates a 32-bit RISC CPU, a media coprocessor and peripheral functionalities for developing high-performance and low-power portable devices. It incorporates several of Faraday's proprietary technologies, such as silicon-proven IPs, CPU architecture optimized for multimedia processing, and ultra-low power design technology to present the leading MIPS/mW performance among the industry.

GM7020 supports various popular audio formats, including the MP3 encoder/decoder, WMA decoder and IMA ADPCM codec. It also supports multiple video decoders, such as the JPEG/MEPG-4 decoders. Comprising interfaces of NAND flash, SD/MMC and IDE, GM7020 supports both the flash and HDD-based storage devices. Furthermore, the built-in SPI, IS, I2C and other interfaces can also ease customers' efforts to customize for various applications.



## Chip Block Diagram



## Applications

- OTG Mini Combo
- Car media center
- Low-power MP4 solution
- Low-power OTG DPF
- Various media solutions

## Algorithm

- IMA ADPCM
- MPEG-1/2/2.5 MP3
- WMA v7
- JPEG





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## Hardware Key Features

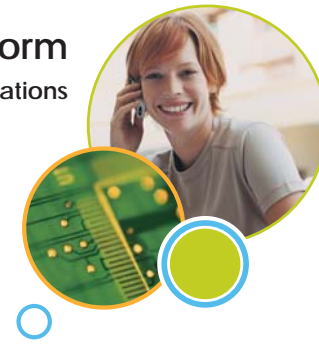
- Embedded 32-Bit RISC Controller
  - 32-bit RISC CPU with 8K/8K instruction/data cache
  - Instruction compatible with ARMv4® architecture
  - 80 KB on-chip RAM
  - 24 KB on-chip ROM
  - Clock speed up to 266 MHz
  - Standard JTAG interface
- USB 2.0 High-Speed (HS) OTG Interface
  - Up to 480 Mbit/s transfer speed
  - USB 2.0 HS/FS physical including OTG support
  - USB 2.0 HS/FS digital core including OTG host
  - DMA bus master functionality
  - Supports 8 endpoints
- External Memory Controller
  - 16-bit SDRAM interface up to 512 Mbit
  - SPI interface for SPI NOR flash
- 10-bit ADC
  - 7 channel MUX input, for key pad, voice recording, battery level detection and touch panel application
  - Maximum conversion rate of 200 kHz
- Video Capture Interface
  - Supports CCIR-656 standard protocol
  - 8-bit data depth
- IDE Controller
  - Supports PIO/DMA mode
  - Hardware interface in conformance with the ATA-7 rev.1 specification
  - Programmable 8-/16-bit mode
- GPIO
  - Each port can separately trigger a GPIO interrupt
  - The interrupt generation of each port can be triggered at the rising edge, falling edge, both edges, high level and low level
  - Supports the programmable sampling rate for all I/O ports
  - Output data bit can be set or cleared separately
  - All ports are set to the input mode by the hardware reset



- NAND Flash Interface
  - Supports 8-/16-bit SLC/MLC flash
  - Hardware 4-bit ECC
  - Supports 8 MB to 1 GB of the NAND flash memory with the page size of 512/2 KB
  - Supports up to 4 CE pins
- MMC/SD Interface
  - MMC/SD 2.0 Card host for multiple card support
  - 4 data line support for SD cards
- LCD Controller Interface
  - Resolution programmable up to 1024 x 768
  - Supports CCIR656 and Serial RGB output
  - 8-bit LCM
- SPI Controller/ I<sup>2</sup>S Interface
  - Provides the Motorola Serial Peripheral Interface (SPI) and the Philips I<sup>2</sup>S functionalities
  - Programmable I<sup>2</sup>S format (including the zero bit padding and right or left justification)
  - Input multiplexed with audio subsystem
  - Dedicated dual-port buffer RAM
- I<sup>2</sup>C 2-Wire Serial Control Interface
  - Master and slave operation
  - Standard and fast modes, support general purpose IO interface
  - Up to 4x 8-bit ports
- PMU (Power Management Unit)
  - Provides fixed clocks for each peripheral unit
  - Provides a method to change the PLL frequency and various power modes, including normal mode, turbo mode and sleep mode
- RTC
  - The RTC output set to 1 Hz and utilized as a system timekeeper
  - 9  $\mu$ A power consumption only
  - Power-on reset
- UART Controller
  - Firmware compatible with high-speed NS 16C550A UART
  - Hardware-configurable 16 transmit/receive FIFOs
  - Programmable baud rates up to 1152 kbps

