A12 Release Note

SDK Version 6.2.005

Version 1.0

April 15, 2016

I Contents

II Preface

This document provides technical details using a set of consistent typographical conventions to help the user differentiate key concepts at a glance.

Conventions include:

Example	Description
AmbaGuiGen, **DirectUSB** **Save, File > Save** **Power, Reset, Home**	Software names GUI commands and command sequences Computer / Hardware buttons
Flash_IO_control **da**, **status**, **enable**	Register names and register fields. For example, **Flash_IO_control** is the register for global control of Flash I/O, and bit 17 (**da**) is used for DMA acknowledgement.
GPIO81, **CLK_AU**	Hardware external pins
VIL, VIH, VOL, VOH	Hardware pin parameters
INT_O, RXDATA_I	Hardware pin signals
amb_performance_t *amb_operating_mode_t* **amb_set_operating_mode()**	API details (e.g., functions, structures, and type definitions)

`/usr/local/bin`
`success = amb_set_operat-`
`ing mode (amb_base_address,`
`& operating_mode)`
	User entries into software dialogues and GUI windows
	File names and paths
	Command line scripting and Code

Table II-1. Typographical Conventions for Technical Documents.

Additional Ambarella typographical conventions include:

- Acronyms are given in UPPER CASE using the default font (e.g., AHB and DDRIO).

- Names of Ambarella documents and publicly available standards, specifications, and databooks appear in *italic* type.

1   Overview

1.1   Overview: Introduction

The Ambarella team is pleased to announce the release of version 6.2.005 of the A12 Software Development Kit (SDK).

This release includes the **Middleware Support Package (MSP)**, a robust framework which allows customers to fully utilize the functionality of the A12 SoC in a straightforward manner. The MSP provides flexible bitstream management which can support a variety of complex applications, such as multiple stream storage, networking, and more. The version 6.2.005 release also provides an updated **Connected App**, an application designed to demonstrate various features that can be implemented with Ambarella API libraries. **SVC (System serVice Code)**, a sample application over the System Software Package (SSP), is also included.

Lastly, this version of the SDK provides support for the A12 **Connected Multi-VIN App**, which is designed to demonstrate applications with multiple video input (VIN) options, such as dual-VIN and selectable VIN applications.

The A12 Middleware Support Package, SVC, Connected App, and Connected Multi-VIN App currently support the following hardware platforms:

1.   The Dragonfly Evaluation Kit (EVK) Reference Board (Figure 1-1)
2.   The Taroko EVK Reference Board (Figure 1-2)
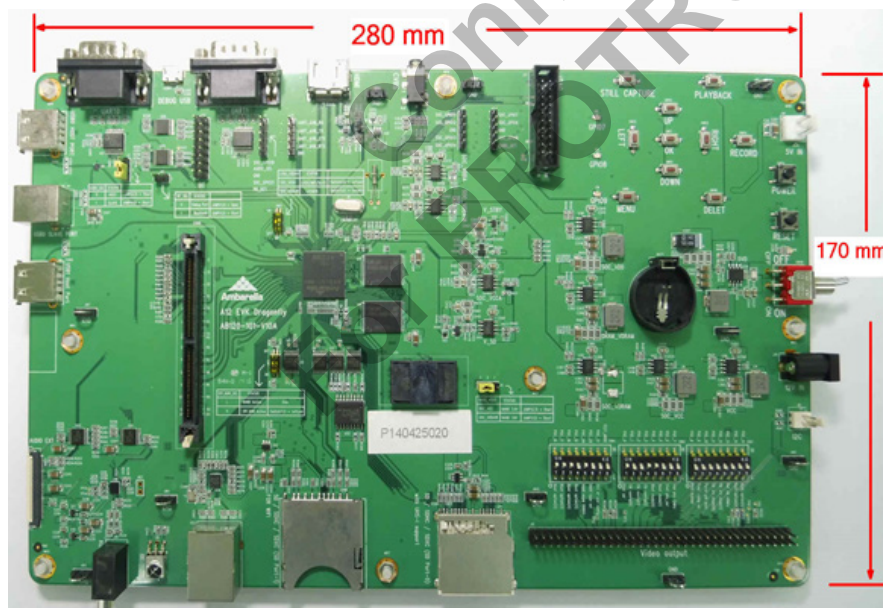
Figure 1-1.   A12 SDK: Dragonfly EVK Board.

Figure 1-2. A12 SDK: Taroko EVK Board.

2 A12 SDK Version 6.2.005

2.1 SDK 6.2.005: Introduction

The Ambarella A12 SDK enables the development of high-performance camera products in the sports, wearable (consumer as well as police/security) and automotive market segments. The SDK provides the necessary software and hardware tools to enable designers to create customized, fully-featured camera products.

Version 6.2.005 of the A12 SDK includes the following software modules:

1. **Middleware Support Package:**

   - ThreadX

     - Middleware Unit Test (Source)
     - Middleware/Codec (Library)
     - Middleware/FIFO (Library)
     - Middleware/Data (Library)

   - Linux

     - Network Apps (Library)

2. **SVC (System serVice Code):**

   - ThreadX

     - SVC App (Source)
     - AppLib (Library)

3. **Connected App:**

   - ThreadX

     - Connected App (Source)
     - AppLib (Library)

4. **Connected Multi-VIN App:**

   - ThreadX

     - Connected Multi-VIN App (Source)
     - AppLib (Library)

This document is organized as shown below.

For a summary of differences between SDK version 6.2.005 and the previous SDK version, refer to Appendix 1.

2.1.1   Introduction: Diagram

Figure 2-1 below provides a software block diagram of the A12 SDK.

Figure 2-1.   A12 SDK: Software Block Diagram.

2.1.2   Introduction: SDK Architecture

The A12 SDK consists of three distinct layers:

- (Section 2.1.2.1) System Support Package (SSP)

- (Section 2.1.2.2) Middleware Support Package (MSP)

- (Section 2.1.2.3) Ambarella Reference Design (ARD)

2.1.2.1 System Support Package (SSP)

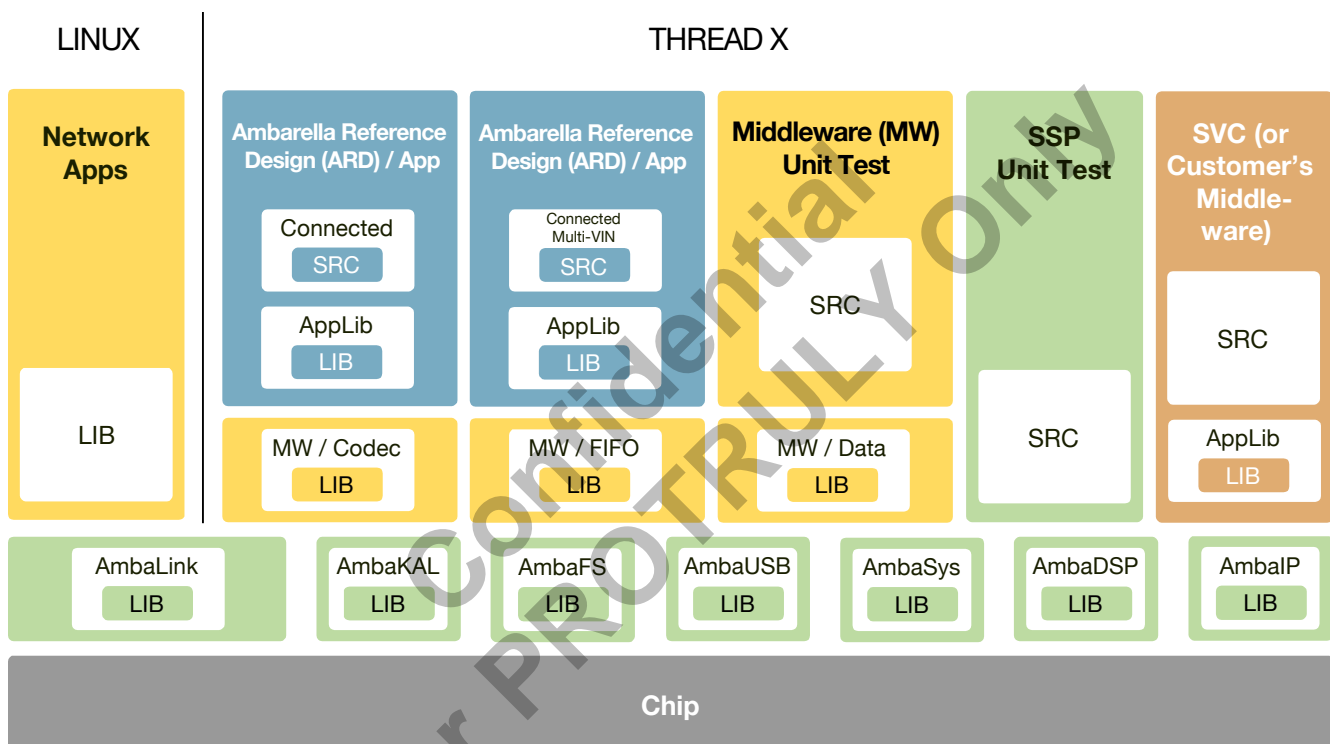The A12 System Support Package (SSP) provides the fundamental services used to run Ambarella chips. This package includes basic unit tests and system service code (sample muxer/demuxers, simple GUIs, file-naming rules, etc.).

Of the available A12 SDK packages, the SSP enables the greatest degree of control and customization when developing new products. Customers who select the SSP package are typically competing in markets where innovation and diversification are key requirements for success. In addition, because the use of the SSP package often leads to a fuller understanding of our technologies, customers who select this package are typically engaged in longer-term, multi-product relationships with Ambarella.

It should be noted, however, that **leveraging the capabilities of the SSP requires the investment of considerable engineering resources on the part of the customer**.

For example, developing products with the SSP requires (a.) studying the source code for Unit Tests/System Service Code, (b.) understanding fundamental SSP behaviors and protocols, and (c.) developing customized software from the ground up, especially in the case of a first-time product (Ambarella typically maintains similar API interfaces across generations of SoCs; therefore, the development cycles for future products may be shortened).

The SSP layer consists of the components listed below.

- **System Libraries:**

    - AmbaKAL: RTOS Kernel Abstraction Layer

    - AmbaFS: File System

    - AmbaUSB: USB Stack

    - AmbaSys: System I/O drivers based on Ambarella chip design

- **AmbaDSP: DSP Support Package**

    - Used to control the DSP inside Ambarella chips

- **AmbaLink**: Provides RTOS and Linux communication and network support

- **AmbaIP**: Ambarella reference AE/AWB/ADJ libraries

- **SSP Unit Test**: Unit tests for the SSP layer

- **SVC (System serVice Code)**: Sample application over SSP

In a typical SSP release, customers will receive the following:

1. **SSP Libraries**

2. **SSP Unit Test Source Code**

3. **SVC Source Code**

4. **Common Service Source Code**: Frequently-used small utilities

5. **Image Quality (IQ) Utility Libraries**: Utilities for calibration, AE/AWB/ADJ scheduling, bitrate monitoring

Documentation: SSP customers will not receive documents related to Middleware and Apps. Documents related to image quality will be provided to customers who perform their own image quality tuning.

2.1.2.2 Middleware Support Package (MSP)

The Middleware Support Package (MSP) enables the full utilization of SSP capabilities via easy-to-control mechanisms, allowing customers to pursue a straightforward product development path.

Because a majority of SSP protocols are either managed or translated to simplified forms, the MSP does not require customers to understand low-level SSP protocols. Customers can create diverse features or refine existing features (demonstrated in the relevant application) from the middleware level.

It should be noted, however, that **leveraging the capabilities of the MSP requires the investment of engineering resources on the part of the customer**. Depending upon customer goals, this investment can be either:

1. **Light**: The customer studies the ARD/APP Applib source code to gain an understanding of how the Applib utilizes the middleware layer to implement a specific feature.

2. **Heavy**: The customer studies the Unit Test source code in order to learn how to use middleware APIs directly.

In either case, customers who select the MSP package will be limited by the middleware architecture and available feature set. For this reason, the MSP is typically selected by customers who are competing in markets where standardized products can be successful. If customers are competing in markets that value differentiation and feature innovation, the SSP package may be preferable, assuming the customer is able to dedicate the necessary engineering resources.

The MSP layer consists of the components listed below.

- **MW/Codecs**: Flow controllers for video encoding/decoding/transcoding, still picture capturing/decoding, audio recording/decoding, external track (e.g., GPS information) recording/decoding, etc. This also includes arbitration mechanisms (pipelines) coordinating codes working together for multi-stream in/out and synchronization (e.g., A/V sync).

- **MW/FIFO**: Bitstream information dispatcher, which handles multiple bitstream client features.

- **MW/Data**: Data flows including muxer/demuxer/editor, cached file read/write scheduler, network transfer controller, DCF indexing (file naming) system, etc. This also includes arbitration mechanisms (pipelines) coordinating multiple muxer/demuxer instances running simultaneously.

- **MW Unit Test**: Unit tests for all middleware modules.

In a typical MSP release, customers will receive the following:

1. **SSP Libraries**
2. **MSP Libraries**
3. **Unit Test Source Code**
4. **ARD/APP Source Code** (Including its Applibs)
5. **Common Service Source Code**: Frequently-used small utilities
6. **Image Quality Utility Libraries**: Utilities for calibration, AE/AWB/ADJ scheduling, bitrate monitoring

Note that DCF (file naming rules) and GUI drawing utilities are included in the ARD/APP's Applib.

Documentation Release: Customers who use the MSP will not receive documents related to SVC. These customers will, however, receive documentation related to the Connected APP (Section 2.1.2.3.1). Documents related to image quality will be provided to customers who perform their own image quality tuning.

2.1.2.3   Ambarella Reference Design (ARD)

The Ambarella Reference Design (ARD) system refers to the logically separated text section where the top-level functionality of the system exists. It is the main entrance point to the system and provides generic features for reference.

The ARD design is based on market segments, such as **Connected** (Section 2.1.2.3.1) and **Connected Multi-VIN** (Section 2.1.2.3.2). These ARDs/APPs share the same low-level protocols, including SSP, MSP and drivers; however, they diversify in terms of their visible feature sets.

Of the available A12 SDK packages, the ARD system typically offers the shortest time to market. Because modularized and generic flows are both provided, only minimal engineering resources are required (e.g., to modify GUI or GUI flows) when using the ARD system, assuming the selected ARD matches the customers' product requirements exactly.

It should be noted that **the feature set of a given ARD is fixed.**

The ARD/APP layer consists of the components listed below.

- **ARD/APP Applib**: Reference code showing how to construct a specific function by using middleware APIs, such as the materials to configure a video recorder and how to control it.

    - Some middleware modules only provide frameworks, while the ARD/APP Applib includes implementations (e.g., DCF file naming rule, graphics engine).

    - By default, ARD/APP Applib is released as a library.

- **ARD/APP Source Code**: Control/UI flows for generic functions.

    - While the ARD/APP Applib provides modules to configure and control middleware components, control/UI flows can be used to diversify products in terms of user experience.

In a typical ARD release, customers will receive the following:

1. **SSP Libraries**
2. **MSP Libraries**
3. **ARD/APP Source Code**
4. **ARD/APP's Applib Libraries**
5. **Common Service Source Code**: Frequently-used small utilities
6. **Image Quality Utility Libraries**: Utilities for calibration, AE/AWB/ADJ scheduling, bitrate monitoring

Documentation Release: Customers who use an ARD module will receive documents related to the MSP and the relevant APP.

2.1.2.3.1   Connected APP

Connected APP is designed to demonstrate generic functions of the Ambarella SDK, such as video encoding, still capture and playback. Connected APP provides a production-wise framework and the simplest flow required to construct a feature. Because Connected APP is not market-specific, all productions can begin from this starting point, making it easier for customers to differentiate their products in a crowded marketplace.

2.1.2.3.2 Connected Multi-VIN APP

The Connected Multi-VIN APP is designed to demonstrate applications with multiple video input (VIN) options, such as dual VIN and selectable VIN applications. Used in conjunction with the Ambarella B5 chip, the Multi-VIN APP provides a production-wise framework and the simplest flow required to construct a multiple-VIN feature set. Because the Multi-VIN APP is not market-specific, any production can begin from this starting point, making it easier for customers to differentiate their products in a crowded marketplace.

2.2   SDK 6.2.005: Middleware Support Package

Specifications for the A12 Middleware Support Package are shown below. Note that new or updated features for this release have been starred and/or marked in green.

- Video IN/OUT Support List
  - ◦ Sensor
    - Sony IMX117
    - Sony IMX290
    - OmniVision OV4689
    - OmniVision OV9750 (For Dual-Channel)
    - Aptina AR0230
    - Panasonic MN34222
    - TI TVP5150 (YUV Input)
    - ★ Sony IMX078
    - ★ Aptina AR0237
    - ★ Sony IMX317
    - ★ Sony IMX322
  - ◦ USB Cam
    - 854x480p30 MJPEG Input
  - ◦ Display
    - 1080p60 HDMI
    - LCD
- Function List
  - ◦ Standby Mode
  - ◦ Fast File Download
  - ◦ VIN Signal Loss Handling
  - ◦ Video Encode
    - Stream Matrix Table
      - OmniVision OV4689 + OmniVision OV4689

NTSC		Second Stream Support	
VIN Channel 0	**VIN Channel 1**	**VIN Channel 0 1280x720p30**	**VIN Channel 1 1280x720p30**
2560x1440p30 HDR	1920x1080p30	832x480p30	832x480p30
	1280x720p30	√	√
2560x1440p30	2560x1440p30	No Second Stream	
	1920x1080p30	No Second Stream	
	1280x720p30	√	√

		VIN Channel 0 1280x720p30	VIN Channel 1 1280x720p30
1920x1080p30 HDR	2560x1440p30	832x480p30	832x480p30
	1920x1080p30	No Second Stream	
	1280x720p30	√	√
1920x1080p30	2560x1440p30	No Second Stream	
	1920x1080p30	√	√
	1280x720p30	√	√
1280x720p60	1280x720p30	720x400p30	720x400p30

Table 2-1.   OmniVision OV4689 + OmniVision OV4689 Encode Performance - NTSC.

PAL		Second Stream Support	
VIN Channel 0	VIN Channel 1	VIN Channel 0 1280x720p25	VIN Channel 1 1280x720p25
2560x1440p25 HDR	1920x1080p25	832x480p25	832x480p25
	1280x720p25	√	√
2560x1440p25	2560x1440p25	No Second Stream	
	1920x1080p25	No Second Stream	
	1280x720p25	√	√
1920x1080p25 HDR	2560x1440p25	832x480p25	832x480p25
	1920x1080p25	No Second Stream	
	1280x720p25	√	√
1920x1080p25	2560x1440p25	No Second Stream	
	1920x1080p25	√	√
	1280x720p25	√	√
1280x720p50	1280x720p25	720x400p25	720x400p25

Table 2-2.   OmniVision OV4689 + OmniVision OV4689 Encode Performance - PAL.

- ◦ Video Encode (Continued)
  - - Stream Matrix Table
    - - Aptina AR0230 + OmniVision OV9750

NTSC		Second Stream Support	
VIN Channel 0	VIN Channel 1	VIN Channel 0 1280x720p30	VIN Channel 1 1280x720p30
1920x1080p30 HDR	1280x720p30	√	√
1920x1080p30	1280x720p30	√	√
1920x1080p60	1280x720p30	720x400p30	720x400p30

Table 2-3.   Aptina AR0230 + OmniVision OV9750 Encode Performance - NTSC.

PAL		Second Stream Support	
VIN Channel 0	**VIN Channel 1**	**VIN Channel 0 1280x720p25**	**VIN Channel 1 1280x720p25**
1920x1080p25 HDR	1280x720p25	√	√
1920x1080p25	1280x720p25	√	√
1920x1080p50	1280x720p25	720x400p25	720x400p25

Table 2-4.   Aptina AR0230 + OmniVision OV9750 Encode Performance - PAL.

- ◦ Video Encode (Continued)
    - - Stream Matrix Table
        - - OmniVision OV4689 + Aptina AR0230

NTSC		Second Stream Support	
VIN Channel 0	**VIN Channel 1**	**VIN Channel 0 1280x720p30**	**VIN Channel 1 1280x720p30**
2560x1440p30	1920x1080p30	√	√
1920x1080p30	1920x1080p30	√	√
2560x1440p30 HDR	1920x1080p30	√	√
1920x1080p30 HDR	1920x1080p30	√	√
1280x720p60	1280x720p30	720x400p30	720x400p30

Table 2-5.   OmniVision OV4689 + Aptina AR0230 Encode Performance - NTSC.

PAL		Second Stream Support	
VIN Channel 0	**VIN Channel 1**	**VIN Channel 0 1280x720p25**	**VIN Channel 1 1280x720p25**
2560x1440p25	1920x1080p25	√	√
1920x1080p25	1920x1080p25	√	√
2560x1440p25 HDR	1920x1080p25	√	√
1920x1080p25 HDR	1920x1080p25	√	√
1280x720p50	1280x720p25	720x400p25	720x400p25

Table 2-6.   OmniVision OV4689 + Aptina AR0230 Encode Performance - PAL.

◦ Video Encode (Continued)
  - Stream Matrix Table
    - OmniVision OV4689 + USB Cam

NTSC		Second Stream Support	
VIN Channel 0	**VIN Channel 1**	**VIN Channel 0** **1280x720p30**	**VIN Channel 1** **1280x720p30**
2560x1440p30	1280x720p30	√	√
1920x1080p30	1280x720p30	√	√
2560x1440p30 HDR	1280x720p30	√	√
1920x1080p30 HDR	1280x720p30	√	√

Table 2-7.   OmniVision OV4689 + USB Cam Encode Performance - NTSC.

PAL		Second Stream Support	
VIN Channel 0	**VIN Channel 1**	**VIN Channel 0** **1280x720p25**	**VIN Channel 1** **1280x720p25**
2560x1440p25	1280x720p25	√	√
1920x1080p25	1280x720p25	√	√
2560x1440p25 HDR	1280x720p25	√	√
1920x1080p25 HDR	1280x720p25	√	√

Table 2-8.   OmniVision OV4689 + USB Cam Encode Performance - PAL.

◦ Video Encode (Continued)
  - Stream Matrix Table
    - Aptina AR0230 + USB Cam

NTSC		Second Stream Support	
VIN Channel 0	**VIN Channel 1**	**VIN Channel 0** **1280x720p30**	**VIN Channel 1** **1280x720p30**
1920x1080p30	1280x720p30	√	√
1920x1080p30 HDR	1280x720p30	√	√

Table 2-9.   Aptina AR0230 + USB Cam Encode Performance - NTSC.

PAL		Second Stream Support	
VIN Channel 0	**VIN Channel 1**	**VIN Channel 0** **1280x720p25**	**VIN Channel 1** **1280x720p25**
1920x1080p25	1280x720p25	√	√
1920x1080p25 HDR	1280x720p25	√	√

Table 2-10.   Aptina AR0230 + USB Cam Encode Performance - PAL.

- ◦ Video Encode (Continued)
  - - Stream Matrix Table
    - - Sony IMX290

NTSC	Encode Resolution	Second Stream Support	
		1920x1080p30	1280x720p30
Main Stream Support	1920x1080p30	√	√
	1920x1080p30 HDR	√	√
	1920x1080p60	√	√

Table 2-11.   Sony IMX290 Encode Performance - NTSC.

PAL	Encode Resolution	Second Stream Support	
		1920x1080p25	1280x720p25
Main Stream Support	1920x1080p25	√	√
	1920x1080p25 HDR	√	√
	1920x1080p50	√	√
	1920x1080p100		√

Table 2-12.   Sony IMX290 Encode Performance - PAL.

- ◦ Video Encode (Continued)
  - - Stream Matrix Table
    - - OmniVision OV4689

NTSC	Encode Resolution	Second Stream Support		
		1920x1080p30	1280x720p30	960x544p30
Main Stream Support	2560x1440p30 HDR	√	√	√
	2560x1440p30	√	√	√
	2560x1440p60			720x400p30
	1920x1080p30 HDR	√	√	√
	1920x1080p30	√	√	√
	1920x1080p60	√	√	√
	1280x720p30		√	√
	1280x720p60		√	√

Table 2-13.   OmniVision OV4689 Encode Performance - NTSC.

PAL	Encode Resolution	Second Stream Support		
		1920x1080p25	1280x720p25	960x544p25
Main Stream Support	2560x1440p25 HDR	√	√	√
	2560x1440p25	√	√	√
	2560x1440p50		√	√
	1920x1080p25 HDR	√	√	√
	1920x1080p25	√	√	√
	1920x1080p50	√	√	√
	1280x720p25		√	√
	1280x720p50		√	√

Table 2-14.   OmniVision OV4689 Encode Performance - PAL.

- ◦ Video Encode (Continued)
  - - Stream Matrix Table
    - - Sony IMX117 @ Core 432 MHz

NTSC	Encode Resolution	Second Stream Support	
		1280x720p30	720x400p30
Main Stream Support	3840x2160p30		√
	2880x2160p30		√
	2560x1440p60	Feature Boundary	Feature Boundary
	1920x1080p120	No Second Stream	
	1280x720p240	√	√

Table 2-15.   Sony IMX117 Encode Performance - NTSC.

PAL	Encode Resolution	Second Stream Support	
		1280x720p25	720x400p25
Main Stream Support	3840x2160p25		√
	2880x2160p25		√
	2560x1440p50	√	√
	1920x1080p100	No Second Stream	
	1280x720p200	√	√

Table 2-16.   Sony IMX117 Encode Performance - PAL.

◦ Video Encode (Continued)

 - Stream Matrix Table

  - Sony IMX078 @ Core 432 MHz

NTSC	Encode Resolution	Second Stream Support	
		1280x720p30	720x400p30
Main Stream Support	3840x2160p30		√
	2880x2160p30		√
	2560x1440p60	Feature Boundary	Feature Boundary
	1280x720p120	√	√

Table 2-17.   Sony IMX078 Encode Performance - NTSC.

PAL	Encode Resolution	Second Stream Support	
		1280x720p25	720x400p25
Main Stream Support	3840x2160p25		√
	2880x2160p25		√
	2560x1440p50	√	√
	1280x720p100	√	√

Table 2-18.   Sony IMX078 Encode Performance - PAL.

◦ Video Encode (Continued)

 - Stream Matrix Table

  - Aptina AR0230

NTSC	Encode Resolution	Second Stream Support	
		1920x1080p30	1280x720p30
Main Stream Support	1920x1080p30	√	√
	1920x1080p30 HDR	√	√
	1920x1080p60	√	√
	1280x720p30		√
	1280x720p60		√

Table 2-19.   Aptina AR0230 Encode Performance - NTSC.

PAL	Encode Resolution	Second Stream Support	
		1920x1080p25	1280x720p25
Main Stream Support	1920x1080p25	√	√
	1920x1080p25 HDR	√	√
	1920x1080p50	√	√
	1280x720p25		√
	1280x720p50		√

Table 2-20.   Aptina AR0230 Encode Performance - PAL.

- ◦ Video Encode (Continued)
  - - Stream Matrix Table
    - - Aptina AR0237

NTSC	Encode Resolution	Second Stream Support	
		1920x1080p30	1280x720p30
Main Stream Support	1920x1080p30	√	√
	1920x1080p30 HDR	√	√

Table 2-21.   Aptina AR0237 Encode Performance - NTSC.

