Hi3751 V600 Brief Data Sheet

Key Specifications

Key Features

- 64-bit CPU
- High-performance DTMB
- 4K x 2K high-quality graphics processing engine
- 4K x 2K@60 Hz HEVC decoding
- HDR
- 4K x 2K UI
- HDMI 2.0 embedded and bridging modes
- Comprehensive integrated digital television solution
- Security processing feature

High-Performance CPU

- 64-bit quad-core RISC
- Maximum frequency of 1.2 GHz, supporting intelligent applications smoothly
- Independent I-cache, D-cache, and L2 cache
- Integrated multimedia acceleration engine NEON
- Integrated hardware floating-point coprocessor

TS Demultiplexing/PVR

- A maximum of 96 hardware PID channels
- Full-service PVR
- Recording of scrambled and non-scrambled streams

Video Decoding

- HEVC (H.265) MP@level 5.0 high-tier, 4K x 2K@60 fps
- H.264 BP/MP/HP@level 5.0, 4K x 2K@30 fps
- MVC, 1080p@60 fps
- MPEG1, 1080p@60 fps
- MPEG2 SP@ML, MP@HL, and 1080p@60 fps
- MPEG4 SP@level 0−3, ASP@level 0−5, GMC, 1080p@60 fps
- MPEG4 short header format (H.263 baseline), 1080p@60 fps
- AVS baseline@level 6.0, AVS+(AVS-P16), and 1080p@60 fps
- VC-1 SP@ML, MP@HL, and AP@level 0−3, 1080p@60 fps
- VP6/8, 1080p@60 fps
- Low-delay decoding
- Multi-channel decoding

Image Decoding

- JPEG hardware decoding, a maximum of 64 megapixels
- Supported formats of 400, 420, 411, 422, 422T, and 444
- MJPEG baseline decoding
- PNG hardware decoding, maximum 64 megapixels
- Gray-scale image, true color image, indexed-color image, gray-scale image with alpha channel data, and true color image with alpha channel data

Video and Image Encoding

- H.264 BP/MP@level 4.2 video encoding, 1x1080p@30 fps or 2x720p@30 fps encoding
- JPEG hardware encoding, maximum resolution of 4K x 2K
- 1/4 pixel motion estimation, CABAC encoding
- Low-delay encoding
- Encoding of multiple ROIs
- VBR and CBR modes

2D Graphics Acceleration

- Hardware acceleration engine, supporting highly efficient 2D processing
- Data formats of ARGB, CLUT, and AYCbCr
- Copying, filling, pattern filling, resizing, clipping, alpha blending, colorkey, and clip mask
- ROP
- Anti-flicker, gamma correction, and contrast/luminance adjustment
- Programmable scanning mode
- Linked-list operation

3D GPU

- Hexa-core high-performance GPU
- 4K x 2K graphics rendering
- OpenGL ES 2.0/1.1/1.0 and OpenVG 1.1

Intermediate-Frequency Demodulation for Analog TV

- All analog TV standards, including M/N, B/G/H, D/K, I, L, and L'
- Tuner low- and intermediate-frequency inputs and configurable intermediate frequency
- External SAW not required
- Group delay compensation and equalization filter

Digital Demodulation

- Tuner low- and intermediate-frequency inputs and embedded 12-bit ADC
- One embedded DVB-C QAM demodulator
  - ITU-T J.83 Annex A/B/C
  - DVB-C 0.7−7 Mbaud symbol rate and correctable carrier frequency deviation range ±700 kHz
- One embedded DVB-T demodulator
  - Standard version 1.51
  - Low- and intermediate-frequency and high- and intermediate-frequency (36 MHz) inputs
  - Rapid signal acquisition (less than 200 ms), reducing the wait time for switching the channel
  - Adaptive spectrum reverse recognition
  - Frequency error detecting range broader than [–600 kHz, +600 kHz]
  - Compliant with various test standards, including DTG7.0, NorDig-Unified Test Specification V2.2.1, and Digital Europe Ebook
- One embedded DTMB demodulator

  - All 330 clock modes of the standard DTMB (GB20600-2006)
  - 6 MHz, 7 MHz, and 8 MHz input bandwidth
  - Low- and intermediate-frequency (4−11 MHz) and high- and intermediate-frequency (36−37 MHz) inputs
  - Access test specifications GB/T20683, 20686-2011 compliance
  - Gaussian, multipath, and mobile reception performance
  - Phase noise suppression
  - Anti-pulse-interference performance
  - Superior anti-interference (from the same frequency) performance
  - Adaptive spectrum reverse recognition
  - Frequency error detecting range broader than [–1.5 MHz, +1.5 MHz]
  - Integrated 12-bit high-performance ADC for supporting highly precise sampling
- External TS inputs for supporting the output TSs after ISDB-T and DVB-T2 demodulation

NTSC/PAL/SECAM Video Demodulation

- NTSC (NTSC-M, NTSC-J, NTSC-4.43), PAL (B, D, G, H, M, N, I, Nc), and SECAM standards
- Automatic standard detection
- Adaptive 3D comb filter
- 4xCVBS or 1xY/C input

Multi-Format Audio Demodulation

- SIF demodulation
- NICAM, A2, EIA-J, BTSC, FM, and AM demodulation
- BTSC, mono, stereo, and SAP modes in the EIA-J standard
- NICAM, mono, stereo, and dual modes in the A2 standard
- Automatic detection of the sound system and mode

Audio and Audio Effect Processing

- Conversion of the audio sampling rate
- Volume, equalization, mute control
- Virtual stereo/surround sound and bass enhancement
- Dialog enhancement and intelligent volume
- Sound processing[option] such as SRS
- Remote pick-up for the microphone array[option]

