

## 1. GENERAL DESCRIPTION

iCatch's V77A SoC integrates advanced image signal processor (ISP), 600MP/s video encoder/decoder (Video CODEC), neural processing unit (NPU), video and audio digital signal processor (VDSP/ADSP), USB3.2 Gen1 Host/Device for connectivity, and Security Engine in a low power single chip design. The ISP and Video CODEC function as the foundation of the imaging system, along with the integrated multi-camera sensor interface making V77A an expandable solution for multi-channel imaging application. The embedded NPU and VDSP can be used to add extra features to improve user experience.

The V77A SoC also includes a series of security features in the Security Engine, such as secure boot, hardware programmable security level for peripheral interfaces, data encryption and protection with a complete set of cypher coding engines, true random number generator (TRNG), and one-time programmable (OTP) memory. User data can be securely protected by incorporating these security functions into system design.

iCatch has developed software development kits (SDK) for V77A SoC. Moreover, a full set of optimized neural network tool chains are also available for customers to port 3rd parties' or in-house developed neural network models onto V77A SoC to efficiently add AI features to the cameras to accelerate the time-to-market cycle.

## 2. FEATURES

### 2.1. Image Sensor Interface

- Up to eight sensor inputs via virtual channels
- Support MIPI D-PHY/sLVDS/HiSpi up to 2.5Gbps per lane

### 2.2. Advanced Image Processing

- Pixel processing speed up to 480M pixels/sec
- Real-time multi-frame fusion video HDR
- Local tone mapping (LTM) for direct HDR sensor
- AI-enhanced denoise engine supporting 4K video
- RCCB and 4X4 RGB-IR de-mosaic with HDR and LTM support
- Event-based Vision Sensor (EVS) support

### 2.3. Video CODEC

- H.264 BP/MP/HP and H.265 MP up to level 5
- Real-time encode/decode up to 600M pixels/s
- Up to 16 simultaneous encoding streams
- Advanced bitrate control in CBR and VBR mode

### 2.4. Processor Cores

- Quad-core ARM Cortex-A7 processors up to 1GHz
- NPU with computation power up to 1.5TOPS
- Video DSP (MAE) for NPU pre/post processing
- AON controller for ultra-low power applications

### 2.5. Audio

- Dual digital PDM microphone input.
- Built-in audio ALC and adaptive EQ
- I2S interface to external audio codec

### 2.6. Memory/Storage

- Programmable DRAM speed up to 1 GHz
- Support SPI NAND and NOR flash with 1/2/4/8-bit data bus
- Support SD/SDHC/SDXC and eMMC interfaces

### 2.7. Security

- Support secure boot
- Support AES encryption standards
- Support SHA-256, SHA-512, ECDSA P-256/P-384
- True random number generators
- Include 4K-bit OTP memory

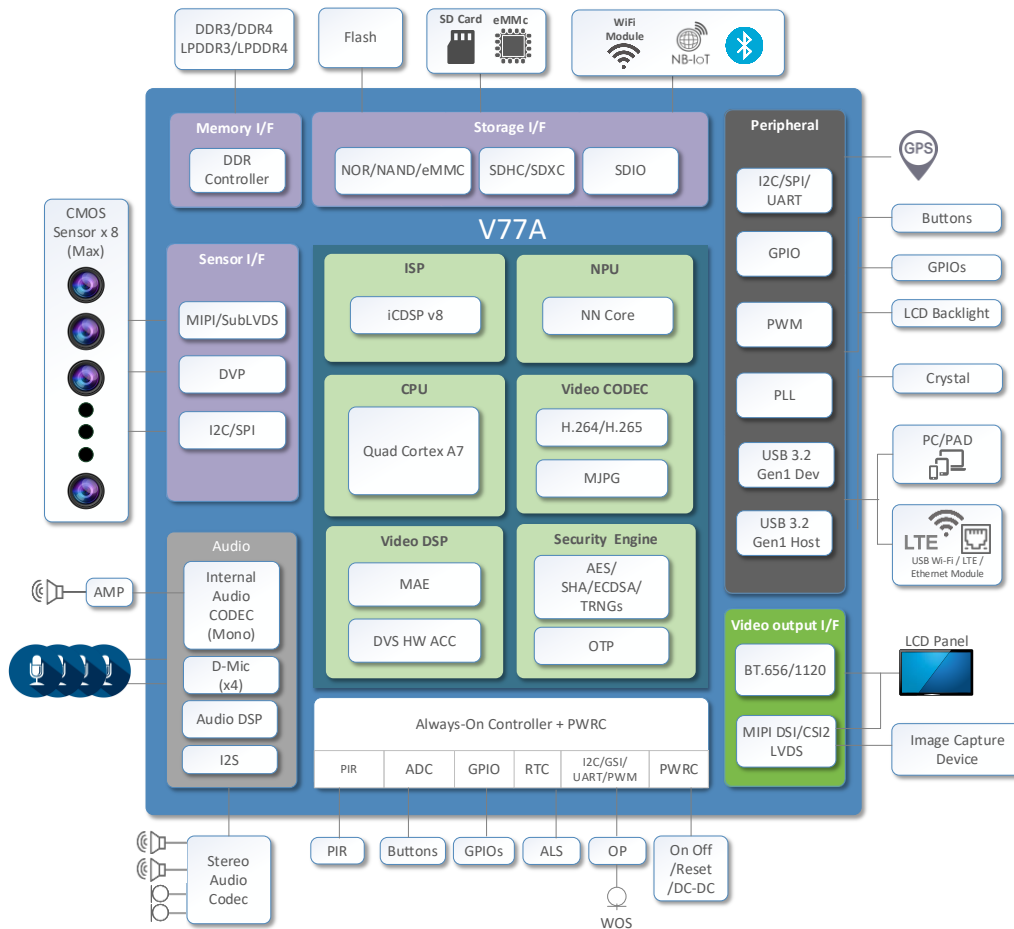
### 2.8. Peripherals

- USB 3.2 G1 device and host interfaces
- GPIO, PWM, UART, SPI, and I2C ports
- Real-time clock and watch-dog timer
- Multiple channels of 10-bits SAR ADC
- SDIO controller for WiFi module

### 2.9. Package

- LFBGA, 14 x 14 x 1.6 mm

### 3. BLOCK DIAGRAM



### 4. DEVELOPMENT PLATFORM

- Evaluation board (EVB)
- Software development kits (SDK)
- Documentations

#### 4.1. Evaluation Board

- V77A main evaluation board (EVB)
- Sensor board, LCD panel board, audio board

#### 4.2. Software Development Kits

- ISP, 3A, NDK Libraries
- WiFi video application reference design source code
- PC tool chains (Programmer, font and string generators)
- Android/iOS mobile phone APP SDK

#### 4.3. Documentations

- EVB user manual, application notes and API documents
- Datasheet, schematics and layout files