PAL	Encode Resolution	Second Stream Support	
		1920x1080p25	1280x720p25
Main Stream Support	1920x1080p25	√	√
	1920x1080p25 HDR	√	√

Table 2-22.   Aptina AR0237 Encode Performance - PAL.

- ◦ Video Encode (Continued)
  - Stream Matrix Table
    - Panasonic MN34222

NTSC	Encode Resolution	Second Stream Support	
		1920x1080p30	1280x720p30
Main Stream Support	1920x1080p30 HDR	√	√
	1920x1080p30	√	√
	1920x1080p60	√	√

Table 2-23. Panasonic MN34222 Encode Performance - NTSC.

PAL	Encode Resolution	Second Stream Support	
		1920x1080p25	1280x720p25
Main Stream Support	1920x1080p25 HDR	√	√
	1920x1080p25	√	√
	1920x1080p50	√	√

Table 2-24. Panasonic MN34222 Encode Performance - PAL.

- ◦ Video Encode (Continued)
  - Stream Matrix Table
    - TI TVP5150

NTSC	Encode Resolution	Second Stream Support
Main Stream Support	720x480i30	No Second Stream

Table 2-25. TI TVP5150 Encode Performance - NTSC.

PAL	Encode Resolution	Second Stream Support
Main Stream Support	720x576i25	No Second Stream

Table 2-26. TI TVP5150 Encode Performance - PAL.

- ◦ Video Encode (Continued)
  - Stream Matrix Table
    - ★ Sony IMX317 @ Core 432 MHz

NTSC	Encode Resolution	Second Stream Support	
		1280x720p30	720x400p30
Main Stream Support	3840x2160p30		√
	2880x2160p30		√
	2560x1440p60	Feature Boundary	Feature Boundary
	1280x720p120	√	√

Table 2-27.   Sony IMX317 Encode Performance - NTSC.

PAL	Encode Resolution	Second Stream Support	
		1280x720p25	720x400p25
Main Stream Support	3840x2160p25		√
	2880x2160p25		√
	2560x1440p50		√
	1280x720p100	√	√

Table 2-28.   Sony IMX317 Encode Performance - PAL.

- ◦ Video Encode (Continued)
  - Stream Matrix Table
    - ★ Sony IMX322

NTSC	Encode Resolution	Second Stream Support	
		1920x1080p30	1280x720p30
Main Stream Support	1920x1080p30	√	√

Table 2-29.   Sony IMX322 Encode Performance - NTSC.

PAL	Encode Resolution	Second Stream Support	
		1920x1080p25	1280x720p25
Main Stream Support	1920x1080p25	√	√

Table 2-30.   Sony IMX322 Encode Performance - PAL.

★ Feature Boundary: OK when disabling TV and Date/Time Stamp

◦ Video Encode (Continued)
  - High Dynamic Range (VIN Channel 0 only)
  - Temporal Adjustment
    - Not supported in dual-channel QHD + QHD or 2880x2160 modes
  - PIV (Non-HDR Resolutions)
    - Single-VIN: Interpolation up to 3840x2160 (Performance Bound) ; When EIS is enabled, the resolution = main stream resolution
    - Dual-VIN: Same as capture window; no interpolation; both channels must have the same frame rate
  - Video Thumbnail
  - Bitrate Control
    - Constant Bitrate
    - Variable Bitrate Monitor
  - Date/Time Stamp (Performance Bound)
  - QP/AQP Control
  - Digital Zoom 4x
    - Single-VIN mode only (2x at 3840x2160p30,p25)
  - Time-Lapsed Encoding
    - Single-VIN mode only
  - 180-degree Rotation
    - Single-VIN mode only
  - Slow Shutter
    - 0.5x
    - Single-VIN mode only
  - Dynamic OB
    - Single-VIN mode only; dependent on sensor
  - EIS
    ★ Only on Single VIN, up to 2560X1440p30 or 1920x1080p60; no HDR, no high frame rate, no dzoom
  - Low-Delay Display (one VOUT only)
  - Low-Delay Encode
◦ Image Tuning
  - Video Tuning
    - Raw to H.264
  - iTuner Script Tuning
  - Amage Tuning
  - IQ Tuning
◦ Still Capture
  - RAW Capture
  - RAW to YUV
    - LISO

- - MISO
  - - HISO
  - - Width Interpolation up to 7680
- - RAW to RAW
  - - 3A Statistics
- - YUV to JPEG
  - - Bitrate Control
- - Burst Capture
  - - Single-VIN mode only
- - PES Capture
  - - Single-VIN mode only
- - AEB Capture
  - - Single-VIN mode only
- - 180-degree Rotation
- - Dynamic OB
- ◦ Video Decode
  - - Forward Normal/Fast/Slow
  - - Backward Normal/Fast/Slow
  - - Step
  - - Time Search
  - - PB Zoom
  - - Pause/Resume
- ◦ Still Decode
  - - Scrolling
  - - Cropping
  - - Blending
- ◦ Calibration
  - - Black Level Correction
  - - Bad Pixel Correction
  - - Chroma Abbreviation
  - - Warp
  - - Vignette
  - - White Balance (with Flash Calibration)
  - - Audio
  - - Gyro
- ◦ Audio
  - - Encode : AAC/PCM
  - - Decode : AAC/PCM
- ◦ OSD
  - - 8 bit
  - - 16 bit (Performance Bound)
  - - 32 bit (Performance Bound)

- ◦ Format
    - EXIF
    - MP4 Mux/Demux/Recovery
    - MOV Mux/Demux/Recovery
- ◦ DCF
    - Index/Sorting Infrastructure
- ◦ Cached File System
    - System for File Search/Status Request
    - Async File Read/Write
- ◦ AmbaLink/NetFIFO
    - Streaming via Wi-Fi
    - Net Control via Wi-Fi
    - Notifier Between Two Operating Systems
    - Linux NetFIFO Status Report
    - Information for Online Playback Request
    - Information for Bandwidth Adjustment
- ◦ Boot Mode
    - NAND Boot
    - eMMC Boot
    - SPI-NOR Boot
- ◦ File System
    - FAT16
    - FAT32
    - ExFAT

2.3   SDK 6.2.005: SVC (System serVice Code)

Specifications for the A12 SVC are provided as follows. Note that new or updated features for this release have been starred and/or marked in green.

- Video IN/OUT Support List

  - Sensor

    - Sony IMX117

    - Sony IMX078

    - 1st VIN: OV4689

    - 2nd VIN: B5+OV4689

  - Display

    - Encode :

      - LCD + 1080p60 HDMI (3840x2160p30/p25 supports LCD only)

    - Decode :

      - LCD + 1080p60 HDMI

- Function List

  - Video Encode

    - Sony IMX117

NTSC	Encode Resolution	Second Stream Support
		768x432p30
Main Stream Support	3840x2160p30	√
	2720x1520p30	√
	2560x1440p60	√
	2560x1440p30	√
	1920x1080p120	432x240p30
	1920x1080p60	√[1]
	1920x1080p30	√[1]
	1280x720p240	√
	1280x720p60	√
	1920x1080p60 (Superview)	√

Table 2-31.   Sony IMX117 Encode Performance - NTSC.

PAL	Encode Resolution	Second Stream Support
		768x432p25
Main Stream Support	3840x2160p25	√
	2720x1520p25	√
	2560x1440p50	√
	2560x1440p25	√
	1920x1080p100	432x240p25
	1920x1080p50	√[1]
	1920x1080p25	√[1]
	1280x720p200	√
	1280x720p50	√
	1920x1080p50 (Superview)	√

Table 2-32.   Sony IMX117 Encode Performance - PAL.

Note:

1. EIS On

◦ Video Encode (Continued)

- Sony IMX078

NTSC	Encode Resolution	Second Stream Support
		768x432p30
Main Stream Support	3840x2160p30	√
	2720x1520p30	√
	2560x1440p60	√
	1920x1080p120	432x240p30
	1920x1080p60	√
	1280x720p240	√
	1280x720p60	√

Table 2-33.   Sony IMX078 Encode Performance - NTSC.

PAL	Encode Resolution	Second Stream Support
		768x432p25
Main Stream Support	3840x2160p25	√
	2720x1520p25	√
	2560x1440p50	√
	1920x1080p100	432x240p25
	1920x1080p50	√
	1280x720p200	√
	1280x720p60	√

Table 2-34. Sony IMX078 Encode Performance - PAL.

- ◦ Video Encode (Continued)
  - - OmniVision OV4689

NTSC	Encode Resolution	Second Stream Support
		768x432p30
Main Stream Support	2560x1440p30/p30 HDR	N/A
	1920x1080p30/p25 HDR	√

Table 2-35. OmniVision OV4689 Encode Performance - NTSC.

PAL	Encode Resolution	Second Stream Support
		768x432p25
Main Stream Support	2560x1440p30/p25 HDR	N/A
	1920x1080p30/p25 HDR	√

Table 2-36. OmniVision OV4689 Encode Performance - PAL.

- ◦ Video Encode (Continued)
  - - Ambarella B5 + OmniVision OV4689

NTSC	Encode Resolution	Second Stream Support
		768x432p30
Main Stream Support	1920x1080p30	√[1]

Table 2-37. Ambarella B5 + OmniVision OV4689 Encode Performance - NTSC.

PAL	Encode Resolution	Second Stream Support
		768x432p25
Main Stream Support	1920x1080p25	$\sqrt{}$[1]

Table 2-38.   Ambarella B5 + OmniVision OV4689 Encode Performance - PAL.

Note:

1. Second Streams are disabled if any Main Stream is 2560x1440 with Dual VIN.

- ◦ Video Encode (Continued)
    - PIV
        - Same as main window size
        - 3840x2160p30/p25, 1920x1080p120/p100, 1280x720p240/p200 do not support PIV
    - Video Thumbnail
    - Bitrate Control
    - Date/Time Stamp
    - Digital Zoom 3x
    - Time-Lapsed Encoding
- ◦ Still Capture
    - Raw Capture
    - Raw to YUV
        - LISO
        - HISO
    - Raw to Raw
    - YUV to JPEG
        - Bitrate Control
    - Burst Capture
    - PES Capture
    - AEB Capture
- ◦ Video Decode
    - Forward Normal/Fast/Slow
    - Backward Normal/Fast/Slow
    - Step
    - Time Search
    - PB Zoom
    - Pause/Resume
- ◦ Still Decode
    - Zoom In/Out
    - Rotation

- ◦ Calibration
  - - Black Level Correction
  - - Bad Pixel Correction
  - - Chroma Abbreviation
  - - Warp
  - - Vignette
- ◦ Audio
  - - Encode : AAC
  - - Decode : AAC
- ◦ OSD
  - - 8 bit
- ◦ Format
  - - EXIF
  - - MOV Mux/Demux/Recovery
- ◦ DCF
- ◦ AmbaLink
  - - Remote Processor Messaging (RPMsg)
  - - Remote Procedure Call (RPC)
  - - IPC Spin Lock
  - - IPC Mutex
  - - Virtual File System Support for AmbaFS
  - - SDIO Wi-Fi
  - - Linux Suspend/Resume
- ◦ Boot Mode
  - - NAND Boot
- ◦ File System
  - - FAT16
  - - FAT32
  - - ExFAT

2.4   SDK 6.2.005: Connected App

Specifications for the A12 Connected App are shown below. Note that new or updated features for this release have been starred and/or marked in green.

- Video IN/OUT Support List

  - Sensor
    - Sony IMX078
    - Sony IMX117
    - ★ Sony IMX206
    - ★ Sony IMX290
    - ★ Sony IMX317
    - ★ Sony IMX322
    - ★ Panasonic MN34222
    - OmniVision OV4689
    - Aptina AR0230
    - Aptina AR0237

  - Display
    - Encode:
      - LCD
    - Decode:
      - LCD + 1080p60 HDMI
      - LCD + 480i Composite

- Function List

  - Video Encode

Sensor: Sony IMX078		
	Main Stream	**Second Stream**
Mode: Normal	3840x2160p30 16:9	768x432p30 16:9
	3840x2160p25 16:9	1280x720p25 16:9
	2880x2160p30 16:9	1280x720p30 16:9
	1920x1080p60 16:9	1280x720p30 16:9
	1920x1080p30 16:9	1280x720p30 16:9
	1280x720p60 16:9	1280x720p30 16:9
	1280x720p30 16:9	1280x720p30 16:9
Mode: High Frame Rate	1920x1080p100 16:9	1280x720p25 16:9

Table 2-39.   Sony IMX078 Encode Performance.

Sensor: Sony IMX117		
	Main Stream	**Second Stream**
Mode: Normal	3840x2160p30 16:9	768x432p30 16:9
	3840x2160p25 16:9	1280x720p25 16:9
	2880x2160p30 16:9	1280x720p30 16:9
	2560x1440p60 16:9	768x432p30 16:9
	2560x1440p30 16:9	1280x720p30 16:9
	1920x1080p60 16:9	1280x720p30 16:9
	1920x1080p30 16:9	1280x720p30 16:9
Mode: High Frame Rate	1920x1080p100 16:9	1280x720p25 16:9
	1280x720p200 16:9	1280x720p25 16:9

Table 2-40.   Sony IMX117 Encode Performance.

Sensor: Sony IMX206		
	Main Stream	**Second Stream**
Mode: Normal	1920x1080p60 16:9	1280x720p30 16:9
	1920x1080p30 16:9	1280x720p30 16:9
	1280x720p30 16:9	1280x720p30 16:9
Mode: High Frame Rate	1280x720p120 16:9	1280x720p30 16:9

Table 2-41.   Sony IMX206 Encode Performance.

Sensor: Sony IMX290		
	Main Stream	**Second Stream**
Mode: Normal	1920x1080p60 16:9	1280x720p30 16:9
	1920x1080p30 16:9	1280x720p30 16:9
Mode: HDR	1920x1080p30 16:9 HDR	1280x720p30 16:9

Table 2-42.   Sony IMX290 Encode Performance.

Sensor: Sony IMX317		
	Main Stream	**Second Stream**
Mode: Normal	3840x2160p30 16:9	768x432p30 16:9
	3840x2160p25 16:9	1280x720p25 16:9
	2880x2160p30 16:9	1280x720p30 16:9
	2560x1440p60 16:9	768x432p30 16:9
	2560x1440p30 16:9	1280x720p30 16:9
	1920x1080p60 16:9	1280x720p30 16:9
	1920x1080p30 16:9	1280x720p30 16:9
Mode: High Frame Rate	1920x1080p100 16:9	1280x720p25 16:9
	1280x720p200 16:9	1280x720p25 16:9

Table 2-43.   Sony IMX317 Encode Performance.

Sensor: Sony IMX322		
	Main Stream	**Second Stream**
Mode: Normal	1920x1080p30 16:9	1280x720p30 16:9

Table 2-44.   Sony IMX322 Encode Performance.

Sensor: Panasonic MN34222		
	Main Stream	**Second Stream**
Mode: Normal	1920x1080p60 16:9	1280x720p30 16:9
	1920x1080p30 16:9	1280x720p30 16:9
Mode: HDR	1920x1080p30 16:9 HDR	1280x720p30 16:9

Table 2-45.   Panasonic MN34222 Encode Performance.

Sensor: OmniVision OV4689		
	Main Stream	**Second Stream**
Mode: Normal	2560x1440p60 16:9	768x432p30 16:9
	2560x1440p30 16:9	1280x720p30 16:9
	1920x1080p60 16:9	1280x720p30 16:9
	1920x1080p30 16:9	1280x720p30 16:9
	1280x720p60 16:9	1280x720p30 16:9
Mode: HDR	2560x1440p30 16:9 HDR	1280x720p30 16:9
	1920x1080p30 16:9 HDR	1280x720p30 16:9

Table 2-46.   OmniVision OV4689 Encode Performance.

Sensor: Aptina AR0230		
	Main Stream	**Second Stream**
Mode: Normal	1920x1080p60 16:9	1280x720p30 16:9
	1920x1080p30 16:9	1280x720p30 16:9
	1280x720p60 16:9	1280x720p30 16:9
	1280x720p30 16:9	1280x720p30 16:9
Mode: HDR	1920x1080p30 16:9 HDR	1280x720p30 16:9
	1280x720p30 16:9 HDR	1280x720p30 16:9

Table 2-47.   Aptina AR0230 Encode Performance.

Sensor: Aptina AR0237		
	Main Stream	**Second Stream**
Mode: Normal	1920x1080p30 16:9	1280x720p30 16:9
Mode: HDR	1920x1080p30 16:9 HDR	1280x720p30 16:9

Table 2-48.   Aptina AR0237 Encode Performance.

- ◦ Video Encode (Continued)
  - - Main Stream (Saved to the SD Card)
  - - Secondary Stream (For Streaming and Saving to the SD Card)
  - - Variable Bitrate Control : 0.75x~1.25x
  - - PIV (Size is the current capture size of sensor mode; Not supported by Taroko Option C; When EIS is enabled, the size is the current main size.)
  - - Slow Shutter
    - - 0.5x (Frame rate > 30)
    - ★ Disabled when EIS is enabled
  - - Date/Time Stamp
  - - Loop Encoding
  - - Event Recording
    - ★ Default: 10+20 seconds. Taroko Option C : 5+10 seconds
    - ★ Not supported by IMX078, IMX117, IMX317, IMX377, MN34210 configurations
  - - EIS
    - ★ Does not support Slow Shutter
  - ★ Encode Low Delay (HFR, 4Kp30 and 4Mp60 are not supported)
  - ★ Liveview Low Delay (HFR, 4K resolution, 2880x2160o30 and 4Mp60 are not supported)
- ◦ Still Capture
  - - Single Capture
  - - Burst Capture   (Not Supported by Taroko Option C)
  - - PES Capture   (Not Supported by Taroko Option C)
  - - Date/Time Stamp
- ◦ Video Decode
  - - Forward Normal/Fast/Slow
  - - Backward Normal/Fast/Slow
  - - Step
  - - Pause/Resume
- ◦ Still Decode
  - - Single Photo Playback
  - - Thumbnail Playback
- ◦ Calibration
  - - Black Level Correction
  - - Bad Pixel Correction
  - - Chroma Abbreviation
  - - Warp
  - - Vignette
  - - White Balance
- ◦ Audio
  - - Encode: AAC

- Decode: AAC
- OSD
  - 8-bit OSD
- Format
  - JPEG and EXIF
  - MP4 Mux/Demux/Recovery
- DCF
  - Date / Time Naming Rule
- USB
  - Mass Storage
- Control
  - Button
  - IR Remote Control
  - Ambalink Network Control
- AmbaLink
  - Liveview Streaming
  - Upload/Download File
  - Video Playback Streaming
  - Seamless Playback Streaming
  - Get IDR Frame from Clip
  - Get Thumbnail / Full Image of Photo
  - Amba Remote Camera Debug Functions
- Miscellaneous
  - GPS Information
  - Partial Load
- Image Tuning
  - Amage Tuning

2.5 SDK 6.2.005: Connected Multi-VIN App

Specifications for the A12 Connected Multi-VIN App are shown below. Note that new or updated features for this release have been starred and/or marked in green.

- Video IN/OUT Support List

  ◦ Sensor
    - OmniVision OV4689 + OmniVision OV4689
    - Aptina AR0230 + OmniVision OV9750
    - OmniVision OV4689 + Aptina AR0230

  ◦ Display
    - Encode:
      - LCD
    - Decode:
      - LCD + 1080p60 HDMI
      - LCD + 480i Composite

- Function List

  ◦ Video Encode
    - OmniVision OV4689 + OmniVision OV4689

Main Stream		Second Stream		PIV	
VIN Channel 0	VIN Channel 1	VIN Channel 0	VIN Channel 1	VIN Channel 0	VIN Channel 1
2560x1440p30 HDR	2560x1440p30	Not Supported	Not Supported	√	√
	1920x1080p30	Not Supported	Not Supported	√	√
	1280x720p30	Not Supported	Not Supported	√	√
	Disabled	1280x720p30	Not Supported	√	
2560x1440p30	2560x1440p30	Not Supported	Not Supported	√	√
	1920x1080p30	Not Supported	Not Supported	√	√
	1280x720p30	Not Supported	Not Supported	√	√
	Disabled	1280x720p30	Not Supported	√	
1920x1080p30 HDR	2560x1440p30	Not Supported	Not Supported	√	√
	1920x1080p30	Not Supported	Not Supported	√	√
	1280x720p30	1280x720p30	1280x720p30		
	Disabled	1280x720p30	Not Supported	√	

Main Stream		Second Stream		PIV	
VIN Channel 0	VIN Channel 1	VIN Channel 0	VIN Channel 1	VIN Channel 0	VIN Channel 1
1920x1080p30	2560x1440p30	Not Supported	Not Supported	√	√
	1920x1080p30	1280x720p30	1280x720p30		
	1280x720p30	1280x720p30	1280x720p30		
	Disabled	1280x720p30	Not Supported	√	
1280x720p30	2560x1440p30	Not Supported	Not Supported	√	√
	1920x1080p30	1280x720p30	1280x720p30		
	1280x720p30	1280x720p30	1280x720p30	√	√
	Disabled	1280x720p30	Not Supported	√	
Disabled	2560x1440p30	Not Supported	1280x720p30		√
	1920x1080p30	Not Supported	1280x720p30		√
	1280x720p30	Not Supported	1280x720p30		√

Table 2-49.   OmniVision OV4689 + OmniVision OV4689 Encode Performance.

- ◦ Video Encode (Continued)
  - - OmniVision OV4689 + Aptina AR0230

Main Stream		Second Stream		PIV	
VIN Channel 0	VIN Channel 1	VIN Channel 0	VIN Channel 1	VIN Channel 0	VIN Channel 1
2560x1440p30 HDR	1920x1080p30	Not Supported	Not Supported	√	√
	1280x720p30	Not Supported	Not Supported	√	√
	Disabled	1280x720p30	Not Supported	√	
2560x1440p30	1920x1080p30	Not Supported	Not Supported	√	√
	1280x720p30	Not Supported	Not Supported	√	√
	Disabled	1280x720p30	Not Supported	√	
1920x1080p30 HDR	1920x1080p30	Not Supported	Not Supported	√	√
	1280x720p30	1280x720p30	1280x720p30		
	Disabled	1280x720p30	Not Supported	√	
1920x1080p30	1920x1080p30	1280x720p30	1280x720p30		
	1280x720p30	1280x720p30	1280x720p30		
	Disabled	1280x720p30	Not Supported	√	

	1920x1080p30	1280x720p30	1280x720p30		
1280x720p30	1280x720p30	1280x720p30	1280x720p30	√	√
	Disabled	1280x720p30	Not Supported	√	
Disabled	1920x1080p30	Not Supported	1280x720p30		√
	1280x720p30	Not Supported	1280x720p30		√

Table 2-50.   OmniVision OV4689 + Aptina AR0230 Encode Performance.

- ◦ Video Encode (Continued)
  - - Aptina AR0230 + OmniVision OV9750

Main Stream		Second Stream		PIV	
VIN Channel 0	VIN Channel 1	VIN Channel 0	VIN Channel 1	VIN Channel 0	VIN Channel 1
1920x1080p30 HDR	1280x720p30	1280x720p30	1280x720p30		
	Disabled	1280x720p30	Not Supported	√	
1920x1080p30	1280x720p30	1280x720p30	1280x720p30		
	Disabled	1280x720p30	Not Supported	√	
1280x720p30 HDR	1280x720p30	1280x720p30	1280x720p30	√	√
	Disabled	1280x720p30	Not Supported	√	
1280x720p30	1280x720p30	1280x720p30	1280x720p30	√	√
	Disabled	1280x720p30	Not Supported	√	
Disabled	1280x720p30	Not Supported	1280x720p30		√

Table 2-51.   Aptina AR0230 + OmniVision OV9750 Encode Performance.

- ◦ Video Encode (Continued)
  - - Aptina AR0230 + USB Camera

Main Stream		Second Stream		PIV	
VIN Channel 0	VIN Channel 1	VIN Channel 0	VIN Channel 1	VIN Channel 0	VIN Channel 1
1920x1080p30 HDR	1280x720p30	1280x720p30	1280x720p30		
	Disabled	1280x720p30	Not Supported	√	
1920x1080p30	1280x720p30	1280x720p30	1280x720p30		
	Disabled	1280x720p30	Not Supported	√	

1280x720p30 HDR	1280x720p30	1280x720p30	1280x720p30	√	√
	Disabled	1280x720p30	Not Supported	√	
1280x720p30	1280x720p30	1280x720p30	1280x720p30	√	√
	Disabled	1280x720p30	Not Supported	√	

Table 2-52.   Aptina AR0230 + USB Camera Encode Performance.