Audio Encoding/Decoding

- Audio decoding formats
  - Dolby Digital, Dolby Digital Plus, Dolby TrueHD
  - DTS, DTSHD
  - MPEG L1/L2
  - MP3
  - AAC_LC, HE_AAC, HE_AACV2
  - LPCM
  - APE
  - FLAC
  - OggVorbis
  - AMRNB
  - AMRWB
  - G.711 (u/a)
- Audio encoding formats
  - AAC_LC, HE_AAC, HE_AACV2
  - AMR-NB
  - G.711 (u/a)

Professional HiSilicon Graphics Engines (Hi-Imprex II Engines)

- Hi-Imprex II scaling engine
  - High-order multi-phase filter with programmable coefficients
  - Various scaling modes including the non-linear scaling mode
  - -Pre-emphasis for graphics scaling and de-ring
- Hi-Imprex II video processing engine
  - 3D progressive/interlaced switching
  - Automatic detection and restoration in 3:2, 2:2, or M: N film mode
  - 3D noise reduction for 4K x 2K videos including network videos
  - MPEG noise reduction for the videos including 4K x 2K videos, de-blocking, and mosquito noise reduction
- Hi-Imprex II image enhancement engine
  - 3D adaptive sharpening for the videos including 4K x 2K videos, and enhancement and shoot control for different directions and frequencies
  - LTI and CTI
  - 3D adaptive color management such as specified color management and automatic color copy
  - Wide color gamut (xvYCC) processing
  - Dynamic contrast enhancement such as adaptive contrast adjustment and color compensation based on luminance variance
  - Blue level expansion
- Hi-SuperClear II processing, edge smoothing, and edge enhancement
- Programmable 12-bit gamma look-up table
- Automatic 3D format detection
- 2D-to-3D processing
- Local dimming

Security Processing[Option]

- Advanced security
- DRM
- AES, DES, and 3DES data encryption and decryption
- Hardware hash algorithm
- Content protection for USB devices
- Downloadable CA[option]

Audio/Video Interfaces

- Audio interfaces
  - SIF audio interface
  - Two I^2S inputs, one I^2S output and one SPDIF output
  - One HDMI ARC channel
  - Three stereo inputs and two MIC inputs
  - Three stereo outputs
- YPbPr/RGB interface
  - Two analog channels, at most 1080p

Hi3751 V600 Brief Data Sheet

  - SoG
  - Automatic format and mode detection
  - Position and phase adjustment for the RGB channel
- Cable online detection for analog video channels
- HDMI interfaces
  - Three HDMI input interfaces (one supports HDMI 2.0, one supports MHL 2.0/HDMI 1.4, and the other one supports HDMI 1.4/ARC)
  - 4K x 2K@60 Hz inputs
  - Rapid port switching
  - CEC
  - HDCP 2.2/1.3/1.1
- 2-link LVDS outputs
- 8-lane VbyOne outputs
- One CVBS output

Memory Control Interfaces

- DDR3/DDR3L interface
  - Maximum 2 GB capacity
  - Maximum 64-bit interface
  - Up to 1.6 Gbit/s frequency
- SPI flash interface
  - 1-, 2-, or 4-bit flash memory
  - Maximum capacity of 32 MB
- NAND flash interface
  - SLC/MLC flash memory
  - Toggle 1.0/2.0 or ONFI 2.0/3.0
  - 8-bit data width
  - Maximum 64 GB capacity
  - Maximum 80-bit ECC
- eMMC flash interface

Peripheral Interfaces

- Three USB 2.0 host ports
- One USB 3.0 host port
- One SDIO 3.0 interface, supporting 3.3 V or 1.8 V component
- One 10 Mbit/s or 100 Mbit/s adaptive Ethernet port
- One CI/CI+
- One IR receiver
- Four keypad interfaces
- Multiple I^2C interfaces
- Three UART interfaces
- Multiple GPIO interfaces
- Multiple PWM interfaces
- Integrated POR module

Others

- 2-layer PCB
- Various boot modes
- Boot program download and execution over a serial port or USB port
- Integrated and dedicated standby processor, supporting various low-power modes
- Low-power design using the technologies such as AVS and DVFS

Acronyms and Abbreviations

3DES	triple data encryption standard
ADC	analog-to-digital converter
AES	advanced encryption standard
ARC	audio return channel
AVS	adaptive voltage scaling
BER	bit error rate
CABAC	context-based adaptive binary arithmetic coding
CBR	constant bit rate
CEC	consumer electronics control
CI	common interface
CTI	chroma transient improvement
CVBS	composite video broadcast signal
DES	data encryption standard
DRM	digital rights management
DTMB	digital terrestrial multimedia broadcasting
DVFS	dynamic voltage frequency scaling
ECC	error correcting code
eMMC	embedded multimedia card
GPIO	general-purpose input/output
GPU	graphics processing unit
HDCP	high-bandwidth digital content protection
HDMI	high-definition multimedia interface

HEVC	high efficiency video coding
I^2C	inter-integrated circuit
IR	infrared
I^2S	inter-IC sound
LTI	luma transient improvement
LVDS	low-voltage differential signaling
MHL	mobile high-definition link
MLC	multi-level cell
OSD	on-screen display
PCB	printed circuit board
POR	power-on reset
PVR	personal video recorder
PWM	pulse-width modulation
QAM	quadrature amplitude modulation
RISC	reduced instruction set computing
ROI	region of interest
ROP	raster of operation
SDIO	secure digital input/output
SIF	sound intermediate frequency
SLC	single-level cell
SoG	sync on green
SPDIF	Sony/Philips digital interface
SPI	serial peripheral interface
TS	transport stream
UART	universal asynchronous receiver transmitter
VBR	variable bit rate