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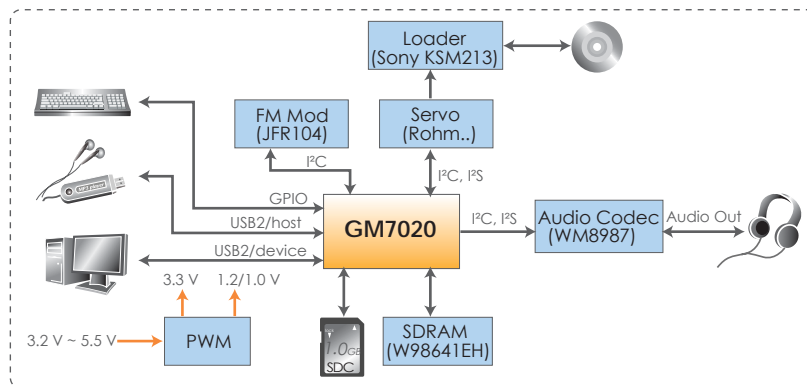


### Software Key Features

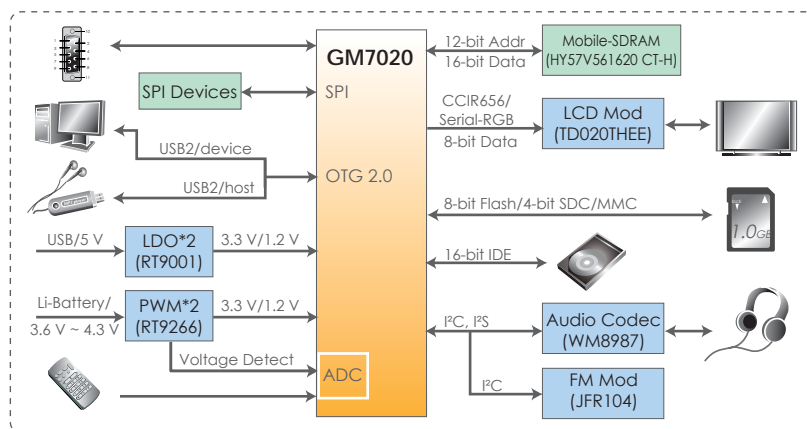
- Multimedia enhanced ARMv4 architecture CPU; max. speed: 266 MHz (1.2 V)
- eCOS SDK for easy development and compact code size
- Software tooling for production and user program update
- GUI demo program
- Wiggle ICE and EV board for development
- Multimedia formats supported:
  - IMA ADPCM encoder/decoder
  - MPEG-1/2/2.5 audio layer 3 encoder
  - MPEG-1/2/2.5 audio layer 3 decoder
  - WMA 9.0 decoder
  - DRM10
  - JPEG decoder
  - MPEG-4 video decoder
  - OS supported: eCos

### System Block Diagrams

#### • Mini Combo



#### • MP4 Player



#### • In a Capsule

Technology	0.13 $\mu$ m CMOS Process
Core/IO voltage	1.2 V/3.3 V
Max. frequency for CPU/AHB (SDRAM)	266/133 MHz @ 1.2 V
Package type	TFBGA-180 LQFP-216



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Flyer version no. GM-2008-03