- ◦ Video Encode (Continued)
  - - USB Camera Encoding (Input: 864x480 YUV ; Encode: 1280x720)
  - - Main Stream (Saved to the SD Card)
  - - Second Stream (For Liveview Streaming Only) (2560x1440 p30 does not support a second stream if dual-VIN is enabled.)
  - - Variable Bitrate Control : 0.75x~1.25x
  - - PIV (Size is the current capture size of sensor mode)
  - - Date/Time Stamp (Single VIN only)
  - - Loop Encoding
  - - Event Recording (Save the second stream in EVENT folder only. 2560x1440p30 is not supported)
  - ★ Encode low delay is enabled in all resolutions
  - ★ Liveview low delay is disabled in USB Cam, and dual-VIN with one 2560x1440p30 or one 2560x1440p30 HDR stream
- ◦ Still Capture
  - - Single Capture
  - - Date/Time Stamp
- ◦ Video Decode
  - - Forward Normal/Fast/Slow
  - - Backward Normal/Fast/Slow
  - - Step
  - - Pause/Resume
- ◦ Calibration
  - - Black Level Correction
  - - Bad Pixel Correction
  - - Chroma Abbreviation
  - - Warp
  - - Vignette
  - - White Balance
- ◦ Audio
  - - Encode: AAC
  - - Decode: AAC
- ◦ OSD
  - - 8-bit OSD
- ◦ Format
  - - JPEG and EXIF

- MP4 Mux/Demux/Recovery
- ◦ DCF
    - Date / Time Naming Rule
- ◦ USB
    - Mass Storage
- ◦ Control
    - Button
    - IR Remote Control
    - Ambalink Network Control
- ◦ AmbaLink
    - Liveview Streaming (Works if there is a second stream)
    - Upload/Download File
    - Video Playback Streaming
    - Seamless Playback Streaming
    - Get IDR Frame from Clip
    - Get Thumbnail / Full Image of Photo
    - Amba Remote Camera (AmbaRemoteCam) Debug Functions
- ◦ Miscellaneous
    - GPS Information
- ◦ Image Tuning
    - Amage Tuning

2.6   SDK 6.2.005: Bug Status

2.6.1   Bug Status: Middleware Support Package

Bug ID	Description	Status
36170	[A12SDK_6.2.005][MSP][Hybrid-LISO][Dual vin]: The HISO photo is brighter and the LCD preview becomes brighter when executing single capture on PIP VIN (OV9750 sensor).	OPEN
36198	[A12SDK_6.2.005][MSP][Dual vin][USB Cam]: LCD preview for the USB VIN shows a shift effect when changing sensor mode on Dual VIN.	OPEN
36215	[A12SDK_6.2.005][MSP][Hybrid-LISO][Dual vin][UG]: AmbaLL_Assert (1067/preview freeze/LOST VIN CH 0, Sensor 1) when encoding Main VIN (HDR1080P30) + PIP VIN (1080P30)/Main VIN(1080P30) + PIP VIN (1440P30) with Dual+Blend on Dual VIN.	OPEN
36234	[A12SDK][MSP][Hybrid-LISO][Dual vin]: LCD preview of PIP VIN is pinkish and shows a flickering effect when starting Main VIN (720P60) + PIP VIN (720P30) live view with dynamic layout change.	OPEN
36370	[A12SDK_6.2.005][MSP][USB Cam]: Occasionally the USBCam preview/clip shows a broken or discontinuous frame phenomenon.	OPEN
36393	[A12SDK_6.2.005][MSP]: The secondary stream's bitrate is out-of-setting when BRC settings are CBR or VBR with dual.	OPEN
36395	[A12SDK_6.2.005][MSP]: The secondary stream's bitrate is out-of-setting when executing Change Average Bitrate while encoding with dual.	OPEN
36443	[A12SDK_6.2.005][MSP][TA][USB Cam]: The system continuously prints "FrmDrop 1 FrmDrift 0 Rep 0 State 1" messages when starting Main VIN (1080P30) + PIP VIN (720P30) live view with TA.	OPEN
36485	[A12SDK_6.2.005][MSP][Dual vin]: The system continuously prints "FrmDrop 1 FrmDrift 0 Rep 0 State 1" messages when starting Main VIN (1080p30/ HDR1080P30) + PIP VIN (1080p30) live view with TA+Dual.	OPEN
36489	[A12SDK_6.2.005][MSP][ucode]: Backwards speed is wrong when decoding the golden data file at backward 1x.	OPEN
36491	[A12SDK_6.2.005][MSP]: System shows an error message when decoding PCM audio clips and is not smooth after encoding clip with audio for approximately 30 seconds.	OPEN
36504	[A12SDK_6.2.005][MSP][Hybrid-LISO][Dual vin]: The system continuously prints "FrmDrop 1 FrmDrift 0 Rep 0 State 1" messages while encoding Main VIN (720P60) + PIP VIN(720P30) clip with TA+Dual.	OPEN
36506	[A12SDK_6.2.005][MSP][Hybrid-LISO][Dual vin]: AmbaLL_Assert (1067/preview freeze/LOST VIN CH 0/MUXER not IDLE !!!!) after encoding Main VIN (720P60) + PIP VIN (720P30) clip with Dual+Blend+TA.	OPEN

Bug ID	Description	Status
36594	[A12SDK_6.2.005][MSP_UT][Hybrid-LISO][OV4689+USB Cam]: AmbaLL_Assert (1067/preview freeze/LOST VIN CH 0) when encoding Main VIN (1440P30) + PIP VIN (720P30) clip with Dual+Blend (start from dailybuild 2016/3/26).	OPEN
36611	[A12SDK_6.2.005][MSP_UT][Hybrid-LISO][Dual vin]: LCD preview flashes a pink frame when starting live view on Main VIN.	OPEN
36613	[A12SDK_6.2.005][MSP_UT][Hybrid-LISO][Dual vin]: AmbaLL_Assert(1067/preview freeze/LOST VIN CH 0) when performing Illegal Signal Detect with Main VIN (720P50) + PIP VIN (720P25) under Dual VIN.	OPEN
36636	[A12SDK_6.2.005][MSP_UT]: Differences exist when comparing golden data with External DeMuxer.	OPEN
36639	[A12SDK_6.2.005][MSP_UT][Hybrid-LISO]: AmbaLL_Assert (1067/previe freeze/AMP_ENC_EVENT_VDSP_ASSERT) when testing 3840x2160p30/2880x2160p30 bitstream spec with dual+THM.	OPEN

Table 2-53.   Bug Status: Middleware Support Package.

2.6.2   Bug Status: SVC

Bug ID	Description	Status
36462	[A12SDK_6.2.005][SSP][Dual vin]: The clip and playback mode show a broken effect at one second time under CH0 on 1440p30 HDR.(From:20160325)	OPEN
36568	[A12SDK_6.2.005][SSP]: Clock is not changed when setting clock on 1080p30.	OPEN
36580	[A12SDK_6.2.005][SSP]: CPU Exception occurs when decoding a clip after split. (From: 20160331)	OPEN
36581	[A12SDK_6.2.005][SSP][Dual vin]: CPU Exception occurs when decoding a clip after split.	OPEN
36617	[A12SDK_6.2.005][SSP_SVC][Dual vin]: The quick preview and photos are broken while taking a snapshot.	OPEN
36632	[A12SDK_6.2.005][SSP_SVC]: TV preview is black (have GUI) when enabling the rotate function with CVBS.	OPEN

Table 2-54.   Bug Status: SVC.

2.6.3   Bug Status: Connected App

Bug ID	Description	Status
36136	[A12SDK_6.2.005][Connected][Dual vin]: K_ASSERT (1473/LCD preview freezes) when triggering Event Recording then executing PIV on 1280x720 p30+1280x720 p30/HDR 1280x720 p30+1280x720 p30.	OPEN
36142	[A12SDK_6.2.005][Connected][Dual vin]: AmbaLL_Assert (1067, preview freezes) when executing PIV on 1280x720 p30 +1280x720 p30/HDR2560x1440 p30+1280x720 p30 under dual-channel.	OPEN
36188	[A12SDK_6.2.005][Connected][Dual vin]: The system hangs (CPU Exception! occurs and preview freezes) when PIV has completed and Event Recording is triggered.	OPEN
36358	[A12SDK6.2.005][Connectec][Taroko][IMX117]: Some photos are broken when executing PES capture (start from 20160317).	OPEN
36421	[A12SDK_6.2.005][Connected][Taroko][IMX117]: Clip is broken at the bottom when checking the second file's clip on PC/TV.	OPEN
36437	[A12SDK_6.2.005][Connected]: The secondary stream shows a flashing full-green rectangle at stamp location when invoking menu then encoding clip.	OPEN
36442	[A12SDK_6.2.005][Connected]: Occasionally the SD card cannot be recognized when USB cable is plugged in and the SD card is inserted/removed repeatedly.(Failure rate 8/10)	OPEN
36454	[A12SDK_6.2.005][Connected][Dual vin]: AmbaLL_Assert (1067, preview freezes) when switching to 1920x1080 p30+1920x1080 30p then waiting 20 seconds~ 2 minutes.(Start from 20160304dailybuild)	OPEN
36569	[A12SDK_6.2.005][Connected][AmbaRemoteCam][Dual vin]: AmbaLL_Assert (1067,preview freezes) when taking photo on unsupported PIV resolutions under dual-channel on AmbaRemoteCam.	OPEN
36593	[A12SDK_6.2.005][Connected][AR0230+OV9750][Dual vin]: The system hangs (CPU Exception! occurs and preview is black) when running Main VIN vignette calibration then executing PIP VIN vignette calibration.	OPEN
36641	[A12SDK6.2.005][Connected][Taroko][IMX117]: View angle of 1920x1080 p100 is different when compared to 1920x1080 p100 and 1920x1080 p60 (1920x1080 p30).	OPEN

Table 2-55.   Bug Status: Connected App.

2.6.4   Bug Status: Image Quality (IQ)

Bug ID	Description
	OPEN: Bug 36581 - [A12SDK_6.2.005][SSP][Dual vin]: CPU Exception occurs while decoding the clip after split file.(From: 20160331) Bug 36580 - [A12SDK_6.2.005][SSP]: CPU Exception occurs while decoding the clip after split file. (From: 20160331) Bug 36438 - [A12SDK_6.2.005][MSP][Dual vin][ov4689+ov4689][IQA]: AE flash effect occurs when light source moves (low-light condition). Bug 36420 - [A12SDK_6.2.005][MSP][ov4689][IQA]: AWB is slightly unstable under low-light condition. Bug 36418 - [A12SDK_6.2.005][MSP][Dual vin][ov4689+ov4689][IQA]: Frame jump effect occurs when light source moves.(HDR1080p30) Bug 35534 - [A12SDK][MSP][Hybrid-LISO][TA][Dual vin]: System continuously prints "[VIN_0] FrmDrop 1 FrmDrift 0 Rep 0 State 1" message when encoding 1440p30/1080p30 clip on Main VIN. **WILL NOT FIX:** Bug 33171 - [A12SDK_6.2.003][MSP][HDR][Dual vin][AR0230+OV9750]: Street lamp/reflection shows a strange pattern (scan effect) in night scene (AR0230). Bug 33969 - [A12SDK_6.2.003][connected][Dual vin][ov4689_b5_ov4689][IQA]: Block effect occurs when the light source moves in front of the lens. Bug 36396 - [A12SDK_6.2.005][MSP][Dual vin][ov4689+ov4689][IQA]: Block effect occurs when waving hand in front of the lens under HDR.

Table 2-56.   Bug Status: Image Quality.

2.7 SDK 6.2.005: QA Test Results

This section provides QA test results for version 6.2.005 of the A12 SDK as follows:

2.7.1 Test Parameters: Middleware Support Package

Test Parameter	Description
Code Information	Code info: ambalink_sdk_3_10_20160401.xml Rtos_20160401.xml u_code_version: Version = 254190 Date = 2016/3/30 API = 253682
Sensor Configuration	rtos_a12_mw_unittest_defconfig (Used OV4689 + B5_OV4689 & OV4689+B5_AR0230 & AR0230 + B5_ OV9750 & AR0230_USBcam & OV4689_USBcam & AR0230 & AR0237 & IMX078 & IMX117 & IMX290 & IMX317 & IMX322 & MN34222 & OV4689 & TI TVP5150 (YUV input))
Hardware Information	Dual VIN AR0230 with B5N (AB120-212-V10) Dual VIN OV9750 with B5F (R1B) Dual VIN OV4689 with B5N (AB120-202-V10) Dual VIN OV4689 with B5F (AB120-203-V10) Dual VIN AR0230 with B5F (AB120-213-V10) WINTEK LCD (AB041-205-V32) T30P61 LCD (AB041-205-V40) EVK Dragonfly (AB120-101-V11A) EVK Dragonfly (AB120-101-V20A) OV4689 (AB074-211-V10) AR0237 (AB120-208-V10) AR0230 (AB120-208-V10) IMX078 (AB071-204-V10) IMX290 (AB120-215-V10) IMX317 (AB094-202-V10) IMX322 (AB074-208-V10) IMX117 (AB074-202-V10) MN34222 (AB120-217-V10)

Video Resolution	**Express Mode** IMX078 [PAL] All Resolutions IMX117 [NTSC] All Resolutions OV4689 [PAL] All Resolutions IMX317 [NTSC] 1280x720p120 IMX117 [NTSC] 1280x720p120 **Hybrid Mode+TA** AR0230 + OV9750 [PAL] All Resolutions OV4689 + OV4689 [NTSC] All Resolutions OV4689 + AR0230 [PAL] All Resolutions OV4689 + USBCAM [PAL] All Resolutions OV4689 + USBCAM [NTSC] All Resolutions IMX078 [NTSC] All Resolutions IMX117 [PAL] All Resolutions IMX322 [NTSC] All Resolutions OV4689 [NTSC] All Resolutions AR0230 [NTSC] All Resolutions AR0237 [PAL] All Resolutions MN34222 [NTSC] All Resolutions IMX317 [NTSC] All Resolutions IMX117 [NTSC] 3840x2160p30/2880x2160p30/2560x1440p60 **Hybrid Mode** IMX290 [NTSC] All Resolutions IMX322 [NTSC/PAL] 1920x1080p30/1920x1080p25 AR0230 [NTSC] 1920x1080p30/1920x1080p60/1280x720p30/1280x720p60 AR0237 [NTSC] 1920x1080p30/1920x1080p30 HDR MN34222 [PAL] 1920x1080p25/1920x1080p50
Still Capture Size	AR0230 + OV9750 All Photo Sizes OV4689 + OV4689 All Photo Sizes OV4689 + AR0230 All Photo Sizes IMX078 All Photo Sizes IMX117 All Photo Sizes IMX290 All Photo Sizes IMX317 All Photo Sizes IMX322 All Photo Sizes OV4689 All Photo Sizes AR0230 All Photo Sizes AR0237 All Photo Sizes MN34222 All Photo Sizes

Table 2-57.   Test Parameters: Middleware Support Package.

2.7.2 Test Results: Middleware Support Package

Feature		Test Result	Note
Display	1080p60 HDMI	Pass	
	LCD	Pass	Bug 36198 Bug 36611 Bug 36370
Standby Mode	Minimal PLL Clocks / Wake up by INT	Pass	
VIN Signal Loss Handling	Illegal Signal Detection	Pass	
Video Encode	YUV Input/Output	Pass	
	Normal Encode	Pass	Bug 36215 Bug 36443 Bug 36485 Bug 36504 Bug 36506 Bug 36594
	PIV (Non-HDR Resolutions) Single VIN - Interpolation up to 3840x2160 (Performance Bound) When EIS is enabled, resolution = main stream resolution Dual VIN - Same as capture window, no interpolation; Both channels must have the same frame rate	Pass	
	Video Thumbnail	Pass	
	Bitrate Control - Constant Bitrate , Variable Bitrate Monitor	Pass	Bug 36393 Bug 36395 Bug 36639
	Date/Time Stamp (Performance Bound)	Pass	
	QP/AQP Control	Pass	
	Digital Zoom 4X (Single VIN Mode Only)(2x at 3840x2160p30/p25)	Pass	
	Time Lapse Encode (Single VIN Mode Only)	Pass	
	180' Rotation (Single VIN Mode Only)	Pass	
	Slow Shutter – 0.5x (Single VIN Mode Only)	Pass	
	High Dynamic Range (VIN Channel 0 Only)	Pass	Bug 36234

Video Encode (Continued)	Temporal Adjustment (Dual-channel QHD + QHD Not Supported)	Pass	
	USB Cam 854x480p30 MJPEG Input	Pass	
	Low-Delay Display (On one VOUT)	Pass	
	Low-Delay Encode	Pass	
Still Capture	Raw Capture	Pass	
	Raw To YUV – LISO/HISO/MISO	Pass	Bug 36170
	Raw To YUV – Interpolation Max Width 7680	Pass	
	Raw To Raw – 3A Statistics	Pass	
	YUV To JPEG – Bitrate Control	Fail	
	Burst Capture (Single VIN Mode Only)	Pass	
	PES Capture (Single VIN Mode Only)	Pass	
	AEB Capture (Single VIN Mode Only)	Pass	
	180' Rotation	Pass	
Video Decode	Forward/Backward Normal/Fast/Slow , Step , Time Search , PB Zoom , Pause/Resume	Pass	Bug 36489
Still Decode	Scrolling , Cropping , Blending	Pass	
Calibration	Black Level Correction , Bad Pixel Correction , Vignette , White Balance (with Flash Calibration) , Warp	Pass	
Display	Color Space Conversion	Pass	
Audio	Encode/Decode : AAC/PCM	Pass	Bug 36491
OSD	8 bit , 16 bit (Performance Bound) , 32 bit (Performance Bound)	Pass	
Format	EXIF	Pass	
	MP4/MOV MUX/DEMUX/RECOVERY	Pass	
DCF	Index/Sorting Infrastructure	Pass	

Cached File System	System for File Search/Status Request	Pass	
	Async File Read/Write	Pass	
AmbaLink / Net-FIFO	Streaming via WiFi / Net Control via WiFi / Notifier Between Two Operating Systems / Linux NetFIFO Status Report / Information For Online Playback Request / Information for Bandwidth Adjustment	Pass	
Boot Mode	NAND Boot , eMMC Boot , SPI NOR Boot	Pass	
File System	FAT16 , FAT32 , ExFAT	Pass	

Table 2-58.   Test Results: Middleware Support Package.

2.7.3 Test Parameters: SVC

Test Parameter	Description
Code Information	Code info: ambalink_sdk_3_10_20160401.xml Rtos_20160401.xml u_code_version: Version = 254190 Date = 2016/3/30 API = 253682
Hardware Information	Dual VIN OV4689 with B5N (AB120-202-V10) Dual VIN OV4689 with B5F (AB120-203-V10) Sony IMX117 (AB074-202-V10) Sony IMX078 (AB071-204-V10) WINTEK LCD (AB041-205-V32) T30P61 LCD (AB041-205-V40) EVK Dragonfly (AB120-101-V20A)
Sensor Configuration	rtos_a12_ssp_svc_ov4689_b5ov4689_dragonfly_defconfig rtos_a12_ssp_svc_ov4689_b5ov4689_dragonfly_t30p61_defconfig rtos_a12_ssp_svc_imx117_dragonfly_defconfig rtos_a12_ssp_svc_imx117_dragonfly_t30p61_defconfig rtos_a12_ssp_svc_imx078_dragonfly_defconfig rtos_a12_ssp_svc_imx078_dragonfly_t30p61_defconfig

Table 2-59.   Test Parameters: SVC.

2.7.4 Test Results: SVC

Feature		Test Result	Note
Display	1080p60 HDMI (3840x2160p30/p25 supports LCD only)	Pass	
	LCD	Pass	
Video Encode	PIV – Same as main window size (3840x2160p30/p25, 1920x1080p120/p100, 1280x720p240/p200 do not support PIV)	Pass	
	Video Thumbnail	Pass	
	Bitrate Control	Pass	
	Date/Time Stamp	Pass	
	Digital Zoom 3X	Pass	

Video Encode Continued	Time-Lapse Encode	Pass	
Still Capture	Raw Capture	Pass	
	Raw to YUV – LISO/HISO	Pass	
	Raw to Raw	Pass	
	YUV to JPEG – Bitrate Control	Pass	
	Burst Capture	Pass	
	PES Capture	Pass	
	AEB Capture	Pass	
Video Decode	Forward/Backward Normal/Fast/Slow , Step , Time Search , PB Zoom , Pause/Resume	Pass	
Still Decode	Zoom In/Out , Rotation	Pass	
Calibration	Black Level Correction , Bad Pixel Correction , Vignette , Chroma Abbreviation , Warp	Pass	
Audio	Encode/Decode : AAC	Pass	
OSD	8 bit	Pass	
Format	EXIF	Pass	
	MOV MUX/DEMUX/RECOVERY	Pass	
Ambalink/Net-FIFO	Remote Processor Messaging (RPMsg)	Pass	
	Remote Procedure Call (RPC)	Pass	
	IPC Spin Lock	Pass	
	IPC Mutex	Pass	
	Virtual File System Support for AmbaFS	Pass	
	SDIO WiFi	Pass	
	Linux Suspend/Resume	Pass	
Boot Mode	NAND Boot	Pass	

File System	FAT16 , FAT32 , ExFAT		Pass	

Table 2-60.   Test Results: SVC.

2.7.5 Test Parameters: Connected App

Test Parameter	Description
Code Information	Code info: ambalink_sdk_3_10_20160401.xml Rtos_20160401.xml u_code_version: Version = 254190 Date = 2016/3/30 API = 253682
Hardware Information	Dual VIN OV9750 with B5F (R1B) Dual VIN OV4689 with B5N (AB120-202-V10) Dual VIN OV4689 with B5F (AB120-203-V10) Dual VIN AR0230 with B5F (AB120-213-V10) WINTEK LCD (AB041-205-V32) T30P61 LCD (AB041-205-V40) EVK Dragonfly (AB120-101-V11A) EVK Dragonfly (AB120-101-V20A) Taroko-OV4689 (AB121-203-V10) Taroko-IMX117 (AB121-202-V11) Taroko OptionA (AB121-101-V20) AR0237 (AB120-208-V10) AR0230 (AB120-208-V10) IMX078 (AB071-204-V10) IMX290 (AB120-215-V10) IMX317 (AB094-202-V10) IMX322 (AB074-208-V10) MN34222 (AB120-217-V10) eMMC_IMX206 (AB120-211-V10)
Sensor Configuration	rtos_a12_app_connected_multi_vin_ov4689_b5_ov4689_defconfig rtos_a12_app_connected_multi_vin_ov4689_b5_ar0230_defconfig rtos_a12_app_connected_multi_vin_ar0230_b5_ov9750_defconfig rtos_a12_app_connected_multi_vin_ar0230_usbcam_defconfig rtos_a12_app_connected_ov4689_taroko_defconfig rtos_a12_app_connected_imx117_taroko_defconfig rtos_a12_app_connected_ar0230_defconfig rtos_a12_app_connected_ar0237_defconfig rtos_a12_app_connected_imx078_defconfig rtos_a12_app_connected_imx290_defconfig rtos_a12_app_connected_imx317_defconfig rtos_a12_app_connected_imx322_defconfig rtos_a12_app_connected_mn34222_defconfig rtos_a12_emmc_app_connected_imx206_396MHz_defconfig

Table 2-61.   Test Parameters: Connected App.

2.7.6   Test Results: Connected App

Feature		Test Result	Note
Display – Decode	LCD (Encode/Decode)	Pass	
	LCD+1080p60 HDMI (Decode)	Pass	
	LCD + 480i Composite	Pass	
Video Encode	Normal Encode / Loop Encoding	Pass	Bug 36421 Bug 36437 Bug 36454 Bug 36641
	USB Camera Encoding (Input: 864x480 YUV, Encode: 1280x720)	Pass	
	Second Stream: Single VIN (For streaming saving to SD card) 1280x720p30/p25 4Mbps Multi VIN (Second streams are disabled if any main stream is 2560x1440 P30 and 1080p30HDR + 1080p30 with Dual-VIN.)	Pass	
	Variable Bitrate Control - 0.75x~1.25x	Pass	
	PIV (Size is the current capture size of sensor mode ; When EIS is enabled, the size is the current main size.)	Pass	Bug 36142 Bug 36569
	Slow Shutter: 0.5x (Frame rate > 30; Slow Shutter is disabled if EIS is enabled)	Pass	
	Date/Time Stamp	Pass	
	Event Recording: Single VIN (Save main and second stream in EVENT folder; Default: 10+20 seconds.) (IMX078, IMX117, IMX317 are not supported) Multi-VIN (Only save the second stream in EVENT folder. 2560X1440 p30 or 1080p30HDR+1080p30 are not supported)	Pass	Bug 36136 Bug 36188 Bug 36454
	USB Camera Encoding (Input: 864x480 YUV; Encode: 1280x720; Single stream only)	Pass	
	EIS (Does not support slow shutter)	Pass	
	Encode Low Delay (HFR, 4Kp30 and 4Mp60 are not supported)	Pass	

Video Encode Continued	Liveview Low Delay (HFR, 4K resolution, 2880x2160p30 and 4Mp60 are not supported) Liveview Low Delay is disabled in USB Cam, and Dual VIN with one 2560x1440p30 or one 2560x1440p30HDR	Pass	
Still Capture	Single Capture	Pass	
	Burst Capture (Single-VIN Configuration Only)	Pass	
	PES Capture (Single-VIN Configuration Only)	Pass	Bug 36358
	Date/Time Stamp	Pass	
Video Decode	Forward – Normal/Fast/Slow , Backward – Normal/Fast/Slow , Step , Pause/Resume	Pass	
Still Decode	Thumbnail Playback , Single Photo Playback	Pass	
Calibration	Black Level Correction , Bad Pixel Correction, Chroma Abbreviation , Warp, White Balance, Vignette	Pass	Bug 36593
Audio	Encode/Decode: AAC	Pass	
OSD	8-bit OSD	Pass	
Format	JPEG and EXIF	Pass	
	MP4 Mux/Demux	Pass	
	Recovery	Pass	
DCF	Date / Time Naming Rule	Pass	
USB	Mass Storage	Pass	
Control	Button (EVK Dragonfly)	Pass	
	IR Remote Control	Pass	
	Ambalink Network Control	Pass	Bug 36569

AmbaLink	Liveview Streaming: Single VIN – Supports 1st VIN Multi-VIN - (2560X1440 p30 or 1080p30HDR + 1080p30 are not supported if Dual-VIN is enabled)	Pass	
	Upload / Download File	Pass	
	Playback Streaming	Pass	
	Seamless Playback Streaming	Pass	
	AMBA_START_SESSION AMBA_STOP_SESSION AMBA_RESETVF AMBA_STOP_VF AMBA_RECORD_START AMBA_RECORD_STOP AMBA_GET_RECORD_TIME AMBA_SET_SETTING > VIDEO_RESOLUTION AMBA_SET_SETTING > VIDEO_QUALITY AMBA_TAKE_PHOTO (Single VIN Only) AMBA_NOTIFICATION > CONTINUE_BURST_ COMPLETE AMBA_CONTINUE_CAPTURE_STOP AMBA_SET_SETTING > CAPTURE_MODE AMBA_DEL_FILE AMBA_LS AMBA_CD AMBA_PWD AMBA_GET_FILE AMBA_CANCEL_FILE_XFER AMBA_NOTIFICATION > GET_FILE_COMPLETE AMBA_PUT_FILE AMBA_NOTIFICATION > PUT_FILE_COMPLETE AMBA_CANCEL_FILE_XFER AMBA_GET_THUMB AMBA_GET_MEDIAINFO AMBA_SET_MEDIA_ATTRIBUTE AMBA_QUERY_SESSION_HOLDER AMBA_FORMAT AMBA_GET_SPACE AMBA_GET_NUMB_FILES AMBA_GET_DEVICEINFO AMBA_SET_SETTING > CAMERA_CLOCK AMBA_GET_SETTING > CAMERA_CLOCK AMBA_SET_SETTING > DEFAULT_SETTING AMBA_WIFI_RESTART AMBA_SET_WIFI_SETTING AMBA_GET_WIFI_SETTING AMBA_WIFI_STOP AMBA_WIFI_START	Pass	
Miscellaneous	GPS Information	Pass	
	Partial Load (Single VIN Configuration Only)	Pass	

Table 2-62.   Test Results: Connected App.

2.7.7 Test Parameters: Image Quality (IQ)

Test Parameter	Description
uCode Version	[00016590][CA9] Version = 254190 [00016590][CA9] Date = 2016/3/30 [00016590][CA9] API = 253682 [00016590][CA9] Silicon = 199 [00016590][CA9] init_data = 0x63e960
Reference Firmware	20151124_A12SDK6.2.003_u01_release 20151230_A12SDK6.2.004_release 20160129_A12SDK6.2.003_u02_release
Hardware Information	EVK - Dragonfly (AB120-101-V11A) - Dragonfly (AB120-101-V20A) LCD Board - WINTEK LCD (AB041-205-V32) Sensor Board - AR0230CS (AB120-208-V10) - AR0237 (AB120-208-V10) - Sony IMX078 (AB071-204-V10) - Sony IMX117 (AB074-202-V10) - Sony IMX290 (AB120-215-V10) - Sony IMX317 (AB094-202-V10) - Sony IMX322 (AB074-208-V10) - MN34222 (AB120-217-V10) - OV4689 (AB074-211-V10) Dual-VIN Sensor Board - AR0230CS_B5N(AB120-212-V11) + OV9750_B5F (AB093-205-V10) - OV4689_B5N (AB120-202-V10) + AR0230_B5F (AB120-213-V10) - OV4689_B5N (AB120-202-V10) + OV4689_B5F (AB120-203-V10)

Table 2-63.   Test Parameters: Image Quality (IQ).

2.7.8 Test Results: Image Quality (IQ)

Sensor	Resolution	Config	MTF50U AVG (LW/PH)	AVG SNR (dB)	Note
OV4689 + OV4689	AVG	20160401_005_APP	1888	26.94	APP=APP
		20160129_003_APP	1822	29.59	APP=APP
		20160401_005_MW	1828	25.57	Bug 36420
		20160129_003_MW	1881	29.76	Bug 36420
		20160401_005_SSP	1824	25.79	Bug 36581

OV4689 + AR0230	AVG	20160401_005_APP	1915	31.25	Bug 36420
		20160129_003_APP	1975	27.98	Bug 36420
		20160401_005_MW	1897	31.74	Bug 36420
		20160129_003_MW	1906	31.67	Bug 36420
AR0230 + OV9750	AVG	20160401_005_APP	1545	33.46	Similar
		20160129_003_APP	1592	32.71	Similar
		20160401_005_MW	1563	34.97	Similar
		20160129_003_MW	1562	34.47	Similar
IMX117	1080p30	20160401_005_APP	1189	39.03	
		20160129_003_APP	1175	39.82	
		20160401_005_MW	1150	39.04	
		20160129_003_MW	1157	39.69	
		20160401_005_SSP	1085	38.54	Crop (EIS_ON-> shake)
		20160129_003_SSP	1157	39.74	
	4kp30	20160401_005_APP	2760	28.25	Similar
		20160401_005_MW	2760	28.26	Similar
		20160401_005_SSP	2729	28.49	Bug 36580
IMX317	4kp30	20160401_005_APP	2388	28.88	New Item
		20160401_005_MW	2424	28.70	
IMX322	1080p30	20160401_005_APP	1848	37.74	New Item
		20160401_005_MW	2024	37.08	

IMX078	4kp30	20160401_005_APP	2200	27.78	Similar
		20151230_004_APP	2283	27.85	Similar
		20160401_005_MW	2188	28.13	Similar
		20151230_004_MW	2210	28.10	Similar
		20160401_005_SSP	2225	27.78	Bug 36580
		20151230_004_SSP	2247	27.77	Similar
AR0230	AVG	20160401_005_APP	2072	32.11	Similar
		20160129_003_APP	2018	32.11	Similar
		20160401_005_MW	2065	31.35	Similar
		20160129_003_MW	2091	31.37	Similar
AR0237	AVG	20160401_005_APP	1854	30.81	Bright (More noise)
		20160129_003_APP	1847	31.89	
		20160401_005_MW	1882	29.64	Bright (More noise)
		20160129_003_MW	1924	30.92	
IMX290	HDR_1080p30	20160401_005_APP	1717	36.26	Similar
		20160129_003_APP	1762	36.78	Similar
		20160401_005_MW	1751	34.59	Similar
		20160129_003_MW	1749	34.66	Similar
MN34222	HDR_1080p30	20160401_005_APP	1895	32.66	Similar
		20151124_003_APP	1840	32.75	Similar
		20160401_005_MW	1837	31.38	Similar
		20151124_003_MW	1882	31.90	Similar
OV4689	AVG	20160401_005_APP	1728	29.96	Sharp and more noise
		20160129_003_APP	1720	32.46	
		20160401_005_MW	1749	29.24	Sharp and more noise
		20160129_003_MW	1685	31.99	

Table 2-64.   Test Results: Image Quality (IQ).

2.8   SDK 6.2.005: Power Measurement Test Results

2.8.1 Power Measurement Test Parameters: Dragonfly + Aptina AR0230 (APP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	AR0230 CS Sensor Board (P1501106014)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	15 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

		1.Built amba_app.elf by hlchang@ambtwubu7 at Mon Mar 28 02:13:09 CST 2016
Firmware	Code Information	2. [00000444][CA9] ============================== [00000444][CA9] version = 253745 [00000444][CA9] date = 2016/3/23 [00000444][CA9] api = 253682 [00000444][CA9] silicon = 3750 [00000444][CA9] init_data = 0x4db980 [00000444][CA9] ============================== 3.FW link:\\qanas3\Daily_Build\20160328\A12SDK_6_2_005_

Case Configurations	Case 1	1920x1080p60+1280x720p30
		Dual Encode
		Capture Window: 1920x1080
		CFA: 1920x1080
		Second Stream: 1280x720p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		        Info.Video.M = 1
		        Info.Video.N = 60
		        Info.Video.GOPSize = 60
		Audio Format: AAC + AAC
		Temp (T_c): 43
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 208

	Case 2	HDR 1920x1080p30+1280x720p30
		Dual Encode
		Capture Window: 1920x2434
		CFA: 1920x1080
		Second Stream: 1280x720p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		        Info.Video.M = 1
		        Info.Video.N = 30
		        Info.Video.GOPSize = 30
		Audio Format: AAC + AAC
		Temp (T_c): 39.6
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 90

Case Configurations (Continued)	Case 3	HDR 1280x720p30+1280x720p30
		Dual Encode
		Capture Window: 1920x2434
		CFA: 1792x1008
		Second Stream: 1280x720p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		     Info.Video.M = 1
		     Info.Video.N = 30
		     Info.Video.GOPSize = 30
		Audio Format: AAC + AAC
		Temp (T_c): 40.1
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 186

Table 2-65.   Power Measurement Test Parameters: Dragonfly + Aptina AR0230 (APP).

2.8.2 Power Measurement Test Results: Dragonfly + Aptina AR0230 (APP)

Case [1]	Channel	Power							Total Power (mW)
		SOC_VDD 1.0 V	SOC_VDDA 1.0 V	SOC_VDRAM 1.5 V	SOC_VDDA18 1.8 V	SOC_VDDA 3.0 V	SOC_VDD 3.0 V	DRAM_VDRAM 1.5 V	
1	Voltage (V)	1.000	0.992	1.499	1.797	3.004	2.996	1.498	1278.40
	Current (mA)	681.3	16.2	83.7	13.4	1.8	49.2	186.2	
	Power (mW)	681.2	16.1	125.4	24.1	5.4	147.4	278.8	
2	Voltage (V)	1.000	0.993	1.504	1.797	3.004	2.997	1.504	1054.71
	Current (mA)	560.5	14.1	69.0	13.5	1.8	49.5	132.1	
	Power (mW)	560.3	14.0	103.8	24.3	5.4	148.4	198.7	
3	Voltage (V)	1.000	0.993	1.504	1.797	3.004	2.997	1.499	962.58
	Current (mA)	528.9	14.1	59.4	13.5	1.7	49.7	101.4	
	Power (mW)	528.9	14.0	89.3	24.3	5.1	149.0	152.0	

Table 2-66.   Power Measurement Test Results: Dragonfly + Aptina AR0230 (APP).

Notes:

1. Refer to Section 2.8.1 "Power Measurement Test Parameters: Dragonfly + Aptina AR0230 (APP)" for Case definitions.

2.8.3   Power Measurement Test Parameters: Dragonfly + Aptina AR0230 (MSP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	AR0230CS Sensor Board (P1501106014)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	15 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_app.elf by hlchang@ambtwubu7 at Mon Mar 28 02:13:09 CST 2016 2. [00227531][CA9] ============================== [00227531][CA9] version = 253745 [00227531][CA9] date = 2016/3/23 [00227531][CA9] api = 253682 [00227531][CA9] silicon = 199 [00227531][CA9] init_data = 0x63e960 [00227531][CA9] ============================== 3.FW link:\\qanas3\Daily_Build\20160328\A12SDK_6_2_005_

Case Configurations	Case 1	1920x1080p30+1920x1080p30
		Dual Encode
		Capture Window: 1920x1080
		CFA: 1920x1080
		Second Stream: 1920x1080p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		      Info.Video.M = 1
		      Info.Video.N = 30
		      Info.Video.GOPSize = 30
		Audio Format: N/A
		Temp (T_c): 41.5
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 139.2

	Case 2	HDR 1920x1080p30+1920x1080p30
		Dual Encode
		Capture Window: 1920x2434
		CFA: 1920x1080
		Second Stream: 1920x1080p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		      Info.Video.M = 1
		      Info.Video.N = 30
		      Info.Video.GOPSize = 30
		Audio Format: N/A
		Temp (T_c): 42.4
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 90

Table 2-67.   Power Measurement Test Parameters: Dragonfly + Aptina AR0230 (MSP).

2.8.4 Power Measurement Test Results: Dragonfly + Aptina AR0230 (MSP)

Case [1]	Channel	Power							Total Power (mW)
		SOC_ VDD 1.0 V	SOC_ VDDA 1.0 V	SOC_ VDRAM 1.5 V	SOC_ VDDA18 1.8 V	SOC_ VDDA 3.0 V	SOC_ VDD 3.0 V	DRAM_ VDRAM 1.5 V	
1	Voltage (V)	1.000	0.993	1.504	1.797	3.004	2.997	1.497	1037.74
	Current (mA)	604.5	12.6	59.7	13.5	0.5	49.8	104.2	
	Power (mW)	604.4	12.5	89.8	24.3	1.5	149.2	156.0	
2	Voltage (V)	1.000	0.992	1.502	1.796	3.004	3.004	1.496	1115.35
	Current (mA)	606.8	12.6	73.3	14.6	0.4	49.9	139.5	
	Power (mW)	606.7	12.5	110.1	26.2	1.2	149.9	208.7	

Table 2-68.   Power Measurement Test Results: Dragonfly + Aptina AR0230 (MSP).

Notes:

1. Refer to Section 2.8.3 "Power Measurement Test Parameters: Dragonfly + Aptina AR0230 (MSP)" for Case definitions.

2.8.5 Power Measurement Test Parameters: Dragonfly + Aptina AR0237 (APP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	AR0237 Sensor Board (P150922019)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	15 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Impedance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Impedance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_app.elf by hlchang@ambtwubu7 at Mon Mar 28 02:16:19 CST 2016 2. [00000690][CA9] ============================== [00000690][CA9] version = 253745 [00000690][CA9] date = 2016/3/23 [00000690][CA9] api = 253682 [00000690][CA9] silicon = 3750 [00000690][CA9] init_data = 0x4da980 [00000690][CA9] ============================== 3.FW link:\\qanas3\Daily_Build\20160328\A12SDK_6_2_005_

Case Configurations	Case 1	HDR 1920x1080p30+1280x720p30
		Dual Encode
		Capture Window: 1920x2434
		CFA: 1920x1080
		Second Stream: 1280x720p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		    Info.Video.M = 1
		    Info.Video.N = 30
		    Info.Video.GOPSize = 30
		Audio Format: AAC + AAC
		Temp (T_c): 39.3
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 90

Table 2-69.   Power Measurement Test Parameters: Dragonfly + Aptina AR0237 (APP).

2.8.6 Power Measurement Test Results: Dragonfly + Aptina AR0237 (APP)

Case [1]	Channel	Power							Total Power (mW)
		SOC_ VDD 1.0 V	SOC_ VDDA 1.0 V	SOC_ VDRAM 1.5 V	SOC_ VDDA18 1.8 V	SOC_ VDDA 3.0 V	SOC_ VDD 3.0 V	DRAM_ VDRAM 1.5 V	
1	Voltage (V)	1.000	0.993	1.500	1.796	3.003	2.997	1.501	1060.79
	Current (mA)	564.7	14.0	70.0	13.5	1.8	49.3	132.9	
	Power (mW)	564.9	13.9	105.0	24.3	5.4	147.8	199.5	

Table 2-70. Power Measurement Test Results: Dragonfly + Aptina AR0237 (APP).

Notes:

1. Refer to Section 2.8.5 "Power Measurement Test Parameters: Dragonfly + Aptina AR0237 (APP)" for Case definitions.

2.8.7 Power Measurement Test Parameters: Dragonfly + Aptina AR0237 (MSP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	AR0237 Sensor Board (P150922019)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	15 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_app.elf by hlchang@ambtwubu7 at Mon Mar 28 02:13:09 CST 2016 2. [00227531][CA9] =============================== [00227531][CA9] version = 253745 [00227531][CA9] date = 2016/3/23 [00227531][CA9] api = 253682 [00227531][CA9] silicon = 199 [00227531][CA9] init_data = 0x63e960 [00227531][CA9] =============================== 3.FW link:\\qanas3\Daily_Build\20160328\A12SDK_6_2_005_

Case Configurations	Case 1	1920x1080p30+1920x1080p30
		Dual Encode
		Capture Window: 1920x1080
		CFA: 1920x1080
		Second Stream: 1920x1080p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		    GopM 1
		    GopN 30
		    GopIDR 30
		Audio Format: N/A
		Temp (T_c): 41.6
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 139.2

	Case 2	HDR 1920x1080p30+1920x1080p30
		Dual Encode
		Capture Window: 1920x2394
		CFA: 1920x1080
		Second Stream: 1920x1080p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		    GopM 1
		    GopN 30
		    GopIDR 30
		Audio Format: N/A
		Temp (T_c): 42.3
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 90

Table 2-71.   Power Measurement Test Parameters: Dragonfly + Aptina AR0237 (MSP).

2.8.8 Power Measurement Test Results: Dragonfly + Aptina AR0237 (MSP)

Case [1]	Channel	Power							Total Power (mW)
		SOC_VDD 1.0 V	SOC_VDDA 1.0 V	SOC_VDRAM 1.5 V	SOC_VDDA18 1.8 V	SOC_VDDA 3.0 V	SOC_VDD 3.0 V	DRAM_VDRAM 1.5 V	
1	Voltage (V)	1.000	0.993	1.498	1.795	3.004	3.003	1.499	1045.13
	Current (mA)	605.5	12.3	60.5	14.5	0.4	50.7	105.0	
	Power (mW)	605.4	12.2	90.6	26.0	1.2	152.2	157.4	
2	Voltage (V)	1.000	0.993	1.499	1.796	3.004	2.995	1.501	1112.39
	Current (mA)	609.6	12.6	69.3	14.6	0.4	50.1	139.3	
	Power (mW)	609.5	12.5	103.9	26.2	1.2	150.1	209.0	

Table 2-72.   Power Measurement Test Results: Dragonfly + Aptina AR0237 (MSP).

Notes:

1. Refer to Section 2.8.7 "Power Measurement Test Parameters: Dragonfly + Aptina AR0237 (MSP)" for Case definitions.

2.8.9 Power Measurement Test Parameters: Dragonfly + Sony IMX078 (APP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	Sony IMX078 Sensor Board (P101117008)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	15 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Impedance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Impedance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_app.elf by hlchang@ambtwubu7 at Mon Mar 28 02:19:42 CST 2016 2. [00000473][CA9] ============================== [00000473][CA9] version = 253745 [00000473][CA9] date = 2016/3/23 [00000473][CA9] api = 253682 [00000473][CA9] silicon = 2750 [00000473][CA9] init_data = 0x4da980 [00000473][CA9] ============================== 3.FW link:\\qanas3\Daily_Build\20160328\A12SDK_6_2_005_

Case Configurations	Case 1	3840x2160p30+768x432p30
		Dual Encode
		Capture Window: 3840x2160
		CFA: 3840x2160
		Second Stream: 768x432p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		        Info.Video.M = 1
		        Info.Video.N = 30
		        Info.Video.GOPSize = 30
		Audio Format: AAC + AAC
		Temp (T_c): 49.2
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 408

	Case 2	2880x2160p30+1280x720p30
		Dual Encode
		Capture Window: 3840x2160
		CFA: 3840x2160
		Second Stream: 1280x720p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		        Info.Video.M = 1
		        Info.Video.N = 30
		        Info.Video.GOPSize = 30
		Audio Format: AAC + AAC
		Temp (T_c): 48.1
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 396

Table 2-73.   Power Measurement Test Parameters: Dragonfly + Sony IMX078 (APP).

2.8.10   Power Measurement Test Results: Dragonfly + Sony IMX078 (APP)

Case [1]	Channel	Power							Total Power (mW)
		SOC_ VDD 1.0 V	SOC_ VDDA 1.0 V	SOC_ VDRAM 1.5 V	SOC_ VDDA18 1.8 V	SOC_ VDDA 3.0 V	SOC_ VDD 3.0 V	DRAM_ VDRAM 1.5 V	
1	Voltage (V)	1.000	0.993	1.500	1.797	3.004	2.997	1.504	1577.04
	Current (mA)	905.6	14.6	101.0	16.9	1.8	53.7	205.5	
	Power (mW)	905.3	14.5	151.5	30.4	5.4	160.9	309.0	
2	Voltage (V)	1.000	0.993	1.501	1.797	3.004	2.997	1.498	1504.52
	Current (mA)	873.7	14.3	94.6	16.9	3.2	53.4	183.2	
	Power (mW)	873.9	14.2	141.9	30.4	9.6	160.0	274.5	

Table 2-74.   Power Measurement Test Results: Dragonfly + Sony IMX078 (APP).

Notes:

1. Refer to Section 2.8.9 "Power Measurement Test Parameters: Dragonfly + Sony IMX078 (APP)" for Case definitions.

2.8.11 Power Measurement Test Parameters: Dragonfly + Sony IMX078 (SVC)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	Sony IMX078 Sensor Board (P101117008)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	15 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_ssp_svc.elf by hlchang@ambtwubu7 at Mon Mar 28 03:17:08 CST 2016 2.[00000488][CA9] =============================== [00000488][CA9] version = 253745 [00000488][CA9] date = 2016/3/23 [00000488][CA9] api = 253682 [00000488][CA9] silicon = 199 [00000488][CA9] init_data = 0x406980 [00000488][CA9] =============================== 3.FW link:\\qanas3\Daily_Build\20160328\A12SDK_6_2_005_
Case Configurations	Case 1	3840x2160p30+768x432p30 Dual Encode Capture Window: 3840x2160 CFA: 3840x2160 Second Stream: 768x432p30 Scene: Worst Case - Complex VOUT: LCD On Video Format: AVC + AVC GOP Format: N/A Audio Format: AAC + AAC Temp (T_c): 50 Temp (T_a): Room Clock: Cortex DRAM Core IDSP 792 600 432 456
	Case 2	2720x1520p30+768x432p30 Dual Encode Capture Window: 3840x2160 CFA: 3600x2026 Second Stream: 768x432p30 Scene: Worst Case - Complex VOUT: LCD On Video Format: AVC + AVC GOP Format: N/A Audio Format: AAC + AAC Temp (T_c): 45.6 Temp (T_a): Room Clock: Cortex DRAM Core IDSP 792 600 396 312
	Case 3	2560x1440p60+768x432p30 Dual Encode Capture Window: 3680x2080 CFA: 2720x1530 Second Stream: 768x432p30 Scene: Worst Case - Complex VOUT: LCD On Video Format: AVC + AVC GOP Format: N/A Audio Format: AAC + AAC Temp (T_c): 49.7 Temp (T_a): Room Clock: Cortex DRAM Core IDSP 792 600 432 312

Table 2-75.   Power Measurement Test Parameters: Dragonfly + Sony IMX078 (SVC).

2.8.12 Power Measurement Test Results: Dragonfly + Sony IMX078 (SVC)

Case [1]	Channel	Power							Total Power (mW)
		SOC_VDD 1.0 V	SOC_VDDA 1.0 V	SOC_VDRAM 1.5 V	SOC_VDDA18 1.8 V	SOC_VDDA 3.0 V	SOC_VDD 3.0 V	DRAM_VDRAM 1.5 V	
1	Voltage (V)	1.000	0.993	1.498	1.796	3.004	2.996	1.501	1618.76
	Current (mA)	936.3	14.4	101.5	16.8	1.8	54.1	212.0	
	Power (mW)	936.6	14.3	152.0	30.2	5.4	162.1	318.2	
2	Voltage (V)	1.000	1.009	1.498	1.796	3.004	2.996	1.500	1303.73
	Current (mA)	752.0	14.4	76.0	16.8	1.8	54.1	150.5	
	Power (mW)	752.0	14.5	113.9	30.2	5.4	162.1	225.7	
2	Voltage (V)	1.000	0.993	1.500	1.804	3.004	3.003	1.502	1623.95
	Current (mA)	903.8	14.6	105.3	16.9	1.8	54.2	232.5	
	Power (mW)	903.6	14.5	157.9	30.5	5.4	162.8	349.3	

Table 2-76. Power Measurement Test Results: Dragonfly + Sony IMX078 (SVC).

Notes:

1. Refer to Section 2.8.11 "Power Measurement Test Parameters: Dragonfly + Sony IMX078 (SVC)" for Case definitions.

2.8.13   Power Measurement Test Parameters: Dragonfly + IMX078 (MSP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	Sony IMX078 Sensor Board (P101117008)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	15 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_mw_ut.elf by hlchang@ambtwubu7 at Mon Mar 28 02:05:21 CST 2016 2. [00023849][CA9] ============================== [00023849][CA9] version = 253745 [00023849][CA9] date = 2016/3/23 [00023849][CA9] api = 253682 [00023849][CA9] silicon = 199 [00023849][CA9] init_data = 0x63e960 [00023849][CA9] ============================== 3.FW link:\\qanas3\Daily_Build\20160328\A12SDK_6_2_005_

Case Configurations	Case 1	3840x2160p30+720x400p30
		Dual Encode
		Capture Window: 3840x2160
		CFA: 3840x2160
		Second Stream: 736x400p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		     GopM 1
		     GopN 30
		     GopIDR 30
		Audio Format: N/A
		Temp (T_c): 50.1
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 408

	Case 2	2880x2160p30+720x400p30
		Dual Encode
		Capture Window: 3840x2160
		CFA: 3840x2160
		Second Stream: 736x400p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		     GopM 1
		     GopN 30
		     GopIDR 30
		Audio Format: N/A
		Temp (T_c): 49.7
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 396

Case Configurations (Continued)	Case 3	2560x1440p60
		Single Encode
		Capture Window: 3840x2160
		CFA: 2720x1530
		Second Stream: N/A
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC
		GOP Format:
		    GopM 1
		    GopN 60
		    GopIDR 60
		Audio Format: N/A
		Temp (T_c): 48.2
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 312

Table 2-77.   Power Measurement Test Parameters: Dragonfly + Sony IMX078 (MSP).

2.8.14 Power Measurement Test Results: Dragonfly + Sony IMX078 (MSP)

Case [1]	Channel	Power SOC_VDD 1.0 V	Power SOC_VDDA 1.0 V	Power SOC_VDRAM 1.5 V	Power SOC_VDDA18 1.8 V	Power SOC_VDDA 3.0 V	Power SOC_VDD 3.0 V	Power DRAM_VDRAM 1.5 V	Total Power (mW)
1	Voltage (V)	1.000	0.992	1.495	1.796	3.004	2.996	1.496	1652.42
	Current (mA)	928.1	20.8	109.1	17.6	0.4	53.6	232.1	
	Power (mW)	928.0	20.6	163.1	31.6	1.2	160.6	347.3	
2	Voltage (V)	1.000	0.992	1.498	1.796	3.004	2.996	1.499	1546.32
	Current (mA)	893.8	21.0	95.7	17.9	0.4	53.5	196.6	
	Power (mW)	893.7	20.8	143.4	32.1	1.2	160.3	294.7	
3	Voltage (V)	1.000	0.992	1.500	1.796	3.004	2.998	1.502	1634.07
	Current (mA)	927.7	20.7	102.4	17.8	0.4	53.4	226.0	
	Power (mW)	927.2	20.5	153.6	32.0	1.2	160.1	339.5	

Table 2-78.   Power Measurement Test Results: Dragonfly + Sony IMX078 (MSP).

Notes:

1. Refer to Section 2.8.13 "Power Measurement Test Parameters: Dragonfly + IMX078 (MSP)" for Case definitions.

2.8.15   Power Measurement Test Parameters: Dragonfly + Sony IMX117 (APP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	Sony IMX117 Sensor Board (P120116007)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	15 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Impedance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Impedance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_app.elf by hlchang@ambtwubu7 at Mon Mar 28 02:08:30 CST 2016 2. [00000497][CA9] ============================== [00000497][CA9] version = 253745 [00000497][CA9] date = 2016/3/23 [00000497][CA9] api = 253682 [00000497][CA9] silicon = 2750 [00000497][CA9] init_data = 0x4da980 [00000497][CA9] ============================== 3.FW link:\\qanas3\Daily_Build\20160328\A12SDK_6_2_005_

Case Configurations	Case 1	3840x2160p30+768x432p30
		Dual Encode
		Capture Window: 3840x2160
		CFA: 3840x2160
		Second Stream: 768x432p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		      Info.Video.M = 1
		      Info.Video.N = 30
		      Info.Video.GOPSize = 30
		Audio Format: AAC + AAC
		Temp (T_c): 47.7
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 408

	Case 2	2560x1440p60+768x432p30
		Dual Encode
		Capture Window: 3840x2160
		CFA: 2720x1530
		Second Stream: 768x432p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		      Info.Video.M = 1
		      Info.Video.N = 60
		      Info.Video.GOPSize = 60
		Audio Format: AAC + AAC
		Temp (T_c): 48.4
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 504

Table 2-79.   Power Measurement Test Parameters: Dragonfly + Sony IMX117 (APP).

2.8.16   Power Measurement Test Results: Dragonfly + Sony IMX117 (APP)

Case [1]	Channel	Power							Total Power (mW)
		SOC_VDD 1.0 V	SOC_VDDA 1.0 V	SOC_VDRAM 1.5 V	SOC_VDDA18 1.8 V	SOC_VDDA 3.0 V	SOC_VDD 3.0 V	DRAM_VDRAM 1.5 V	
1	Voltage (V)	1.000	0.992	1.504	1.803	3.004	3.001	1.504	1597.65
	Current (mA)	908.4	14.6	102.9	17.0	1.8	54.1	214.0	
	Power (mW)	908.2	14.5	154.7	30.6	5.4	162.4	321.8	
2	Voltage (V)	1.000	0.992	1.501	1.803	3.004	2.996	1.501	1611.26
	Current (mA)	909.5	14.4	108.9	16.9	1.8	53.8	218.0	
	Power (mW)	909.3	14.3	163.4	30.5	5.4	161.2	327.2	

Table 2-80.   Power Measurement Test Results: Dragonfly + Sony IMX117 (APP).

Notes:

1. Refer to Section 2.8.15 "Power Measurement Test Parameters: Dragonfly + Sony IMX117 (APP)" for Case definitions.

2.8.17 Power Measurement Test Parameters: Dragonfly + Sony IMX117 (SVC)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	Sony IMX117 Sensor Board (P120116007)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	15 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Impedance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Impedance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_ssp_svc.elf by hlchang@ambtwubu7 at Mon Mar 28 03:07:56 CST 2016 2. [00000522][CA9] ============================== [00000522][CA9] version = 253745 [00000522][CA9] date = 2016/3/23 [00000522][CA9] api = 253682 [00000522][CA9] silicon = 199 [00000522][CA9] init_data = 0x407980 [00000522][CA9] ============================== 3.FW link:\\qanas3\Daily_Build\20160328\A12SDK_6_2_005_
Case Configurations	Case 1	3840x2160p30+768x432p30 Dual Encode Capture Window: 3840x2160 CFA: 3840x2160 Second Stream: 768x432p30 Scene: Worst Case - Complex VOUT: LCD On Video Format: AVC + AVC GOP Format: N/A Audio Format: AAC + AAC Temp (T_c): 49.4 Temp (T_a): Room Clock: Cortex DRAM Core IDSP 792 600 432 504
	Case 2	2720x1520p30+768x432p30 Dual Encode Capture Window: 3840x2160 CFA: 3600x2026 Second Stream: 768x432p30 Scene: Worst Case - Complex VOUT: LCD On Video Format: AVC + AVC GOP Format: N/A Audio Format: AAC + AAC Temp (T_c): 44.8 Temp (T_a): Room Clock: Cortex DRAM Core IDSP 792 600 396 312
	Case 3	2560x1440p60+768x432p30 Dual Encode Capture Window: 3840x2160 CFA: 2720x1530 Second Stream: 768x432p30 Scene: Worst Case - Complex VOUT: LCD On Video Format: AVC + AVC GOP Format: N/A Audio Format: AAC + AAC Temp (T_c): 49.2 Temp (T_a): Room Clock: Cortex DRAM Core IDSP 792 600 432 312

Case Configurations (Continued)	Case 4	1920x1080p60 (Superview) Dual Encode Capture Window: 2000x1500 CFA: 1920x1088 Second Stream: 768x432p30 Scene: Worst Case - Complex VOUT: LCD On Video Format: AVC + AVC GOP Format: N/A Audio Format: AAC + AAC Temp (T_c): 43.4 Temp (T_a): Room Clock: Cortex DRAM Core IDSP 792 600 396 174

Table 2-81.   Power Measurement Test Parameters: Dragonfly + Sony IMX117 (SVC).

2.8.18   Power Measurement Test Results: Dragonfly + Sony IMX117 (SVC)

Case [1]	Channel	Power							Total Power (mW)
		SOC_ VDD 1.0 V	SOC_ VDDA 1.0 V	SOC_ VDRAM 1.5 V	SOC_ VDDA18 1.8 V	SOC_ VDDA 3.0 V	SOC_ VDD 3.0 V	DRAM_ VDRAM 1.5 V	
1	Voltage (V)	1.000	0.993	1.499	1.797	3.004	2.996	1.503	1625.22
	Current (mA)	939.7	14.3	102.6	16.8	1.8	54.0	213.3	
	Power (mW)	939.2	14.2	153.7	30.2	5.4	161.8	320.7	
2	Voltage (V)	1.000	0.993	1.502	1.797	3.004	2.996	1.503	1302.88
	Current (mA)	749.1	14.2	77.2	16.8	1.8	54.0	150.6	
	Power (mW)	749.2	14.1	116.0	30.2	5.4	161.8	226.3	
3	Voltage (V)	1.000	0.993	1.498	1.797	3.004	2.996	1.501	1635.13
	Current (mA)	910.0	14.5	107.4	16.8	1.8	54.2	234.6	
	Power (mW)	909.8	14.4	160.9	30.2	5.4	162.4	352.1	
4	Voltage (V)	1.000	0.993	1.501	1.796	3.004	2.996	1.500	1207.51
	Current (mA)	673.6	14.0	73.3	15.5	1.9	55.0	141.2	
	Power (mW)	673.5	13.9	110.0	27.8	5.7	164.8	211.7	

Table 2-82.   Power Measurement Test Results: Dragonfly + Sony IMX117 (SVC).

Notes:

1. Refer to Section 2.8.17 "Power Measurement Test Parameters: Dragonfly + Sony IMX117 (SVC)" for Case definitions.

2.8.19   Power Measurement Test Parameters: Dragonfly + IMX117 (MSP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	Sony IMX117 Sensor Board (P120116007)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	15 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_mw_ut.elf by hlchang@ambtwubu7 at Mon Mar 28 02:05:21 CST 2016 2. [00126896][CA9] ============================== [00126896][CA9] version = 253745 [00126896][CA9] date = 2016/3/23 [00126896][CA9] api = 253682 [00126896][CA9] silicon = 199 [00126896][CA9] init_data = 0x63e960 [00126896][CA9] ============================== 3.FW link:\\qanas3\Daily_Build\20160328\A12SDK_6_2_005_

Case Configurations	Case 1	3840x2160p30+720x400p30
		Dual Encode
		Capture Window: 3840x2160
		CFA: 3840x2160
		Second Stream: 736x400p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		    GopM 1
		    GopN 30
		    GopIDR 30
		Audio Format: N/A
		Temp (T_c): 47.4
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 408

	Case 2	2880x2160p30+720x400p30
		Dual Encode
		Capture Window: 3840x2160
		CFA: 3840x2160
		Second Stream: 736x400p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		    GopM 1
		    GopN 30
		    GopIDR 30
		Audio Format: N/A
		Temp (T_c): 45.7
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 396

Case Configurations (Continued)	Case 3	2560x1440p60
		Single Encode
		Capture Window: 3840x2160
		CFA: 2720x1530
		Second Stream: N/A
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC
		GOP Format:
		       GopM 1
		       GopN 60
		       GopIDR 60
		Audio Format: N/A
		Temp (T_c): 47.1
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 312

Table 2-83.   Power Measurement Test Parameters: Dragonfly + Sony IMX117 (MSP).

2.8.20 Power Measurement Test Results: Dragonfly + Sony IMX117 (MSP)

Case [1]	Channel	Power							Total Power (mW)
		SOC_VDD 1.0 V	SOC_VDDA 1.0 V	SOC_VDRAM 1.5 V	SOC_VDDA18 1.8 V	SOC_VDDA 3.0 V	SOC_VDD 3.0 V	DRAM_VDRAM 1.5 V	
1	Voltage (V)	1.000	0.992	1.497	1.796	3.004	2.995	1.503	1600.34
	Current (mA)	923.4	13.1	101.7	18.1	0.4	55.1	208.5	
	Power (mW)	923.0	13.0	152.3	32.5	1.2	165.0	313.3	
2	Voltage (V)	1.000	0.996	1.500	1.786	3.004	3.004	1.501	1473.56
	Current (mA)	870.1	12.9	90.1	18.0	0.4	55.2	171.1	
	Power (mW)	869.7	12.8	135.2	32.1	1.2	165.8	256.7	
3	Voltage (V)	1.000	0.993	1.503	1.796	3.004	3.001	1.502	1620.50
	Current (mA)	910.9	12.8	105.6	18.0	0.4	55.2	225.9	
	Power (mW)	910.7	12.7	158.7	32.3	1.2	165.7	339.2	

Table 2-84. Power Measurement Test Results: Dragonfly + Sony IMX117 (MSP).

Notes:

1. Refer to Section 2.8.19 "Power Measurement Test Parameters: Dragonfly + IMX117 (MSP)" for Case definitions.

2.8.21 Power Measurement Test Parameters: Dragonfly + Sony IMX206 (APP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	Sony IMX206 Sensor Board (P130716008)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	eMMC THGBMBG8D4KBAIL MLC 32GB (P150130011)
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	15 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Impedance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Impedance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_app.elf by hlchang@ambtwubu7 at Fri Apr 1 01:28:57 CST 2016 2. [00001398][CA9] =============================== [00001398][CA9] version = 254190 [00001398][CA9] date = 2016/3/30 [00001398][CA9] api = 253682 [00001398][CA9] silicon = 199 [00001398][CA9] init_data = 0x4d6960 [00001398][CA9] =============================== 3.FW link:\\qanas3\Daily_Build\20160401\A12SDK_6_2_005_

Case Configurations	Case 1	1280x720p120+1280x720p30
		Dual Encode
		Capture Window: 1536x864
		CFA: 1536x864
		Second Stream: 1280x720p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		     Info.Video.M = 1
		     Info.Video.N = 30
		     Info.Video.GOPSize = 30
		Audio Format: AAC + AAC
		Temp (T_c): 42
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		504 396 288 192

	Case 2	1920x1080p60+1280x720p30
		Dual Encode
		Capture Window: 2304x1296
		CFA: 2304x1296
		Second Stream: 1280x720p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		     Info.Video.M = 1
		     Info.Video.N = 60
		     Info.Video.GOPSize = 60
		Audio Format: AAC + AAC
		Temp (T_c): 43
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		504 396 288 224

Table 2-85.   Power Measurement Test Parameters: Dragonfly + Sony IMX206 (APP).

2.8.22 Power Measurement Test Results: Dragonfly + Sony IMX206 (APP)

Case [1]	Channel	Power							Total Power (mW)
		SOC_VDD 1.0 V	SOC_VDDA 1.0 V	SOC_VDRAM 1.5 V	SOC_VDDA18 1.8 V	SOC_VDDA 3.0 V	SOC_VDD 3.0 V	DRAM_VDRAM 1.5 V	
1	Voltage (V)	1.000	0.994	1.503	1.797	3.004	2.997	1.503	1074.56
	Current (mA)	569.3	12.8	68.2	13.2	1.7	54.4	132.0	
	Power (mW)	569.1	12.7	102.5	23.7	5.1	163.0	198.4	
2	Voltage (V)	1.000	0.994	1.501	1.797	3.004	2.997	1.499	1165.14
	Current (mA)	600.8	12.8	81.7	13.2	1.7	54.5	158.0	
	Power (mW)	600.9	12.7	122.6	23.7	5.1	163.3	236.8	

Table 2-86.   Power Measurement Test Results: Dragonfly + Sony IMX206 (APP).

Notes:

1. Refer to Section 2.8.21 "Power Measurement Test Parameters: Dragonfly + Sony IMX206 (APP)" for Case definitions.

2.8.23   Power Measurement Test Parameters: Dragonfly + Sony IMX290 (APP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	Sony IMX290 Sensor Board (P150812003)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	15 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_app.elf by hlchang@ambtwubu7 at Fri Apr 1 02:38:51 CST 2016 2. [00000606][CA9] ============================== [00000606][CA9] version = 254190 [00000606][CA9] date = 2016/3/30 [00000606][CA9] api = 253682 [00000606][CA9] silicon = 3750 [00000606][CA9] init_data = 0x4db980 [00000606][CA9] ============================== 3.FW link:\\qanas3\Daily_Build\20160401\A12SDK_6_2_005_
Case Configurations	Case 1	HDR 1920x1080p30+1280x720p30 Dual Encode Capture Window: 1920x2894 CFA: 1920x1080 Second Stream: 1280x720p30 Scene: Worst Case - Complex VOUT: LCD On Video Format: AVC + AVC GOP Format: 　　　Info.Video.M = 1 　　　Info.Video.N = 30 　　　Info.Video.GOPSize = 30 Audio Format: AAC + AAC Temp (T_c): 41.7 Temp (T_a): Room Clock: Cortex DRAM Core IDSP 792 600 432 192
	Case 2	1920x1080p60+1280x720p30 Dual Encode Capture Window: 1920x1080 CFA: 1920x1080 Second Stream: 1280x720p30 Scene: Worst Case - Complex VOUT: LCD On Video Format: AVC + AVC GOP Format: 　　　Info.Video.M = 1 　　　Info.Video.N = 60 　　　Info.Video.GOPSize = 60 Audio Format: AAC + AAC Temp (T_c): 44.2 Temp (T_a): Room Clock: Cortex DRAM Core IDSP 792 600 432 208

Table 2-87.   Power Measurement Test Parameters: Dragonfly + Sony IMX290 (APP).

2.8.24 Power Measurement Test Results: Dragonfly + Sony IMX290 (APP)

Case [1]	Channel	Power							Total Power (mW)
		SOC_VDD 1.0 V	SOC_VDDA 1.0 V	SOC_VDRAM 1.5 V	SOC_VDDA18 1.8 V	SOC_VDDA 3.0 V	SOC_VDD 3.0 V	DRAM_VDRAM 1.5 V	
1	Voltage (V)	1.000	0.994	1.504	1.797	3.004	2.998	1.496	1083.76
	Current (mA)	575.8	14.2	72.5	16.1	1.7	50.1	133.9	
	Power (mW)	576.0	14.1	109.0	28.9	5.1	150.2	200.3	
2	Voltage (V)	1.000	0.994	1.502	1.798	3.004	2.998	1.499	1271.08
	Current (mA)	676.0	14.1	87.5	13.6	1.6	49.8	180.8	
	Power (mW)	676.0	14.0	131.4	24.4	4.8	149.3	271.1	

Table 2-88.   Power Measurement Test Results: Dragonfly + Sony IMX290 (APP).

Notes:

1. Refer to Section 2.8.23 "Power Measurement Test Parameters: Dragonfly + Sony IMX290 (APP)" for Case definitions.

2.8.25   Power Measurement Test Parameters: Dragonfly + IMX290 (MSP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	Sony IMX290 Sensor Board (P150812003)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	15 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_mw_ut.elf by hlchang@ambtwubu7 at Fri Apr 1 02:11:37 CST 2016 2. [00015354][CA9] =============================== [00015354][CA9] version = 254190 [00015354][CA9] date = 2016/3/30 [00015354][CA9] api = 253682 [00015354][CA9] silicon = 199 [00015354][CA9] init_data = 0x63e960 [00015354][CA9] =============================== 3.FW link:\\qanas3\Daily_Build\20160401\A12SDK_6_2_005_
Case Configurations	Case 1	1920x1080p60+1920x1080p30 Dual Encode Capture Window: 1920x1080 CFA: 1920x1080 Second Stream: 1920x1080p30 Scene: Worst Case - Complex VOUT: LCD On Video Format: AVC + AVC GOP Format: 　　　GopM　1 　　　GopN　60 　　　GopIDR 60 Audio Format: N/A Temp (T_c): 44.8 Temp (T_a): Room Clock: Cortex DRAM Core IDSP 792 600 432 208
	Case 2	HDR 1920x1080p30+1920x1080p30 Dual Encode Capture Window: 1920x2894 CFA: 1920x1080 Second Stream: 1920x1080p30 Scene: Worst Case - Complex VOUT: LCD On Video Format: AVC + AVC GOP Format: 　　　GopM　1 　　　GopN　30 　　　GopIDR 30 Audio Format: N/A Temp (T_c): 42.9 Temp (T_a): Room Clock: Cortex DRAM Core IDSP 792 600 432 192

Table 2-89.   Power Measurement Test Parameters: Dragonfly + Sony IMX290 (MSP).

2.8.26 Power Measurement Test Results: Dragonfly + Sony IMX290 (MSP)

Case [1]		Power							Total Power (mW)
	Channel	SOC_VDD 1.0 V	SOC_VDDA 1.0 V	SOC_VDRAM 1.5 V	SOC_VDDA18 1.8 V	SOC_VDDA 3.0 V	SOC_VDD 3.0 V	DRAM_VDRAM 1.5 V	
1	Voltage (V)	1.000	0.992	1.503	1.797	3.005	2.998	1.499	1278.53
	Current (mA)	732.0	12.7	82.1	14.8	0.3	49.2	157.0	
	Power (mW)	732.3	12.6	123.4	26.6	0.9	147.5	235.3	
2	Voltage (V)	1.000	0.993	1.503	1.797	3.005	2.998	1.501	1154.65
	Current (mA)	627.3	12.6	77.6	17.4	0.3	49.6	144.9	
	Power (mW)	627.1	12.5	116.6	31.3	0.9	148.7	217.5	

Table 2-90.   Power Measurement Test Results: Dragonfly + Sony IMX290 (MSP).

Notes:

1. Refer to Section 2.8.25 "Power Measurement Test Parameters: Dragonfly + IMX290 (MSP)" for Case definitions.

2.8.27 Power Measurement Test Parameters: Dragonfly + Sony IMX317 (APP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	Sony IMX317 Sensor Board (P150707022)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	15 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_app.elf by hlchang@ambtwubu7 at Fri Apr 1 02:44:29 CST 2016 2. [00000630][CA9] ============================== [00000630][CA9] version = 254190 [00000630][CA9] date = 2016/3/30 [00000630][CA9] api = 253682 [00000630][CA9] silicon = 2750 [00000630][CA9] init_data = 0x4d8960 [00000630][CA9] ============================== 3.FW link:\\qanas3\Daily_Build\20160401\A12SDK_6_2_005_

Case Configurations	Case 1	3840x2160p30+768x432p30
		Dual Encode
		Capture Window: 3840x2160
		CFA: 3840x2160
		Second Stream: 768x432p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		    Info.Video.M = 1
		    Info.Video.N = 30
		    Info.Video.GOPSize = 30
		Audio Format: AAC + AAC
		Temp (T_c): 48.3
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 408

	Case 2	1920x1080p100+1280x720p25
		Dual Encode
		Capture Window: 1920x1080
		CFA: 1920x1080
		Second Stream: 1280x720p25
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		    Info.Video.M = 1
		    Info.Video.N = 100
		    Info.Video.GOPSize = 100
		Audio Format: AAC + AAC
		Temp (T_c): 45.9
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 264

		1280x720p200+1280x720p25

Case Configurations (Continued)	Case 3	Dual Encode
		Capture Window: 1280x540
		CFA: 1280x540
		Second Stream: 1280x720p25
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		     Info.Video.M = 1
		     Info.Video.N = 200
		     Info.Video.GOPSize = 200
		Audio Format: AAC + AAC
		Temp (T_c): 44.5
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 232

Table 2-91.　Power Measurement Test Parameters: Dragonfly + Sony IMX317 (APP).

2.8.28 Power Measurement Test Results: Dragonfly + Sony IMX317 (APP)

Case [1]	Channel	Power							Total Power (mW)
		SOC_ VDD 1.0 V	SOC_ VDDA 1.0 V	SOC_ VDRAM 1.5 V	SOC_ VDDA18 1.8 V	SOC_ VDDA 3.0 V	SOC_ VDD 3.0 V	DRAM_ VDRAM 1.5 V	
1	Voltage (V)	1.000	0.993	1.498	1.797	3.004	2.997	1.501	1610.05
	Current (mA)	921.1	14.4	100.6	15.2	1.7	56.8	214.3	
	Power (mW)	920.8	14.3	150.7	27.3	5.1	170.2	321.6	
2	Voltage (V)	1.000	0.994	1.501	1.797	3.004	2.996	1.503	1481.53
	Current (mA)	844.8	14.3	86.6	15.1	1.7	56.8	193.1	
	Power (mW)	844.6	14.2	130.0	27.1	5.1	170.2	290.3	
3	Voltage (V)	1.000	0.993	1.502	1.797	3.004	2.996	1.497	1371.60
	Current (mA)	779.6	14.0	79.5	13.9	1.7	57.1	172.1	
	Power (mW)	779.4	13.9	119.4	25.0	5.1	171.0	257.7	

Table 2-92.   Power Measurement Test Results: Dragonfly + Sony IMX317 (APP).

Notes:

1. Refer to Section 2.8.27 "Power Measurement Test Parameters: Dragonfly + Sony IMX317 (APP)" for Case definitions.

2.8.29 Power Measurement Test Parameters: Dragonfly + IMX317 (MSP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	Sony IMX317 Sensor Board (P150707022)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	15 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_mw_ut.elf by hlchang@ambtwubu7 at Fri Apr 1 02:11:37 CST 2016 2. [00025244][CA9] ============================== [00025244][CA9] version = 254190 [00025244][CA9] date = 2016/3/30 [00025244][CA9] api = 253682 [00025244][CA9] silicon = 199 [00025244][CA9] init_data = 0x63e960 [00025244][CA9] ============================== 3.FW link:\\qanas3\Daily_Build\20160401\A12SDK_6_2_005_

Case Configurations	Case 1	3840x2160p30+720x400p30
		Dual Encode
		Capture Window: 3840X2160
		CFA: 3840X2160
		Second Stream: 720x400p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		    GopM 1
		    GopN 30
		    GopIDR 30
		Audio Format: N/A
		Temp (T_c): 47.7
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 408

	Case 2	1280x720p120+720x400p30
		Dual Encode
		Capture Window: 1920x1080
		CFA: 1792x1008
		Second Stream: 720x400p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		    GopM 1
		    GopN 120
		    GopIDR 120
		Audio Format: N/A
		Temp (T_c): 42.7
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 276

Table 2-93.   Power Measurement Test Parameters: Dragonfly + Sony IMX317 (MSP).

2.8.30 Power Measurement Test Results: Dragonfly + Sony IMX317 (MSP)

Case [1]	Channel	Power							Total Power (mW)
		SOC_VDD 1.0 V	SOC_VDDA 1.0 V	SOC_VDRAM 1.5 V	SOC_VDDA18 1.8 V	SOC_VDDA 3.0 V	SOC_VDD 3.0 V	DRAM_VDRAM 1.5 V	
1	Voltage (V)	1.000	0.994	1.500	1.797	3.004	3.004	1.503	1599.58
	Current (mA)	925.8	12.8	98.6	16.2	0.4	56.8	207.9	
	Power (mW)	925.5	12.7	147.9	29.1	1.2	170.6	312.5	
2	Voltage (V)	1.000	0.993	1.505	1.797	3.004	3.004	1.498	1236.19
	Current (mA)	755.8	12.4	61.4	16.1	0.3	57.8	114.9	
	Power (mW)	755.9	12.3	92.4	28.9	0.9	173.6	172.1	

Table 2-94.   Power Measurement Test Results: Dragonfly + Sony IMX317 (MSP).

Notes:

1. Refer to Section 2.8.29 "Power Measurement Test Parameters: Dragonfly + IMX317 (MSP)" for Case definitions.

2.8.31   Power Measurement Test Parameters: Dragonfly + Sony IMX322 (APP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	Sony IMX322 Sensor Board (P140106004)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	15 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Impedance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Impedance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_app.elf by hlchang@ambtwubu7 at Fri Apr 1 02:52:13 CST 2016 2. [00000450][CA9] =============================== [00000450][CA9] version = 254190 [00000450][CA9] date = 2016/3/30 [00000450][CA9] api = 253682 [00000450][CA9] silicon = 3750 [00000450][CA9] init_data = 0x4d9980 [00000450][CA9] =============================== 3.FW link:\\qanas3\Daily_Build\20160401\A12SDK_6_2_005_

Case Configurations	Case 1	1920x1080p30+1280x720p30
		Dual Encode
		Capture Window: 1920x1080
		CFA: 1920x1080
		Second Stream: 1280x720p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		        Info.Video.M = 1
		        Info.Video.N = 30
		        Info.Video.GOPSize = 30
		Audio Format: AAC + AAC
		Temp (T_c): 38.2
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 90

Table 2-95.   Power Measurement Test Parameters: Dragonfly + Sony IMX322 (APP).

2.8.32 Power Measurement Test Results: Dragonfly + Sony IMX322 (APP)

Case [1]	Power								
	Channel	SOC_VDD 1.0 V	SOC_VDDA 1.0 V	SOC_VDRAM 1.5 V	SOC_VDDA18 1.8 V	SOC_VDDA 3.0 V	SOC_VDD 3.0 V	DRAM_VDRAM 1.5 V	Total Power (mW)
1	Voltage (V)	1.000	0.993	1.501	1.798	3.004	2.998	1.497	1018.52
	Current (mA)	550.8	13.9	64.5	10.4	1.7	51.6	119.4	
	Power (mW)	550.7	13.8	96.8	18.7	5.1	154.7	178.7	

Table 2-96.   Power Measurement Test Results: Dragonfly + Sony IMX322 (APP).

Notes:

1. Refer to Section 2.8.31 "Power Measurement Test Parameters: Dragonfly + Sony IMX322 (APP)" for Case definitions.

2.8.33 Power Measurement Test Parameters: Dragonfly + IMX322 (MSP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	Sony IMX322 Sensor Board (P140106004)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	15 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Impedance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Impedance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_mw_ut.elf by hlchang@ambtwubu7 at Fri Apr 1 02:11:37 CST 2016 2. [00024570][CA9] =============================== [00024570][CA9] version = 254190 [00024570][CA9] date = 2016/3/30 [00024570][CA9] api = 253682 [00024570][CA9] silicon = 199 [00024570][CA9] init_data = 0x63e960 [00024570][CA9] =============================== 3.FW link:\\qanas3\Daily_Build\20160401\A12SDK_6_2_005_

Case Configurations	Case 1	1920x1080p30+1920x1080p30
		Dual Encode
		Capture Window: 1920x1080
		CFA: 1920x1080
		Second Stream: 1920x1080p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		  GopM 1
		  GopN 30
		  GopIDR 30
		Audio Format: N/A
		Temp (T_c): 40.6
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 139.2

Table 2-97.   Power Measurement Test Parameters: Dragonfly + Sony IMX322 (MSP).

2.8.34 Power Measurement Test Results: Dragonfly + Sony IMX322 (MSP)

Case [1]		Power							Total Power (mW)
	Channel	SOC_ VDD 1.0 V	SOC_ VDDA 1.0 V	SOC_ VDRAM 1.5 V	SOC_ VDDA18 1.8 V	SOC_ VDDA 3.0 V	SOC_ VDD 3.0 V	DRAM_ VDRAM 1.5 V	
1	Voltage (V)	1.000	0.994	1.505	1.798	3.004	2.998	1.498	1060.59
	Current (mA)	608.7	12.6	64.1	11.4	0.3	51.7	111.2	
	Power (mW)	608.6	12.5	96.5	20.5	0.9	155.0	166.6	

Table 2-98. Power Measurement Test Results: Dragonfly + Sony IMX322 (MSP).

Notes:

1. Refer to Section 2.8.33 "Power Measurement Test Parameters: Dragonfly + IMX322 (MSP)" for Case definitions.

2.8.35 Power Measurement Test Parameters: Dragonfly + Panasonic MN34222 (APP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	MN34222PL Sensor Board (P150717006)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	15 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Impedance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Impedance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_app.elf by hlchang@ambtwubu7 at Fri Apr 1 03:09:24 CST 2016 2. [00000460][CA9] ============================== [00000460][CA9] version = 254190 [00000460][CA9] date = 2016/3/30 [00000460][CA9] api = 253682 [00000460][CA9] silicon = 3750 [00000460][CA9] init_data = 0x4db980 [00000460][CA9] ============================== 3.FW link:\\qanas3\Daily_Build\20160401\A12SDK_6_2_005_

Case Configurations	Case 1	HDR 1920x1080p30+1280x720p30
		Dual Encode
		Capture Window: 1920x2996
		CFA: 1920x1080
		Second Stream: 1280x720p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		        Info.Video.M = 1
		        Info.Video.N = 30
		        Info.Video.GOPSize = 30
		Audio Format: AAC + AAC
		Temp (T$_c$): 40.1
		Temp (T$_a$): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 104

	Case 2	1920x1080p60+1280x720p30
		Dual Encode
		Capture Window: 1920x1080
		CFA: 1920x1080
		Second Stream: 1280x720p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		        Info.Video.M = 1
		        Info.Video.N = 60
		        Info.Video.GOPSize = 60
		Audio Format: AAC + AAC
		Temp (T$_c$): 43
		Temp (T$_a$): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 208

Table 2-99.   Power Measurement Test Parameters: Dragonfly + Panasonic MN34222 (APP).

2.8.36 Power Measurement Test Results: Dragonfly + Panasonic MN34222 (APP)

Case [1]	Channel	Power							Total Power (mW)
		SOC_ VDD 1.0 V	SOC_ VDDA 1.0 V	SOC_ VDRAM 1.5 V	SOC_ VDDA18 1.8 V	SOC_ VDDA 3.0 V	SOC_ VDD 3.0 V	DRAM_ VDRAM 1.5 V	
1	Voltage (V)	1.000	0.993	1.503	1.797	3.004	2.997	1.504	1069.95
	Current (mA)	567.5	14.0	70.8	13.6	1.8	50.6	133.5	
	Power (mW)	567.3	13.9	106.4	24.4	5.4	151.7	200.8	
2	Voltage (V)	1.000	0.993	1.500	1.797	3.004	2.997	1.496	1290.09
	Current (mA)	680.3	14.1	88.9	13.5	1.8	50.2	188.7	
	Power (mW)	680.2	14.0	133.4	24.3	5.4	150.4	282.4	

Table 2-100.   Power Measurement Test Results: Dragonfly + Panasonic MN34222 (APP).

Notes:

1. Refer to Section 2.8.35 "Power Measurement Test Parameters: Dragonfly + Panasonic MN34222 (APP)" for Case definitions.

2.8.37 Power Measurement Test Parameters: Dragonfly + Panasonic MN34222 (MSP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	MN34222PL Sensor Board (P150717006)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	15 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Impedance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Impedance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_mw_ut.elf by hlchang@ambtwubu7 at Fri Apr 1 02:11:37 CST 2016 2. [00028270][CA9] =============================== [00028270][CA9] version = 254190 [00028270][CA9] date = 2016/3/30 [00028270][CA9] api = 253682 [00028270][CA9] silicon = 199 [00028270][CA9] init_data = 0x63e960 [00028270][CA9] =============================== 3.FW link:\\qanas3\Daily_Build\20160401\A12SDK_6_2_005_

Case Configurations	Case 1	HDR 1920x1080p30+1920x1080p30
		Dual Encode
		Capture Window: 1920x2996
		CFA: 1920x1080
		Second Stream: 1920x1080p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		        GopM 1
		        GopN 30
		        GopIDR 30
		Audio Format: N/A
		Temp (T_c): 44.9
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 104

	Case 2	1920x1080p60+1920x1080p30
		Dual Encode
		Capture Window: 1920x1080
		CFA: 1920x1080
		Second Stream: 1920x1080p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		        GopM 1
		        GopN 60
		        GopIDR 60
		Audio Format: N/A
		Temp (T_c): 47.8
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 208

Table 2-101.   Power Measurement Test Parameters: Dragonfly + Panasonic MN34222 (MSP).

2.8.38 Power Measurement Test Results: Dragonfly + Panasonic MN34222 (MSP)

Case [1]	Channel	Power							Total Power (mW)
		SOC_ VDD 1.0 V	SOC_ VDDA 1.0 V	SOC_ VDRAM 1.5 V	SOC_ VDDA18 1.8 V	SOC_ VDDA 3.0 V	SOC_ VDD 3.0 V	DRAM_ VDRAM 1.5 V	
1	Voltage (V)	1.000	0.994	1.501	1.797	3.005	2.998	1.500	1129.78
	Current (mA)	621.3	12.7	73.7	15.0	0.4	49.8	138.6	
	Power (mW)	621.2	12.6	110.6	27.0	1.2	149.3	207.9	
2	Voltage (V)	1.000	0.994	1.501	1.797	3.005	2.998	1.499	1297.91
	Current (mA)	739.8	12.7	83.1	15.2	0.4	50.3	161.0	
	Power (mW)	739.9	12.6	124.7	27.3	1.2	150.8	241.3	

Table 2-102.   Power Measurement Test Results: Dragonfly + Panasonic MN34222 (MSP).

Notes:

1. Refer to Section 2.8.37 "Power Measurement Test Parameters: Dragonfly + Panasonic MN34222 (MSP)" for Case definitions.

2.8.39 Power Measurement Test Parameters: Dragonfly + OmniVision OV4689 (MSP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	OV4689 Sensor Board (P130911002)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	15 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Impedance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Impedance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_mw_ut.elf by hlchang@ambtwubu7 at Fri Apr 1 02:11:37 CST 2016 2. [00035284][CA9] ============================== [00035284][CA9] version = 254190 [00035284][CA9] date = 2016/3/30 [00035284][CA9] api = 253682 [00035284][CA9] silicon = 199 [00035284][CA9] init_data = 0x63e960 [00035284][CA9] ============================== 3.FW link:\\qanas3\Daily_Build\20160401\A12SDK_6_2_005_

Case Configurations	Case 1	HDR 2560x1440p30+1920x1080p30
		Dual Encode
		Capture Window: 2688x3640
		CFA: 2688x1512
		Second Stream: 1920x1080p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		        GopM 1
		        GopN 30
		        GopIDR 30
		Audio Format: N/A
		Temp (T_c): 43.8
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 180

	Case 2	1920x1080p60+1920x1080p30
		Dual Encode
		Capture Window: 2688x1512
		CFA: 2688x1512
		Second Stream: 1920x1080p30
		Scene: Worst Case - Complex
		VOUT: LCD On
		Video Format: AVC + AVC
		GOP Format:
		        GopM 1
		        GopN 60
		        GopIDR 60
		Audio Format: N/A
		Temp (T_c): 45.4
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 300

Table 2-103.   Power Measurement Test Parameters: Dragonfly + OmniVision OV4689 (MSP).

2.8.40 Power Measurement Test Results: Dragonfly + OmniVision OV4689 (MSP)

Case [1]	Channel	Power							Total Power (mW)
		SOC_VDD 1.0 V	SOC_VDDA 1.0 V	SOC_VDRAM 1.5 V	SOC_VDDA18 1.8 V	SOC_VDDA 3.0 V	SOC_VDD 3.0 V	DRAM_VDRAM 1.5 V	
1	Voltage (V)	1.000	0.992	1.498	1.796	3.004	3.004	1.499	1355.42
	Current (mA)	724.9	12.7	93.4	14.5	0.4	50.2	199.9	
	Power (mW)	725.2	12.6	139.9	26.0	1.2	150.8	299.7	
2	Voltage (V)	1.000	0.992	1.503	1.796	3.004	3.004	1.496	1406.43
	Current (mA)	828.9	12.7	86.6	14.3	0.4	50.2	171.9	
	Power (mW)	828.8	12.6	130.2	25.7	1.2	150.8	257.2	

Table 2-104.   Power Measurement Test Results: Dragonfly + OmniVision OV4689 (MSP).

Notes:

1. Refer to Section 2.8.39 "Power Measurement Test Parameters: Dragonfly + OmniVision OV4689 (MSP)" for Case definitions.

2.8.41 Power Measurement Test Parameters: Dragonfly + AR0230 + OV9750 (APP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	1.Dual VIN AR0230CS with B5N Sensor Board (P150326029) 2.OV9750 RIC (P150321023-R01)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	12 cm / 12 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_app.elf by hlchang@ambtwubu7 at Fri Apr 1 03:22:27 CST 2016 2. [00003192][CA9] =============================== [00003192][CA9] version　　　= 254190 [00003192][CA9] date　　　　= 2016/3/30 [00003192][CA9] api　　　　= 253682 [00003192][CA9] silicon　　　= 199 [00003192][CA9] init_data　　　= 0x50f960 [00003192][CA9] =============================== 3.FW link:\\qanas3\Daily_Build\20160401\A12SDK_6_2_005_
Case Configurations	Case 1	VIN0_HDR 1920x1080p30+1280x720p30 VIN1 1280x720p30+1280x720p30 Dual Encode Capture Window: 　　　VIN0_1920x2434 　　　VIN1_1280x720 CFA: 　　　VIN0_1920x1080 　　　VIN1_1280x720 Second Stream: 　　　VIN0_1280x720p30 　　　VIN1_1280x720p30 Scene: Worst Case - Complex VOUT: 　　　VIN0_LCD 　　　VIN1_LCD Video Format: 　　　VIN0_AVC+AVC 　　　VIN1_AVC+AVC GOP Format: 　　　Info.Video.M = 1 　　　Info.Video.N = 30 　　　Info.Video.GOPSize = 30 Audio Format: 　　　VIN0_AAC+AAC 　　　VIN1_AAC+AAC Temp (T_c): 43.6 Temp (T_a): Room Clock: Cortex DRAM Core IDSP 792　　600　　396　　198

Case Configurations (Continued)	Case 2	VIN0_HDR 1280x720p30+1280x720p30
		VIN1 1280x720p30+1280x720p30
		Dual Encode
		Capture Window:
		    VIN0_1920x2434
		    VIN1_1280x720
		CFA:
		    VIN0_1920x1080
		    VIN1_1280x720
		Second Stream:
		    VIN0_1280x720p30
		    VIN1_1280x720p30
		Scene: Worst Case - Complex
		VOUT:
		    VIN0_LCD
		    VIN1_LCD
		Video Format:
		    VIN0_AVC+AVC
		    VIN1_AVC+AVC
		GOP Format:
		    Info.Video.M = 1
		    Info.Video.N = 30
		    Info.Video.GOPSize = 30
		Audio Format:
		    VIN0_AAC+AAC
		    VIN1_AAC+AAC
		Temp (T_c): 42.6
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 396 312

Table 2-105. Power Measurement Test Parameters: Dragonfly + AR0230 + OV9750 (APP).

2.8.42　Power Measurement Test Results: Dragonfly + AR0230 + OV9750 (APP)

Case [1]		Power							Total Power (mW)
	Channel	SOC_VDD 1.0 V	SOC_VDDA 1.0 V	SOC_VDRAM 1.5 V	SOC_VDDA18 1.8 V	SOC_VDDA 3.0 V	SOC_VDD 3.0 V	DRAM_VDRAM 1.5 V	
1	Voltage (V)	1.000	0.993	1.503	1.797	3.004	2.998	1.501	1203.27
	Current (mA)	629.2	14.4	80.9	14.6	1.6	51.0	169.6	
	Power (mW)	628.9	14.3	121.6	26.2	4.8	152.9	254.5	
2	Voltage (V)	1.000	0.993	1.504	1.797	3.004	2.997	1.496	1113.98
	Current (mA)	595.8	14.2	72.4	14.6	1.6	50.8	141.6	
	Power (mW)	595.9	14.1	108.9	26.2	4.8	152.3	211.8	

Table 2-106.　Power Measurement Test Results: Dragonfly + AR0230 + OV9750 (APP).

Notes:

1. Refer to Section 2.8.41 "Power Measurement Test Parameters: Dragonfly + AR0230 + OV9750 (APP)" for Case definitions.

2.8.43   Power Measurement Test Parameters: Dragonfly + AR0230 + OV9750 (MSP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	1.Dual VIN AR0230CS with B5N Sensor Board (P150326029) 2.OV9750 RIC (P150321023-R01)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	12 cm / 12 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_mw_ut.elf by hlchang@ambtwubu7 at Fri Apr 1 02:11:37 CST 2016 2. [00021758][CA9] ============================== [00021758][CA9] version = 254190 [00021758][CA9] date = 2016/3/30 [00021758][CA9] api = 253682 [00021758][CA9] silicon = 199 [00021758][CA9] init_data = 0x63e960 [00021758][CA9] ============================== 3.FW link:\\qanas3\Daily_Build\20160401\A12SDK_6_2_005_

Case Configurations	Case 1	VIN0_HDR 1920x1080p30+1280x720p30
		VIN1 1280x720p30+1280x720p30
		Dual Encode
		Capture Window:
		     VIN0_1920x2434
		     VIN1_1280x720
		CFA:
		     VIN0_1920x1080
		     VIN1_1280x720
		Second Stream:
		     VIN0_1280x720p30
		     VIN1_1280x720p30
		Scene: Worst Case - Complex
		VOUT:
		     VIN0_LCD
		     VIN1_LCD
		Video Format:
		     VIN0_AVC+AVC
		     VIN1_AVC+AVC
		GOP Format:
		     GopM 1
		     GopN 30
		     GopIDR 30
		Audio Format: N/A
		Temp (T_c): 47.4
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 198

Table 2-107.   Power Measurement Test Parameters: Dragonfly + AR0230 + OV9750 (MSP).

2.8.44 Power Measurement Test Results: Dragonfly + AR0230 + OV9750 (MSP)

Case [1]	Power								
	Channel	SOC_ VDD 1.0 V	SOC_ VDDA 1.0 V	SOC_ VDRAM 1.5 V	SOC_ VDDA18 1.8 V	SOC_ VDDA 3.0 V	SOC_ VDD 3.0 V	DRAM_ VDRAM 1.5 V	Total Power (mW)
1	Voltage (V)	1.000	0.994	1.503	1.797	3.004	2.998	1.500	1200.16
	Current (mA)	657.2	13.1	78.8	15.7	0.3	49.0	156.9	
	Power (mW)	657.3	13.0	118.4	28.2	0.9	146.9	235.4	

Table 2-108.   Power Measurement Test Results: Dragonfly + AR0230 + OV9750 (MSP).

Notes:

1. Refer to Section 2.8.43 "Power Measurement Test Parameters: Dragonfly + AR0230 + OV9750 (MSP)" for Case definitions.

2.8.45 Power Measurement Test Parameters: Dragonfly + AR0230 + USBCam (APP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	1.Dual VIN AR0230CS with B5N Sensor Board (P150326029) 2. USB Camera Logitech
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	12 cm / 15 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_app.elf by hlchang@ambtwubu7 at Fri Apr 1 03:30:01 CST 2016 2. [00001801][CA9] ============================== [00001801][CA9] version = 254190 [00001801][CA9] date = 2016/3/30 [00001801][CA9] api = 253682 [00001801][CA9] silicon = 199 [00001801][CA9] init_data = 0x52d960 [00001801][CA9] ============================== 3.FW link:\\qanas3\Daily_Build\20160401\A12SDK_6_2_005_

Case Configurations	Case 1	VIN0_HDR 1920x1080p30+1280x720p30
		VIN1 1280x720p30+1280x720p30
		Dual Encode
		Capture Window:
		     VIN0_1920x2434
		     VIN1_864x480
		CFA:
		     VIN0_1920x1080
		     VIN1_864x480
		Second Stream:
		     VIN0_1280x720p30
		     VIN1_1280x720p30
		Scene: Worst Case - Complex
		VOUT:
		     VIN0_LCD
		     VIN1_LCD
		Video Format:
		     VIN0_AVC+AVC
		     VIN1_AVC+AVC
		GOP Format:
		     Info.Video.M = 1
		     Info.Video.N = 30
		     Info.Video.GOPSize = 30
		Audio Format:
		     VIN0_AAC+AAC
		     VIN1_AAC+AAC
		Temp (T_c): 43.3
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 396 158.4

Case Configurations (Continued)	Case 2	VIN0_HDR 1280x720p30+1280x720p30
		VIN1 1280x720p30+1280x720p30
		Dual Encode
		Capture Window:
		    VIN0_1920x2434
		    VIN1_864x480
		CFA:
		    VIN0_1920x1080
		    VIN1_864x480
		Second Stream:
		    VIN0_1280x720p30
		    VIN1_1280x720p30
		Scene: Worst Case - Complex
		VOUT:
		    VIN0_LCD
		    VIN1_LCD
		Video Format:
		    VIN0_AVC+AVC
		    VIN1_AVC+AVC
		GOP Format:
		    Info.Video.M = 1
		    Info.Video.N = 30
		    Info.Video.GOPSize = 30
		Audio Format:
		    VIN0_AAC+AAC
		    VIN1_AAC+AAC
		Temp (T_c): 42.4
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 396 276

Table 2-109. Power Measurement Test Parameters: Dragonfly + AR0230 + USBCam (APP).

2.8.46 Power Measurement Test Results: Dragonfly + AR0230 + USBCam (APP)

Case [1]	Channel	Power							Total Power (mW)
		SOC_VDD 1.0 V	SOC_VDDA 1.0 V	SOC_VDRAM 1.5 V	SOC_VDDA18 1.8 V	SOC_VDDA 3.0 V	SOC_VDD 3.0 V	DRAM_VDRAM 1.5 V	
1	Voltage (V)	1.000	0.992	1.503	1.796	3.003	2.997	1.501	1209.51
	Current (mA)	592.2	18.0	79.7	25.3	6.7	51.9	172.2	
	Power (mW)	592.3	17.9	119.8	45.4	20.1	155.6	258.4	
2	Voltage (V)	1.000	0.992	1.504	1.796	3.003	2.997	1.504	1127.42
	Current (mA)	562.9	17.8	71.1	25.2	6.8	52.1	145.1	
	Power (mW)	562.8	17.7	106.9	45.3	20.4	156.2	218.2	

Table 2-110.   Power Measurement Test Results: Dragonfly + AR0230 + USBCam (APP).

Notes:

1. Refer to Section 2.8.45 "Power Measurement Test Parameters: Dragonfly + AR0230 + USBCam (APP)" for Case definitions.

2.8.47 Power Measurement Test Parameters: Dragonfly + AR0230 + USBCam (MSP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	1.Dual VIN AR0230CS with B5N Sensor Board (P150326029) 2. USB Camera Logitech
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	12 cm / 15 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_mw_ut.elf by hlchang@ambtwubu7 at Fri Apr 1 02:11:37 CST 2016 2. [00023889][CA9] ============================== [00023889][CA9] version = 254190 [00023889][CA9] date = 2016/3/30 [00023889][CA9] api = 253682 [00023889][CA9] silicon = 199 [00023889][CA9] init_data = 0x63e960 [00023889][CA9] ============================== 3.FW link:\\qanas3\Daily_Build\20160401\A12SDK_6_2_005_

Case Configurations	Case 1	VIN0_HDR 1920x1080p30+1280x720p30
		VIN1 1280x720p30+1280x720p30
		Dual Encode
		Capture Window:
		     VIN0_1920x2434
		     VIN1_848x480
		CFA:
		     VIN0_1920x1080
		     VIN1_848x477
		Second Stream:
		     VIN0_1280x720p30
		     VIN1_1280x720p30
		Scene: Worst Case - Complex
		VOUT:
		     VIN0_LCD
		     VIN1_LCD
		Video Format:
		     VIN0_AVC+AVC
		     VIN1_AVC+AVC
		GOP Format:
		     GopM 1
		     GopN 30
		     GopIDR 30
		Audio Format: N/A
		Temp (T_c): 44.2
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 158.4

Table 2-111.   Power Measurement Test Parameters: Dragonfly + AR0230 + USBCam (MSP).

2.8.48 Power Measurement Test Results: Dragonfly + AR0230 + USBCam (MSP)

Case [1]	Power								
	Channel	SOC_VDD 1.0 V	SOC_VDDA 1.0 V	SOC_VDRAM 1.5 V	SOC_VDDA18 1.8 V	SOC_VDDA 3.0 V	SOC_VDD 3.0 V	DRAM_VDRAM 1.5 V	Total Power (mW)
1	Voltage (V)	1.000	0.993	1.503	1.804	3.003	2.997	1.499	1187.95
	Current (mA)	579.4	18.6	77.0	28.1	6.8	51.5	165.9	
	Power (mW)	579.6	18.5	115.7	50.7	20.4	154.3	248.8	

Table 2-112.   Power Measurement Test Results: Dragonfly + AR0230 + USBCam (MSP).

Notes:

1. Refer to Section 2.8.47 "Power Measurement Test Parameters: Dragonfly + AR0230 + USBCam (MSP)" for Case definitions.

2.8.49   Power Measurement Test Parameters: Dragonfly + OV4689 + OV4689 (APP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	1.Dual VIN OV4689 with B5N (P141105029) 2.Dual VIN OV4689 with B5F (P141104018)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	12 cm / 12 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_app.elf by hlchang@ambtwubu7 at Fri Apr 1 03:17:44 CST 2016 2. [00003204][CA9] =============================== [00003204][CA9] version = 254190 [00003204][CA9] date = 2016/3/30 [00003204][CA9] api = 253682 [00003204][CA9] silicon = 199 [00003204][CA9] init_data = 0x510960 [00003204][CA9] =============================== 3.FW link:\\qanas3\Daily_Build\20160401\A12SDK_6_2_005_

Case Configurations	Case 1	VIN0_HDR 2560x1440p30
		VIN1 2560x1440p30
		Single Encode
		Capture Window:
		      VIN0_2688x3640
		      VIN1_2688x1512
		CFA:
		      VIN1_2688x1512
		      VIN1_2688x1512
		Second Stream: N/A
		Scene: Worst Case - Complex
		VOUT:
		      VIN0_LCD
		      VIN1_LCD
		Video Format:
		      VIN0_AVC+AVC
		      VIN1_AVC+AVC
		GOP Format:
		    Info.Video.M = 1
		    Info.Video.N = 30
		    Info.Video.GOPSize = 30
		Audio Format:
		      VIN0_AAC+AAC
		      VIN1_AAC+AAC
		Temp (T_c): 46.5
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 396 396

Case Configurations (Continued)	Case 2	VIN0_HDR 1920x1080p30
		VIN1 2560x1440p30
		Single Encode
		Capture Window:
		    VIN0_2688x3640
		    VIN1_2688x1512
		CFA:
		    VIN1_2688x1512
		    VIN1_2688x1512
		Second Stream: N/A
		Scene: Worst Case - Complex
		VOUT:
		    VIN0_LCD
		    VIN1_LCD
		Video Format:
		    VIN0_AVC+AVC
		    VIN1_AVC+AVC
		GOP Format:
		    Info.Video.M = 1
		    Info.Video.N = 30
		    Info.Video.GOPSize = 30
		Audio Format:
		    VIN0_AAC+AAC
		    VIN1_AAC+AAC
		Temp (T_c): 45.3
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 396 396

Table 2-113.   Power Measurement Test Parameters: Dragonfly + OV4689 + OV4689 (APP).

2.8.50 Power Measurement Test Results: Dragonfly + OV4689 + OV4689 (APP)

Case [1]	Channel	Power							Total Power (mW)
		SOC_ VDD 1.0 V	SOC_ VDDA 1.0 V	SOC_ VDRAM 1.5 V	SOC_ VDDA18 1.8 V	SOC_ VDDA 3.0 V	SOC_ VDD 3.0 V	DRAM_ VDRAM 1.5 V	
1	Voltage (V)	1.000	0.993	1.497	1.796	3.004	3.000	1.499	1557.22
	Current (mA)	837.2	14.6	96.2	14.6	1.7	79.4	194.9	
	Power (mW)	837.0	14.5	144.0	26.2	5.1	238.2	292.1	
2	Voltage (V)	1.000	0.993	1.499	1.797	3.004	2.999	1.502	1483.40
	Current (mA)	800.5	14.6	88.7	14.6	1.7	80.7	174.3	
	Power (mW)	800.7	14.5	132.9	26.2	5.1	242.1	261.9	

Table 2-114.   Power Measurement Test Results: Dragonfly + OV4689 + OV4689 (APP).

Notes:

1. Refer to Section 2.8.49 "Power Measurement Test Parameters: Dragonfly + OV4689 + OV4689 (APP)" for Case definitions.

2.8.51   Power Measurement Test Parameters: Dragonfly + OV4689 + OV4689 (SVC)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	1.Dual VIN OV4689 with B5N (P141105029) 2.Dual VIN OV4689 with B5F (P141104018)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	12 cm / 12 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_ssp_svc.elf by hlchang@ambtwubu7 at Fri Apr 1 03:51:58 CST 2016 2. [00002071][CA9] ================================ [00002071][CA9] version = 254190 [00002071][CA9] date = 2016/3/30 [00002071][CA9] api = 253682 [00002071][CA9] silicon = 199 [00002071][CA9] init_data = 0x414980 [00002071][CA9] ================================ 3.FW link:\\qanas3\Daily_Build\20160401\A12SDK_6_2_005_
Case Configurations	Case 1	VIN0_HDR 2560x1440p30 VIN1 1920x1080p30 Single Encode Capture Window: VIN0_2688x3640 VIN1_2688x1512 CFA: VIN1_2688x1512 VIN1_2688x1512 Second Stream: N/A Scene: Worst Case - Complex VOUT: VIN0_LCD VIN1_LCD Video Format: VIN0_AVC+AVC VIN1_AVC+AVC GOP Format: N/A Audio Format: VIN0_AAC+AAC VIN1_AAC+AAC Temp (T_c): 48.5 Temp (T_a): Room Clock: Cortex DRAM Core IDSP 792 600 432 504

| Case Configurations (Continued) | Case 2 | VIN0_HDR 1920x1080p30+768x432p30
VIN1 1920x1080p30+768x432p30
Dual Encode
Capture Window:
    VIN0_2688x3640
    VIN1_2688x1512
CFA:
    VIN1_2688x1512
    VIN1_2688x1512
Second Stream:
    VIN0_768x432p30
    VIN1_768x432p30
Scene: Worst Case - Complex
VOUT:
    VIN0_LCD
    VIN1_LCD
Video Format:
    VIN0_AVC+AVC
    VIN1_AVC+AVC
GOP Format: N/A
Audio Format:
    VIN0_AAC+AAC
    VIN1_AAC+AAC
Temp (T_c): 48.9
Temp (T_a): Room
Clock:
Cortex DRAM Core IDSP
792   600   432   504 |

Table 2-115.   Power Measurement Test Parameters: Dragonfly + OV4689 + OV4689 (SVC).

2.8.52 Power Measurement Test Results: Dragonfly + OV4689 + OV4689 (SVC)

Case [1]	Channel	Power							Total Power (mW)
		SOC_ VDD 1.0 V	SOC_ VDDA 1.0 V	SOC_ VDRAM 1.5 V	SOC_ VDDA18 1.8 V	SOC_ VDDA 3.0 V	SOC_ VDD 3.0 V	DRAM_ VDRAM 1.5 V	
1	Voltage (V)	1.000	0.994	1.501	1.797	3.004	2.998	1.503	1481.53
	Current (mA)	786.4	14.7	91.2	14.6	1.6	84.0	173.7	
	Power (mW)	786.1	14.6	136.9	26.2	4.8	251.9	261.0	
2	Voltage (V)	1.000	0.993	1.501	1.797	3.000	2.998	1.504	1478.12
	Current (mA)	801.6	14.7	87.0	14.6	1.6	83.7	165.8	
	Power (mW)	801.6	14.6	130.6	26.2	4.8	250.9	249.3	

Table 2-116.   Power Measurement Test Results: Dragonfly + OV4689 + OV4689 (SVC).

Notes:

1. Refer to Section 2.8.51 "Power Measurement Test Parameters: Dragonfly + OV4689 + OV4689 (SVC)" for Case definitions.

2.8.53 Power Measurement Test Parameters: Dragonfly + OV4689 + OV4689 (MSP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	1.Dual VIN OV4689 with B5N (P141105029) 2.Dual VIN OV4689 with B5F (P141104018)
	VOUT Type	1.Single LCD Wintek/TPO (P140220016) 2.ViewSonic VX2475SMHL-4K LCD HDMI (VS16024)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	12 cm / 12 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_mw_ut.elf by hlchang@ambtwubu7 at Fri Apr 1 02:11:37 CST 2016 2. [00021969][CA9] ============================== [00021969][CA9] version = 254190 [00021969][CA9] date = 2016/3/30 [00021969][CA9] api = 253682 [00021969][CA9] silicon = 199 [00021969][CA9] init_data = 0x63e960 [00021969][CA9] ============================== 3.FW link:\\qanas3\Daily_Build\20160401\A12SDK_6_2_005_

Case Configurations	Case 1	VIN0_HDR 2560x1440p30+832x480p30
		VIN1 1920x1080p30+832x480p30
		Dual Encode
		Capture Window:
		     VIN0_2688x3640
		     VIN1_2688x1512
		CFA:
		     VIN1_2688x1512
		     VIN1_2688x1512
		Second Stream:
		     VIN0_832x480p30
		     VIN1_832x480p30
		Scene: Worst Case - Complex
		VOUT:
		     VIN0_LCD
		     VIN1_LCD
		Video Format:
		     VIN0_AVC+AVC
		     VIN1_AVC+AVC
		GOP Format:
		     GopM 1
		     GopN 30
		     GopIDR 30
		Audio Format: N/A
		Temp (T_c): 49.6
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 396

| Case Configurations (Continued) | Case 2 | VIN0 2560x1440p30
VIN1 2560x1440p30
Single Encode
Capture Window:
      VIN0_2688x1512
      VIN1_2688x1512
CFA:
      VIN1_2688x1512
      VIN1_2688x1512
Second Stream: N/A
Scene: Worst Case - Complex
VOUT:
      VIN0_LCD
      VIN1_HDMI
Video Format:
      VIN0_AVC+AVC
      VIN1_AVC+AVC
GOP Format:
      GopM   1
      GopN   30
      GopIDR 30
Audio Format: N/A
Temp (T_c): 52.4
Temp (T_a): Room
Clock:
Cortex DRAM Core   IDSP
792   600   432   384 |

Table 2-117.   Power Measurement Test Parameters: Dragonfly + OV4689 + OV4689 (MSP).

2.8.54   Power Measurement Test Results: Dragonfly + OV4689 + OV4689 (MSP)

Case [1]	Channel	Power							Total Power (mW)
		SOC_ VDD 1.0 V	SOC_ VDDA 1.0 V	SOC_ VDRAM 1.5 V	SOC_ VDDA18 1.8 V	SOC_ VDDA 3.0 V	SOC_ VDD 3.0 V	DRAM_ VDRAM 1.5 V	
1	Voltage (V)	1.000	0.993	1.498	1.797	3.004	3.000	1.501	1551.80
	Current (mA)	846.8	13.6	93.1	15.8	0.3	83.1	182.4	
	Power (mW)	846.5	13.5	139.4	28.4	0.9	249.3	273.8	
2	Voltage (V)	1.000	0.993	1.501	1.797	3.005	3.002	1.496	1589.20
	Current (mA)	869.2	19.8	93.2	15.1	0.3	80.9	193.4	
	Power (mW)	869.5	19.7	139.9	27.1	0.9	242.9	289.2	

Table 2-118.   Power Measurement Test Results: Dragonfly + OV4689 + OV4689 (MSP).

Notes:

1. Refer to Section 2.8.53 "Power Measurement Test Parameters: Dragonfly + OV4689 + OV4689 (MSP)" for Case definitions.

2.8.55 Power Measurement Test Parameters: Dragonfly + OV4689 + AR0230 (APP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	1.Dual VIN OV4689 with B5N (P141105029) 2.AR0230CS with B5F (P150324011)
	VOUT Type	1.Single LCD Wintek/TPO (P140220016) 2.ViewSonic VX2475SMHL-4K LCD HDMI (VS16024)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	12 cm / 9 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Impedance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Impedance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_app.elf by hlchang@ambtwubu7 at Fri Apr 1 03:17:44 CST 2016 2. [00003204][CA9] =============================== [00003204][CA9] version = 254190 [00003204][CA9] date = 2016/3/30 [00003204][CA9] api = 253682 [00003204][CA9] silicon = 199 [00003204][CA9] init_data = 0x510960 [00003204][CA9] =============================== 3.FW link:\\qanas3\Daily_Build\20160401\A12SDK_6_2_005_

Case Configurations	Case 1	VIN0_HDR 2560x1440p30
		VIN1 1920x1080p30
		Single Encode
		Capture Window:
		      VIN0_2688x3640
		      VIN1_1920x1080
		CFA:
		      VIN1_2688x1512
		      VIN1_1920x1080
		Second Stream: N/A
		Scene: Worst Case - Complex
		VOUT:
		      VIN0_LCD
		      VIN1_LCD
		Video Format:
		      VIN0_AVC+AVC
		      VIN1_AVC+AVC
		GOP Format:
		      Info.Video.M = 1
		      Info.Video.N = 30
		      Info.Video.GOPSize = 30
		Audio Format:
		      VIN0_AAC+AAC
		      VIN1_AAC+AAC
		Temp (T_c): 48.8
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 396 312

Case Configurations (Continued)	Case 2	VIN0 2560x1440p30
		VIN1 1920x1080p30
		Single Encode
		Capture Window:
		      VIN1_2688x1512
		      VIN1_1920x1080
		CFA:
		      VIN1_2688x1512
		      VIN1_1920x1080
		Second Stream: N/A
		Scene: Worst Case - Complex
		VOUT:
		      VIN0_LCD
		      VIN1_LCD
		Video Format:
		      VIN0_AVC+AVC
		      VIN1_AVC+AVC
		GOP Format:
		      Info.Video.M = 1
		      Info.Video.N = 30
		      Info.Video.GOPSize = 30
		Audio Format:
		      VIN0_AAC+AAC
		      VIN1_AAC+AAC
		Temp (T_c): 48.4
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 396 300

Table 2-119.   Power Measurement Test Parameters: Dragonfly + OV4689 + AR0230 (APP).

2.8.56 Power Measurement Test Results: Dragonfly + OV4689 + AR0230 (APP)

Case [1]	Channel	Power							Total Power (mW)
		SOC_ VDD 1.0 V	SOC_ VDDA 1.0 V	SOC_ VDRAM 1.5 V	SOC_ VDDA18 1.8 V	SOC_ VDDA 3.0 V	SOC_ VDD 3.0 V	DRAM_ VDRAM 1.5 V	
1	Voltage (V)	1.000	0.994	1.502	1.797	3.005	2.994	1.498	1402.01
	Current (mA)	743.2	14.6	83.7	14.5	1.6	82.0	161.5	
	Power (mW)	743.4	14.5	125.7	26.1	4.8	245.5	242.0	
2	Voltage (V)	1.001	0.994	1.503	1.797	3.005	2.994	1.501	1351.86
	Current (mA)	729.5	14.6	75.2	14.1	1.6	81.4	147.0	
	Power (mW)	729.9	14.5	113.0	25.3	4.8	243.7	220.6	

Table 2-120.   Power Measurement Test Results: Dragonfly + OV4689 + AR0230 (APP).

Notes:

1. Refer to Section 2.8.55 "Power Measurement Test Parameters: Dragonfly + OV4689 + AR0230 (APP)" for Case definitions.

2.8.57   Power Measurement Test Parameters: Dragonfly + OV4689 + AR0230 (MSP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	1.Dual VIN OV4689 with B5N (P141105029) 2.AR0230CS with B5F (P150324011)
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	12 cm / 9 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_mw_ut.elf by hlchang@ambtwubu7 at Fri Apr 1 02:11:37 CST 2016 2. [00021758][CA9] ============================== [00021758][CA9] version = 254190 [00021758][CA9] date = 2016/3/30 [00021758][CA9] api = 253682 [00021758][CA9] silicon = 199 [00021758][CA9] init_data = 0x63e960 [00021758][CA9] ============================== 3.FW link:\\qanas3\Daily_Build\20160401\A12SDK_6_2_005_

Case Configurations	Case 1	VIN0_HDR 2560x1440p30+1280x720p30
		VIN1 1920x1080p30+1280x720p30
		Dual Encode
		Capture Window:
		        VIN0_2688x3640
		        VIN1_1920x1080
		CFA:
		        VIN1_2688x1512
		        VIN1_1920x1080
		Second Stream:
		        VIN0_1280x720p30
		        VIN1_1280x720p30
		Scene: Worst Case - Complex
		VOUT:
		        VIN0_LCD
		        VIN1_LCD
		Video Format:
		        VIN0_AVC+AVC
		        VIN1_AVC+AVC
		GOP Format:
		        GopM 1
		        GopN 30
		        GopIDR 30
		Audio Format: N/A
		Temp (T_c): 49.2
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 312

Case Configurations (Continued)	Case 2	VIN0_HDR 1920x1080p30+1280x720p30
		VIN1 1920x1080p30+1280x720p30
		Dual Encode
		Capture Window:
		      VIN0_2688x3640
		      VIN1_1920x1080
		CFA:
		      VIN1_2688x1512
		      VIN1_1920x1080
		Second Stream:
		      VIN0_1280x720p30
		      VIN1_1280x720p30
		Scene: Worst Case - Complex
		VOUT:
		      VIN0_LCD
		      VIN1_LCD
		Video Format:
		      VIN0_AVC+AVC
		      VIN1_AVC+AVC
		GOP Format:
		      GopM 1
		      GopN 30
		      GopIDR 30
		Audio Format: N/A
		Temp (T_c): 48.2
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 312

Table 2-121.   Power Measurement Test Parameters: Dragonfly + OV4689 + AR0230 (MSP).

2.8.58 Power Measurement Test Results: Dragonfly + OV4689 + AR0230 (MSP)

Case [1]	Channel	Power							Total Power (mW)
		SOC_ VDD 1.0 V	SOC_ VDDA 1.0 V	SOC_ VDRAM 1.5 V	SOC_ VDDA18 1.8 V	SOC_ VDDA 3.0 V	SOC_ VDD 3.0 V	DRAM_ VDRAM 1.5 V	
1	Voltage (V)	1.000	0.993	1.497	1.797	3.004	3.000	1.502	1506.31
	Current (mA)	814.0	15.5	88.0	15.6	0.3	81.4	181.0	
	Power (mW)	814.2	15.4	131.7	28.0	0.9	244.2	271.8	
2	Voltage (V)	1.000	1.496	1.496	1.796	3.004	3.000	1.498	1505.99
	Current (mA)	772.9	15.4	88.5	17.4	0.3	81.4	201.2	
	Power (mW)	772.8	23.0	132.4	31.3	0.9	244.2	301.4	

Table 2-122.   Power Measurement Test Results: Dragonfly + OV4689 + AR0230 (MSP).

Notes:

1. Refer to Section 2.8.57 "Power Measurement Test Parameters: Dragonfly + OV4689 + AR0230 (MSP)" for Case definitions.

2.8.59 Power Measurement Test Parameters: Dragonfly + OV4689 + USBCam (MSP)

Test Parameter		Description
Hardware	DSP	A12-A0-RH
	Chip Type	NN
	BUB	A12 EVK Dragonfly AB120-101-V11A (P150203004)
	DDR	Samsung DDR3_4GX2
	Sensor	1.Dual VIN OV4689 with B5N (P141105029) 2. USB Camera Logitech
	VOUT Type	Single LCD Wintek/TPO (P140220016)
	Storage Media	Sandisk Extreme Pro 64G U3 Class 10 95MB/s
Environment Parameters	USB	Disconnected
	Object for Record	Worst Case: Complex Scene
	Distance Between Object and Lens	12 cm / 15 cm
	Light Condition:	300 lux 5700K
		Lens Aperture = F2.8
	True RMS Multimeter:	1.Current measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 2.Voltage measurement: FLUKE 289 (Probe Line Imped-ance=0.10 Ω) 3. Keithley 2302 Battery Simulator (For SOC_VDD Only)

Firmware	Code Information	1.Built amba_mw_ut.elf by hlchang@ambtwubu7 at Fri Apr 1 02:11:37 CST 2016 2. [00023889][CA9] =============================== [00023889][CA9] version = 254190 [00023889][CA9] date = 2016/3/30 [00023889][CA9] api = 253682 [00023889][CA9] silicon = 199 [00023889][CA9] init_data = 0x63e960 [00023889][CA9] =============================== 3.FW link:\\qanas3\Daily_Build\20160401\A12SDK_6_2_005_

Case Configurations	Case 1	VIN0_HDR 2560x1440p30+1280x720p30
		VIN1 1280x720p30+1280x720p30
		Dual Encode
		Capture Window:
		    VIN0_2688x3640
		    VIN1_848x480
		CFA:
		    VIN0_2688x1512
		    VIN1_848x477
		Second Stream:
		    VIN0_1280x720p30
		    VIN1_1280x720p30
		Scene: Worst Case - Complex
		VOUT:
		    VIN0_LCD
		    VIN1_LCD
		Video Format:
		    VIN0_AVC+AVC
		    VIN1_AVC+AVC
		GOP Format:
		    GopM 1
		    GopN 30
		    GopIDR 30
		Audio Format: N/A
		Temp (T_c): 47.9
		Temp (T_a): Room
		Clock:
		Cortex DRAM Core IDSP
		792 600 432 264

Table 2-123.   Power Measurement Test Parameters: Dragonfly + OV4689 + USBCam (MSP).

2.8.60 Power Measurement Test Results: Dragonfly + OV4689 + USBCam (MSP)

Case [1]	Channel	Power							Total Power (mW)
		SOC_ VDD 1.0 V	SOC_ VDDA 1.0 V	SOC_ VDRAM 1.5 V	SOC_ VDDA18 1.8 V	SOC_ VDDA 3.0 V	SOC_ VDD 3.0 V	DRAM_ VDRAM 1.5 V	
1	Voltage (V)	1.000	0.993	1.502	1.796	3.004	3.004	1.498	1418.75
	Current (mA)	689.8	18.9	84.4	28.1	6.8	84.0	173.8	
	Power (mW)	689.6	18.8	126.8	50.5	20.4	252.3	260.4	

Table 2-124.   Power Measurement Test Results: Dragonfly + OV4689 + USBCam (MSP).

Notes:

1. Refer to Section 2.8.59 "Power Measurement Test Parameters: Dragonfly + OV4689 + USBCam (MSP)" for Case definitions.

Appendix 1   SDK Change List

This appendix provides a summary of the API changes from the previous version of the A12 SDK. The appendix is organized as follows:

- (Section A1.1) ImgProc

- (Section A1.2) Data Flow

- (Section A1.3) Net

- (Section A1.4) SSD

- (Section A1.5) Image Kernel

A1.1   ImgProc

```
1. Increased ev index max count  from 20 to 25 (related IQ table adj still/video/
scene mode)
rtos/vendors/ambarella/inc/image/imgproc/AmbaImg_Adjustment_A12.h
rtos/vendors/ambarella/inc/image/imgproc/AmbaImg_Adjustment_Def.h
2. Refined for AE control flow
rtos/vendors/ambarella/inc/image/imgproc/AmbaImg_Impl_Cmd.h
+#define MW_IP_GET_AE_CHNO_MODE                 MW_IP_CMD(0x0F6)
+#define MW_IP_SET_AE_CHNO_MODE                 MW_IP_CMD(0x0F7)
3. Refined HDR control flow.
rtos/vendors/ambarella/inc/image/imgproc/AmbaImg_VDsp_Handler.h
```

A1.2   Data Flow

```
[diff]  vendors/ambarella/inc/mw/common/common.h

 #define ALIGN_8(x)   (((x) + 7) & 0xFFFFFFF8)
 #define ALIGN_4(x)   (((x) + 3) & 0xFFFFFFFC)
 #define ALIGN_2(x)   (((x) + 1) & 0xFFFFFFFE)
+#define ALIGN_CLINE ALIGN_32    /**< for cache line alignment, platform dependent,
e.g., should be ALIGN_64 on Cortex-A53 */
 #define CLIP(a, max, min) ((a) > (max)) ? (max) : (((a) < (min)) ? (min) : (a))
 #define TRUNCATE_16(x)  ((x) & 0xFFFFFFF0)
 #define TRUNCATE_64(x)  ((x) & 0xFFFFFFC0)


[Purpose]
  Add a Macro for cache line alignment, to improve code portability

--------------------------------------------------
```

```
[diff]  /vendors/ambarella/inc/mw/dcf/AmpDcf.h

 #include <cfs/AmpCfs.h>

-#define AMP_DCF_MAX_ROOT    4   /**< The maximum number of roots for each DCF han-
dler */
-
 typedef enum _AMP_DCF_ERR_e_ {
     AMP_DCF_NO_ERR = 0,              /* No error                  */
     AMP_DCF_FATAL_ERR,              /* Fatal error               */
@@ -83,6 +81,7 @@ typedef struct _AMP_DCF_INIT_CFG_s_ {
     AMP_DCF_ITM_CFG_s ItmCfg;           /**< ITM configuration (See AMP_DCF_ITM_
CFG_s.) */
     AMP_DCF_DEF_TBL_CFG_s DefTblCfg;    /**< The configuration of the default table
(This is only worked when EnableDefTbl is TRUE. See AMP_DCF_DEF_TBL_CFG_s.) */
     UINT8 MaxHdlr;                      /**< The maximum number of DCF handlers in
the DCF module */
+    UINT8 MaxRootPerHdlr;              /**< The maximum number of roots for each
DCF handler */
     BOOL8 EnableITM;                   /**< The flag used to enable the ITM func-
tion */
     BOOL8 EnableDefTbl;                /**< The flag used to enable the default
table */
 } AMP_DCF_INIT_CFG_s;
@@ -182,6 +181,7 @@ typedef struct _AMP_DCF_CFG_s_ {
 /**
  * Get the required buffer size for initializing the DCF module.
  * @param [in] maxHdlr The maximum of DCF handlers
+ * @param [in] maxRootPerHdlr The maximum number of roots for each DCF handler
  * @param [in] stackSize Stack size
  * @param [in] maxDirPerDnum The maximum number of directories with the same number
  * @param [in] maxFilePerId The maximum number of files with the same ID
@@ -192,7 +192,7 @@ typedef struct _AMP_DCF_CFG_s_ {
  * @param [in] maxTblFile The maximum number of files in the DCF module (The number
is shared between all DCF tables, and only worked when EnableDefTable is TRUE.)
  * @return The required buffer size
  */
-extern UINT32 AmpDCF_GetRequiredBufferSize(UINT8 maxHdlr, UINT32 stackSize, UINT32
maxDirPerDnum, UINT32 maxFilePerId, UINT32 maxPendingOp, BOOL8 enableDefTable, UINT8
maxTblHdlr, UINT32 maxTblDir, UINT32 maxTblFile);
+extern UINT32 AmpDCF_GetRequiredBufferSize(UINT8 maxHdlr, UINT8 maxRootPerHdlr,
UINT32 stackSize, UINT32 maxDirPerDnum, UINT32 maxFilePerId, UINT32 maxPendingOp,
BOOL8 enableDefTable, UINT8 maxTblHdlr, UINT32 maxTblDir, UINT32 maxTblFile);

 /**
  * Get the default configuration of scanning files.

[Purpose]
Let DCF support UINT32 ID


--------------------------------------------------


[diff]  /vendors/ambarella/inc/mw/display/Display.h

[Purpose]
Port the latest MW Display from a12sdk_main
```

```
--------------------------------------------------
```

```
[diff]  /vendors/ambarella/inc/mw/format/Format.h
        /vendors/ambarella/inc/mw/format/FormatDef.h
        /vendors/ambarella/inc/mw/format/Iso.h
        /vendors/ambarella/inc/mw/format/Matroska.h
```

```
[Purpose]
Port the latest MW Dataflow from a12sdk_main
```

A1.3 Net

```
[Purpose]
     Support to send statuses of handlers ( linux (shell) commands, remote commands and re-
mote data) to RTOS-App.
[patches]
diff --git a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/
mw/net/NetCtrl.h b/vendors/ambarella/inc/./mw/net/NetCtrl.h
index e1519d1..83033c8 100644
--- a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/mw/net/
NetCtrl.h
+++ b/vendors/ambarella/inc/./mw/net/NetCtrl.h
@@ -177,7 +177,7 @@ typedef struct _AMP_NETCTRL_DATASVC_CANCEL_RESULT_s_ {
   */
   typedef struct _AMP_NETCTRL_SEND_INFO_s {
       UINT32 ClientId; /**< The client id for wifi or BT2.0*/
-      UINT32 ClientPort; /**< the connected port */
+      UINT32 ClientPort;    /**< the connected port */
       UINT64 ClientAddress;     /**< the client address such as IP address or mac address
*/
       UINT32 Size; /**< The size of data which sould be sent data */
       char* MemAddr; /*< The pointer indicates the address of allocated memory whose data
should be sent out*/
@@ -201,6 +201,25 @@ typedef struct _AMP_NETCTRL_DATASVC_CANCEL_RESULT_s_ {
       char TransportType[16]; /**< transport protocol type */
   } AMP_NETCTRL_DATASVC_DEST_INFO_s;

+/**
+ * The definition for status of the linux handler
+ */
+typedef enum _AMP_NETCTRL_HANDLR_STATUS_e_ {
+    LNX_CMD_HANDLR_READY = 0,     /**< The handler of linux(shell) commands is ready. */
+    LNX_CMD_HANDLR_EXIT,      /**< The handler of linux(shell) commands is terminated nor-
mally. */
+    LNX_CMD_HANDLR_ERROR,     /**< An error is gotten in the handler of linux(shell)
commands. */
+
+    REMOTE_CMD_HANDLR_READY,    /**< The handler of remote(network) commands is ready. */
+    REMOTE_CMD_HANDLR_EXIT,     /**< The handler of remote(network) commands is termi-
nated normally. */
+    REMOTE_CMD_HANDLR_ERROR,    /**< An error is gotten in the handler of remote(network)
commands. */
+
```

```
+    REMOTE_DATA_HANDLR_READY,    /**< The handler of remote(network) data is ready. */
+    REMOTE_DATA_HANDLR_EXIT,     /**< The handler of remote(network) data is terminated
normally. */
+    REMOTE_DATA_HANDLR_ERROR,    /**< An error is gotten in the handler of
remote(network) data. */
+
+
+    HANDLR_STATUS_NUM    /**< The amount of status. It should be the last element of
enum. */
+} AMP_NETCTRL_HANDLR_STATUS_e;

 /**
  * The callback function for receiving commands
@@ -215,6 +234,24 @@ typedef int (*AmpNetCtrl_CmdRcv_Cb)(AMP_NETCTRL_HDLR_INFO_s *hdlrIn-
fo, AMP_NETCT

 typedef int (*AmpNetCtrl_DataSvc_Status_Cb)(AMP_NETCTRL_DATASVC_HDLR_INFO_s *hdlrInfo,
AMP_NETCTRL_DATASVC_STATUS_s *statusFromDataSvc);

+/**
+ * The callback prototype for receiving the status from the handler of linux commands.
+ */
+
+typedef int (*AmpNetCtrl_LnxCmd_Handler_Status_Cb)(AMP_NETCTRL_HANDLR_STATUS_e status);
+
+/**
+ * The callback prototype for receiving the status from the handler of remote(network)
commands.
+ */
+
+typedef int (*AmpNetCtrl_RemoteCmd_Handler_Status_Cb)(AMP_NETCTRL_HANDLR_STATUS_e sta-
tus);
+
+/**
+ * The callback prototype for receiving the status from the handler of remote(network)
data.
+ */
+
+typedef int (*AmpNetCtrl_RemoteData_Handler_Status_Cb)(AMP_NETCTRL_HANDLR_STATUS_e sta-
tus);
+

 /**
@@ -431,7 +468,7 @@ extern int AmpNetCtrl_DeleteInstance(AMP_NETCTRL_HDLR_INFO_s *hdlrIn-
fo);
  * or not.
  *
  * @param [in] the handler info
- * @return 0 - The receiving function has been registed
+ * @return 0 - The receiving function has to be registered
  * @return negative value - AMP_NETCTRL_ERROR_e (ex. The receiving function is NULL)
  */
 extern int AmpNetCtrl_CheckRecvCbStatus(AMP_NETCTRL_HDLR_INFO_s *hdlrInfo);
@@ -442,13 +479,47 @@ extern int AmpNetCtrl_CheckRecvCbStatus(AMP_NETCTRL_HDLR_INFO_s
*hdlrInfo);
  * commands with specified handler.
  *
```

```
   * @param [in] the handler info
-  * @param [in] the function should be registered
+  * @param [in] the function has to be registered
   * @return 0 - OK, negative value - AMP_NETCTRL_ERROR_e
   */

 extern int AmpNetCtrl_RegCmdRcvCB(AMP_NETCTRL_HDLR_INFO_s *hdlrInfo, AmpNetCtrl_CmdRcv_Cb
cbCmdRcv);

 /**
+ * @brief Register the callback function for receiving the status from the handler of
linux commands.
+ * This function is used to register the callback function for
+ * receiving the status from the handler of linux commands.
+ *
+ * @param [in] the function has to be registered
+ * @return 0 - OK, negative value - AMP_NETCTRL_ERROR_e
+ */
+
+extern int AmpNetCtrl_LnxCmd_RegRecvStatusCb(AmpNetCtrl_LnxCmd_Handler_Status_Cb cbSta-
tusRcv);
+
+/**
+ * @brief Register the callback function for receiving the status from the handler of
remote(network) commands.
+ * This function is used to register the callback function for
+ * receiving the status from the handler of remote(network) commands.
+ *
+ * @param [in] the function has to be registered
+ * @return 0 - OK, negative value - AMP_NETCTRL_ERROR_e
+ */
+
+extern int AmpNetCtrl_RemoteCmd_RegRecvStatusCb(AmpNetCtrl_RemoteCmd_Handler_Status_Cb
cbStatusRcv);
+
+/**
+ * @brief Register the callback function for receiving the status from the handler of
remote(network) data.
+ * This function is used to register the callback function for
+ * receiving the status from the handler of remote(network) data.
+ *
+ * @param [in] the function has to registered
+ * @return 0 - OK, negative value - AMP_NETCTRL_ERROR_e
+ */
+
+extern int AmpNetCtrl_RemoteData_RegRecvStatusCb(AmpNetCtrl_RemoteData_Handler_Status_Cb
cbStatusRcv);
+
+
+/**
   * @brief A general function for sending the returned result/notification.
   * This function is used to send the data from the indicated memory with specified handler
   * and it should be created first.
@@ -515,7 +586,7 @@ extern int AmpNetCtrl_DataSvc_DeleteInstance(AMP_NETCTRL_DATASVC_HDLR_
INFO_s *hd
   * or not.
   *
```

```
   * @param [in] the handler info
- * @return 0 - The receiving function has been registed
+ * @return 0 - The receiving function has to be registered
   * @return negative value - AMP_NETCTRL_ERROR_e (ex. The receiving function is NULL)
   */
 extern int AmpNetCtrl_DataSvc_CheckRecvCbStatus(AMP_NETCTRL_DATASVC_HDLR_INFO_s *hdlrIn-
fo);
@@ -527,7 +598,7 @@ extern int AmpNetCtrl_DataSvc_CheckRecvCbStatus(AMP_NETCTRL_DATASVC_
HDLR_INFO_s
   * the notification with specified handler.
   *
   * @param [in] the handler info
- * @param [in] the function should be registered
+ * @param [in] the function has to be registered
   * @return 0 - OK, negative value - AMP_NETCTRL_ERROR_e
   */


diff --git a/vendors/ambarella/inc/./mw/net/rpcprog/AmbaIPC_RpcProg_RT_CmdHndlr.h b/
vendors/ambarella/inc/./mw/net/rpcprog/AmbaIPC_RpcProg_RT_CmdHndlr.h
new file mode 100755
index 0000000..72a1727
--- /dev/null
+++ b/vendors/ambarella/inc/./mw/net/rpcprog/AmbaIPC_RpcProg_RT_CmdHndlr.h
@@ -0,0 +1,46 @@
+/**
+ * @file inc/mw/net/rpcprog/AmbaIPC_RpcProg_RT_CmdHndlr.h
+ *
+ * Header file for NetCtrl RPC Services
+ *
+ * Copyright (C) 2015, Ambarella, Inc.
+ *
+ * All rights reserved. No Part of this file may be reproduced, stored
+ * in a retrieval system, or transmitted, in any form, or by any means,
+ * electronic, mechanical, photocopying, recording, or otherwise,
+ * without the prior consent of Ambarella, Inc.
+ */
+
+#ifndef _RPC_PROG_RT_LNXCMDHNDLR_H_
+#define _RPC_PROG_RT_LNXCMDHNDLR_H_
+
+#include "AmbaIPC_Rpc_Def.h"
+
+/* The Module Name is : RT_LNXCMDHNDLR */
+
+#define RT_LNXCMDHNDLR_PROG_ID        0x1000000B
+#define     RT_LNXCMDHNDLR_VER             1
+
+/* The following section is the definition about sending the status to the RTOS */
+
+#define RT_LNXCMDHNDLR_NOTIFY_STATUS_SVC    1
+
+/* The status of linux commands(shell commands)*/
+typedef enum _RT_LNXCMDHANDLR_STATUS_e_ {
+    RT_LNXCMDHANDLR_READY = 0,    /**< The server of shell(linux) commands in the linux
is ready. */
+    RT_LNXCMDHANDLR_EXIT = 1,     /**< The server of shell(linux) commands in the linux
is terminated normally. */
+    RT_LNXCMDHANDLR_ERROR = 2,    /**< An error is gotten in the server of shell(linux)
```

```
commands in the linux. */
+
+    RT_LNXCMDHANDLR_STATUS_NUM    /**< The number of status. It should be put in the tail
of enum. */
+} RT_LNXCMDHANDLR_STATUS_e;
+
+/**
+ * [in] RT_LNXCMDHNDLR_CMD_s
+ * [out] NULL
+ * Description: This function is used to notify the status of linux(shell) commands to
the RTOS
+ */
+int RT_LnxCmdHndlr_Notify_Status_Svc(RT_LNXCMDHANDLR_STATUS_e *Status, AMBA_IPC_SVC_
RESULT_s *pRet);
+AMBA_IPC_REPLY_STATUS_e RT_LnxCmdHndlr_Notify_Status_Clnt(RT_LNXCMDHANDLR_STATUS_e *Sta-
tus, int *pResult, int Clnt);
+
+#endif /* RPC_PROG_RT_LNXCMDHNDLR_H */
+
diff --git a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/
mw/net/rpcprog/AmbaIPC_RpcProg_RT_DataNotify.h b/vendors/ambarella/inc/./mw/net/rpcprog/
AmbaIPC_RpcProg_RT_DataNotify.h
index e06408d..b5ffc2b 100755
--- a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/mw/net/
rpcprog/AmbaIPC_RpcProg_RT_DataNotify.h
+++ b/vendors/ambarella/inc/./mw/net/rpcprog/AmbaIPC_RpcProg_RT_DataNotify.h
@@ -41,5 +41,26 @@ typedef struct _RT_DATASVC_STATUS_s_ {
 int RT_DataNotify_Svc(RT_DATASVC_STATUS_s *pStatus, AMBA_IPC_SVC_RESULT_s *pRet);
 AMBA_IPC_REPLY_STATUS_e RT_DataNotify_Clnt(RT_DATASVC_STATUS_s *pStatus, int *pResult,
int Clnt);

+/* The following section is the definition about sending the status to the RTOS */
+
+#define RT_DATANOTIFY_NOTIFY_STATUS_SVC      2
+
+/* The status of the handler(handler) of data*/
+typedef enum _RT_DATANOTIFY_HANDLER_STATUS_e_ {
+    RT_DATANOTIFY_HANDLER_READY = 0,    /**< The handler of data in the linux is ready.
*/
+    RT_DATANOTIFY_HANDLER_EXIT = 1,     /**< The handler of data in the linux is termi-
nated normally. */
+    RT_DATANOTIFY_HANDLER_ERROR = 2,    /**< An error is gotten in the handler of data in
the linux. */
+
+    RT_DATANOTIFY_HANDLER_STATUS_NUM    /**< The number of status. It should be the last
element of enum. */
+} RT_DATANOTIFY_HANDLER_STATUS_e;
+
+/**
+ * [in] RT_DATANOTIFY_STATUS_s
+ * [out] NULL
+ * Description: This function is used to notify the status for the handler of data to the
RTOS
+ */
+int RT_DataNotify_Notify_Status_Svc(RT_DATANOTIFY_HANDLER_STATUS_e *Status, AMBA_IPC_SVC_
RESULT_s *pRet);
+AMBA_IPC_REPLY_STATUS_e RT_DataNotify_Notify_Status_Clnt(RT_DATANOTIFY_HANDLER_STATUS_e
*Status, int *pResult, int Clnt);
```

```
+
 #endif /* RPC_PROG_DATA_NOTIFY_H */

diff --git a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/
mw/net/rpcprog/AmbaIPC_RpcProg_RT_NetCtrl.h b/vendors/ambarella/inc/./mw/net/rpcprog/
AmbaIPC_RpcProg_RT_NetCtrl.h
index 237b5fd..c7adaa6 100755
--- a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/mw/net/
rpcprog/AmbaIPC_RpcProg_RT_NetCtrl.h
+++ b/vendors/ambarella/inc/./mw/net/rpcprog/AmbaIPC_RpcProg_RT_NetCtrl.h
@@ -40,5 +40,28 @@ typedef struct _RT_NETCTRL_CMD_s_ {
 int RT_NetCtrl_Send_Svc(RT_NETCTRL_CMD_s *pArg, AMBA_IPC_SVC_RESULT_s *pRet);
 AMBA_IPC_REPLY_STATUS_e RT_NetCtrl_Send_Clnt(RT_NETCTRL_CMD_s *pArg, int *pResult, int
Clnt);

+
+/* The following section is the definition about sending the status to the RTOS */
+
+#define RT_NETCTRL_NOTIFY_STATUS_SVC    2
+
+/* The status of the handler(handler) of commands*/
+typedef enum _RT_NETCTRL_STATUS_e_ {
+    RT_NETCTRL_READY = 0,    /**< The handler of commands in the linux is ready. */
+    RT_NETCTRL_EXIT = 1,     /**< The handler of commands in the linux is terminated nor-
mally. */
+    RT_NETCTRL_ERROR = 2,    /**< An error is gotten in the handler of commands in the
linux. */
+
+    RT_NETCTRL_STATUS_NUM    /**< The number of status. It should be put in the tail of
the enum. */
+} RT_NETCTRL_STATUS_e;
+
+/**
+ * [in] RT_NETCTRL_STATUS_s
+ * [out] NULL
+ * Description: This function is used to notify the status for the handler of commands to
the RTOS
+ */
+int RT_NetCtrl_Notify_Status_Svc(RT_NETCTRL_STATUS_e *Status, AMBA_IPC_SVC_RESULT_s
*pRet);
+AMBA_IPC_REPLY_STATUS_e RT_NetCtrl_Notify_Status_Clnt(RT_NETCTRL_STATUS_e *Status, int
*pResult, int Clnt);
+
+
 #endif /* _RPC_PROG_RT_NETCTRL_H_ */



[Purpose]
    To support intra refresh streaming, need to pass intra-refresh cycle/recovery_frame_cnt
information to linux, update header file to a9s_main.
    Because a12_main share the same ambalink with a9s_main, we need to update the rpc head-
er change to a12_main to avoid CRC check error.
[patches]
diff --git a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/
mw/net/NetFifo.h b/vendors/ambarella/inc/./mw/net/NetFifo.h
index 542e9dc..31682a2 100644
```

```
--- a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/mw/net/
NetFifo.h
+++ b/vendors/ambarella/inc/./mw/net/NetFifo.h
@@ -51,6 +51,8 @@ typedef struct {
     UINT16 nHeight;           /**< Picture height */
     UINT16 nM;                /**< The number of the picture between reference
pictures(IDR, I, P) */
     UINT16 nN;                /**< The number of the picture between I pictures */
+    UINT16 nIRCycle;          /**< Intra refresh cycle */
+    UINT16 nRecoveryFrameCnt; /**< The value of recovery_frame_cnt in SEI-recovery
point */
     BOOL8 bDefault;           /**< The flag defines the track as default video track, if
the media hasn't one video track. */
     UINT8 nMode;              /**< The value defines the picture mode of the video. It
has progressive and interlaced mode. Interlaced mode has Field Per Sample and Frame Per
Sample, See AMP_VIDEO_MODE_s */
     BOOL8 bClosedGOP;         /**< The structure of the Close GOP is I P B B P B B. The
structure of the Open GOP is I B B P B B, If resume or auto split, the value always is
Open GOP. */
diff --git a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/
mw/net/rpcprog/AmbaIPC_RpcProg_RT_NetFifo.h b/vendors/ambarella/inc/./mw/net/rpcprog/
AmbaIPC_RpcProg_RT_NetFifo.h
old mode 100755
new mode 100644
index b7d5e25..23af6dc
--- a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/mw/net/
rpcprog/AmbaIPC_RpcProg_RT_NetFifo.h
+++ b/vendors/ambarella/inc/./mw/net/rpcprog/AmbaIPC_RpcProg_RT_NetFifo.h
@@ -163,6 +163,8 @@ typedef struct _RT_NETFIFO_VIDEO_TRACK_CFG_s_ {
     unsigned short  nHeight;              /**< Picture height */
     unsigned short  nM;                   /**< The number of the picture between reference
pictures(IDR, I, P) */
     unsigned short  nN;                   /**< The number of the picture between I pic-
tures */
+    unsigned short  nIRCycle;             /**< Intra refresh cycle number */
+    unsigned short  nRecoveryFrameCnt;    /**< recovery_frame_cnt value of SEI recovery
point */
     unsigned char bDefault;               /**< The flag defines the track as default video
track, if the media hasn't one video track. */
     unsigned char nMode;                  /**< The value defines the picture mode of the
video. It has progressive and interlaced mode. Interlaced mode has Field Per Sample and
Frame Per Sample, See AMP_VIDEO_MODE_s */
     unsigned char bClosedGOP;             /**< The structure of the Close GOP is I P B B P
B B. The structure of the Open GOP is I B B P B B, If resume or auto split, the value
always is Open GOP. */
```

A1.4   SSD

```
1. AmbaFS.h
[Purpose]
Sync up AmbaFS APIs

[Patch]
```

```
diff --git a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/
ssp/fs/AmbaFS.h b/vendors/ambarella/inc/./ssp/fs/AmbaFS.h
index 0ac46a5..47e94e1 100755
--- a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/ssp/fs/
AmbaFS.h
+++ b/vendors/ambarella/inc/./ssp/fs/AmbaFS.h
@@ -102,20 +102,6 @@ typedef struct _AMBA_FS_FILE_s_ {
 #define AMBA_FS_MAX_SHORT_NAME_LEN      13
 #define AMBA_FS_MAX_LONG_NAME_LEN       256

-typedef struct _AMBA_FS_DIRENT_s_ {
-    int     FsType;
-    char    FileName[AMBA_FS_MAX_SHORT_NAME_LEN * 2];
-    char    LongName[AMBA_FS_MAX_LONG_NAME_LEN * 2];
-    UINT32  Attr;
-    UINT64  Size;
-    UINT32  Year;
-    UINT32  Month;
-    UINT32  Day;
-    UINT32  Hour;
-    UINT32  Minute;
-    UINT32  Second;
-} AMBA_FS_DIRENT;
-
 typedef union _AMBA_FS_DTA_u_ {
     DTA dta;
     WDTA wdta;
@@ -257,6 +243,8 @@ typedef enum _AMBA_FS_MODE_e_ {
 #define AMBA_FS_DIR         PF_DIR
 #define AMBA_FS_FPOS        PF_FPOS_T
 #define AMBA_FS_DTA_EXEC    PF_DTA_EXEC
+#define AMBA_FS_TIMESTMP    PF_TIMESTMP
+#define AMBA_FS_DIRENT      PF_DIRENT

 /*-------------------------------------
  * Every slot has one ff_env instance.
@@ -306,6 +294,9 @@ int AmbaFS_GetVol(char Drive, AMBA_FS_VOLTAB *pVolTab);
 int AmbaFS_GetDev(char Drive, AMBA_FS_DEVINF *pDevInf);
 int AmbaFS_SpaceAvaiable(char Drive, UINT64 *pSizeByte);

+int AmbaFS_GetTimeStamp(const char *pFileName, AMBA_FS_TIMESTMP *pTimestamp);
+int AmbaFS_SetTimeStamp(const char *pFileName, AMBA_FS_TIMESTMP *pTimestamp);
+
 int AmbaFS_Chmod(const char *pFileName, int Attr);
 int AmbaFS_Chdmod(const char *pDirName, int Attr);
 int AmbaFS_ChmodDir(const char * pPath, const char * pFileName,
@@ -330,6 +321,13 @@ int AmbaFS_feof(AMBA_FS_FILE *pFile);
 int AmbaFS_CleanDir(const char *pDirName, const char *pFileName, UINT32 OpMode, UINT32
*pCount);
 int AmbaFS_DeleteDir(const char *pDirName);

+AMBA_FS_DIR* AmbaFS_OpenDir(const char *pDirName);
+int AmbaFS_CloseDir(AMBA_FS_DIR* pDir);
+int AmbaFS_ReadDir(AMBA_FS_DIR* pDir, AMBA_FS_DIRENT* pDirEntry);
+int AmbaFS_TellDir(AMBA_FS_DIR* pDir, int* pOffset);
+int AmbaFS_SeekDir(AMBA_FS_DIR* pDir, int Offset);
+int AmbaFS_RewindDir(AMBA_FS_DIR* pDir);
+
```

```
  /*******************************/
  /* Initial and utility functions. */
  /*******************************/


============================================================================================
====================
2. AmbaFS_Format.h
   AmbaFS_PrFile.h
   AmbaSD_Def.h
[Purpose]
Added three new APIs to get reserved space from SD card

[Patch]
diff --git a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/
ssp/fs/AmbaFS_Format.h b/vendors/ambarella/inc/./ssp/fs/AmbaFS_Format.h
index 3337cd4..06218cf 100755
--- a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/ssp/fs/
AmbaFS_Format.h
+++ b/vendors/ambarella/inc/./ssp/fs/AmbaFS_Format.h
@@ -47,6 +47,7 @@
 #define NAND_NHEAD              0x10
 #define NAND_SPT                0x3f

+#define HIDDEN_ALIGN_SECTORS    64
 /**
  * Used in creating data to be written to storage devices during formatting.
  */
@@ -65,6 +66,7 @@ typedef struct __AMBA_FS_DRIVE_INFO__ {
     UINT16 FatType;          /**< The valid values are: 12, 16, 32 */
     UINT16 FatId;            /**< FAT12/FAT16(S)/FAT32 */
     UINT16 Drive;            /**< Flash, xD, CF or SD Drive */
+    UINT32 HiddenSectors;    /**< The number of sectors for Reserved Space */
 } AMBA_FS_DRIVE_INFO;


 /**
diff --git a/vendors/ambarella/inc/../../../../rtos2_62004/rtos/vendors/ambarella/inc/
ssp/fs/AmbaFS_PrFile.h b/vendors/ambarella/inc/./ssp/fs/AmbaFS_PrFile.h
index af7cc08..fe2798a 100755
--- a/vendors/ambarella/inc/../../../../rtos2_62004/rtos/vendors/ambarella/inc/ssp/fs/
AmbaFS_PrFile.h
+++ b/vendors/ambarella/inc/./ssp/fs/AmbaFS_PrFile.h
@@ -272,6 +272,10 @@ int AmbaFS_RdPrf2FormatDrive(const char *pParam);
 int AmbaFS_Prf2Format(char Drive, const char * pParam);
 void AmbaFS_PrFileInit(void);

+int AmbaGetReservedSpace(int SlotID, UINT32 *Sectors);
+int AmbaSD_ReadReservedSector(int SlotID, UINT8 *pBuf, UINT32 Sector, UINT32 Sectors);
+int AmbaSD_WriteReservedSector(int SlotID, UINT8 *pBuf, UINT32 Sector, UINT32 Sectors);
+
 /**
  * PapRtition entry description.
  */
diff --git a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/
ssp/soc/AmbaSD_Def.h b/vendors/ambarella/inc/./ssp/soc/AmbaSD_Def.h
index 2e17e7b..c07686a 100755
--- a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/ssp/soc/
AmbaSD_Def.h
+++ b/vendors/ambarella/inc/./ssp/soc/AmbaSD_Def.h
```

```
@@ -304,6 +304,7 @@ typedef struct _AMBA_SD_CARD_ {
     UINT8   IsBusy;
     UINT8   SccCtrl;      /**< Is in SDXC speed class ctrl */
     UINT32  RawScr[2];
+    UINT32  HiddenSpaOffset[MAX_SD_INSTANCE];
     AMBA_SD_SD_STATUS        Ssr;
 #define SAVE_RESP_NUM        5
     struct CmdResp_s {
```

==
====================
3. AmbaEDID.h
   AmbaHDMI.h
[Purpose]
Provide deep color and supporting pixel format information of HDMI sink.

[Patch]
```
diff --git a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/
ssp/soc/AmbaEDID.h b/vendors/ambarella/inc/./ssp/soc/AmbaEDID.h
index 18ada01..c2e75ef 100755
--- a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/ssp/soc/
AmbaEDID.h
+++ b/vendors/ambarella/inc/./ssp/soc/AmbaEDID.h
@@ -46,6 +46,11 @@
 #define HDMI_VSDB_I_LATENCY_FIELDS_PRESENT   0x40
 #define HDMI_VSDB_LATENCY_FIELDS_PRESENT     0x80

+#define HDMI_VSDB_DC_Y444_PRESENT            0x08
+#define HDMI_VSDB_DC_30BIT_PRESENT           0x10
+#define HDMI_VSDB_DC_36BIT_PRESENT           0x20
+#define HDMI_VSDB_DC_48BIT_PRESENT           0x40
+
 typedef enum _EDID_CEA861_CEA_DATA_BLOCK_TYPE_e_ {
     EDID_CEA861_TAG_AUDIO                 = 1,     /* Tag Code of Audio Data Block */
     EDID_CEA861_TAG_VIDEO                 = 2,     /* Tag Code of Video Data Block */
diff --git a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/
ssp/soc/AmbaHDMI.h b/vendors/ambarella/inc/./ssp/soc/AmbaHDMI.h
index f06603d..aad7b59 100755
--- a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/ssp/soc/
AmbaHDMI.h
+++ b/vendors/ambarella/inc/./ssp/soc/AmbaHDMI.h
@@ -158,13 +158,34 @@ typedef union _CEA861_VIDEO_CAPABILITY_u_ {
 } CEA861_VIDEO_CAPABILITY_u;

 /*-----------------------------------------------------------------------------------
---------*\
+ * Definitions for Sink Deep Color Support Info
+\*-----------------------------------------------------------------------------------
---------*/
+typedef union _AMBA_HDMI_SINK_DEEP_COLOR_u_ {
+    UINT8  Data;
+
+    struct {
+        UINT8 Rgb30Bpp:      1;  /* [0] Set if Sink supports RGB 4:4:4 30 bits/pixel (10
bits/color) */
+        UINT8 Rgb36Bpp:      1;  /* [1] Set if Sink supports RGB 4:4:4 36 bits/pixel (12
bits/color) */
```

```
+        UINT8 Rgb48Bpp:      1;  /* [2] Set if Sink supports RGB 4:4:4 48 bits/pixel (16
bits/color) */
+        UINT8 Reserved0:     1;  /* [3] Reserved */
+        UINT8 Ycc30Bpp:      1;  /* [4] Set if Sink supports YCbCr 4:4:4 30 bits/pixel (10
bits/color) */
+        UINT8 Ycc36Bpp:      1;  /* [5] Set if Sink supports YCbCr 4:4:4 36 bits/pixel (12
bits/color) */
+        UINT8 Ycc48Bpp:      1;  /* [6] Set if Sink supports YCbCr 4:4:4 48 bits/pixel (16
bits/color) */
+        UINT8 Reserved1:     1;  /* [7] Reserved */
+    } Bits;
+} AMBA_HDMI_SINK_DEEP_COLOR_u;
+
+/*-----------------------------------------------------------------------------------
---------*\
  * HDMI Management Structure
 \*-----------------------------------------------------------------------------------
---------*/
 typedef struct _AMBA_HDMI_SINK_INFO_s_ {
     AMBA_HDMI_CABLE_DETECT_e      CableState;                  /* The current DVI/HDMI
cable configuration */
+    AMBA_HDMI_SINK_DEEP_COLOR_u    DeepColorInfo;               /* Sink supported deep
color info */
     UINT8                         SelectableRgbQuantRange;     /* RGB quantization range
is selectable or not */
     UINT8                         SelectableYccQuantRange;     /* YCbCr quantization
range is selectable or not */
-
+    UINT8                         SupportYCbCr444;             /* Sink supports YCbCr444
format or not */
+    UINT8                         SupportYCbCr422;             /* Sink supports YCbCr422
format or not */
+    UINT8                         NumDTD;                      /* Number of detailed
timing descriptors */
     UINT8                         NumVideoFormat;              /* Number of supported
video formats */
     AMBA_VIDEO_TIMING_s           *pDetailedTimingDescriptor;  /* DTDs related to AMBA_
VIDEO_ID_DTD0, ... */
     AMBA_HDMI_VIDEO_DESCRIPTOR_u  *pVideoInfo;                 /* Supported video for-
mats (in order of priority) */


===============================================================================================
====================
4. AmbaROM.h
[Purpose]
Add the APIs to get the memory address of file from allocated buffer on AmbaROM.c

[Patch]
diff --git a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/
ssp/soc/AmbaROM.h b/vendors/ambarella/inc/./ssp/soc/AmbaROM.h
index a633c1d..a3071fe 100755
--- a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/ssp/soc/
AmbaROM.h
+++ b/vendors/ambarella/inc/./ssp/soc/AmbaROM.h
@@ -45,7 +45,7 @@ typedef enum _AMBA_ROM_REGION_e_ {
 #define ROM_BB_MAX              128
 #define ROM_PAGE_SIZE           2048
```

```
 #define ROM_HEADER_MAX_SIZE          1048576    /* 1 MB for ROM header */
-#define ROM_INODE_MAX                600
+#define ROM_INODE_MAX                700
 #define ROM_NAND                     0
 #define ROM_NOR                      1
 #define ROM_SM                       2
@@ -180,11 +180,14 @@ int AmbaROM_FileExists(UINT32 RomID, const char *pFile);
 int AmbaROM_GetName(UINT32 RomID, int Index, char *pName, UINT32 Len);
 int AmbaROM_GetIndex(UINT32 RomID, const char *pFile);
 int AmbaROM_GetSize(UINT32 RomID, const char *pFile, int Index);
+UINT8 *AmbaROM_GetFileAddr(UINT32 RomID, const char *pFile, UINT32 Fpos);
 int AmbaROM_LoadByName(UINT32 RomID, const char *pFile, UINT8 *pPtr, UINT32 Len, UINT32
Fpos);
 int AmbaROM_LoadByIndex(UINT32 RomID, int Index, UINT8 *pPtr, UINT32 Len, UINT32 Fpos);
 void AmbaROM_GetVolInfo(UINT32 RomID, AMBA_ROM_INFO_s *pVolInfo);
 int AmbaROM_IsInit(UINT32 RomID);
-
+int AmbaROM_MemAllocate(UINT32 RomID, AMBA_MEM_CTRL_s RomMem);
+UINT32 AmbaROM_GetPartitionSize(UINT32 RomID);
+void AmbaROM_ReleaseMem(UINT32 RomID);
 int AmbaROM_Init(AMBA_KAL_BYTE_POOL_t *pCachedHeap, UINT32 RomDevice);

 #endif /* _AMBA_HOST_UTIL_ */
```

==
====================
5. AmbaRTSL_SD.h
   AmbaSD.h
[Purpose]
Porting detail delay code for A12

[Patch]
```
diff --git a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/
ssp/soc/AmbaRTSL_SD.h b/vendors/ambarella/inc/./ssp/soc/AmbaRTSL_SD.h
index 4f960ab..dec5a7f 100755
--- a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/ssp/soc/
AmbaRTSL_SD.h
+++ b/vendors/ambarella/inc/./ssp/soc/AmbaRTSL_SD.h
@@ -536,6 +536,20 @@
 #define ERR_SDIO_MR6_ILLEGAL_COMMAND   -241
 #define ERR_SDIO_MR6_ERROR            -242

+typedef union _AMBA_SD_DETAIL_DELAY_u_ {
+    UINT32   Data;                        /* 32 bits = 1 word */
+
+    struct {
+        UINT32 RdLatency:      1;
+        UINT32 RXClkPol:       1;
+        UINT32 ClkOutBypass:   1;
+        UINT32 DataCmdBypass:  1;
+        UINT32 SelValue:       8;
+        UINT32 SbcCoreDelay:   4;
+        UINT32 Rev:            16;
+    } Bits;
+} AMBA_SD_DETAIL_DELAY_u;
+
 /* SDIO CISTPL_FUNCE tuple for function 0 */
```

```
     typedef struct _AMBA_SDIO_FN0_FUNCE_ {
         UINT8   Type;
@@ -1317,5 +1331,7 @@ UINT32 AmbaRTSL_SDGetRdLatencyCtrl(AMBA_SD_HOST *pHost);
 void AmbaRTSL_SDSetHiSpdEnable(AMBA_SD_HOST *pHost, UINT8 HiSpdEnable);
 UINT8 AmbaRTSL_SDGetEnableDDR(AMBA_SD_HOST *pHost);
 void AmbaRTSL_SDSetEnableDDR(AMBA_SD_HOST *pHost, UINT8 EnableDDR);
+int AmbaRTSL_SetDelayConfig(AMBA_SD_HOST *pHost, UINT32 DetailDelay);
+UINT32 AmbaRTSL_GetDelayConfig(AMBA_SD_HOST *pHost);

 #endif  /* _AMBA_RTSL_SD_H_ */
diff --git a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/
ssp/soc/AmbaSD.h b/vendors/ambarella/inc/./ssp/soc/AmbaSD.h
index dc936fc..df9c0fd 100755
--- a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/ssp/soc/
AmbaSD.h
+++ b/vendors/ambarella/inc/./ssp/soc/AmbaSD.h
@@ -122,6 +122,8 @@ void AmbaSD_FwContainterCheck(int Id, UINT32 * pSector, UINT32 Sec-
tors);
 UINT32 AmbaSD_GetStorageSectorCount(int Id);
 void AmbaSD_SetDrivingStrength(int Id, AMBA_SD_DRIVING_STRENGTH_TYPE_e Type, AMBA_SD_
DRIVING_STRENGTH_VALUE_e Driving);
 AMBA_SD_DRIVING_STRENGTH_VALUE_e AmbaSD_GetPinDrivingStrength(AMBA_GPIO_PIN_ID_e GpioPi-
nID);
+int AmbaSD_SetCardConfig(UINT32 DetailDelay);
+int AmbaSD_GetCardConfig(UINT32 *pDetailDelay);
 int AmbaSD_DelayCtrlAdjustPhy(UINT32 RoundDelay, UINT32 ClkPeriod, UINT8 HighSpeed, UINT8
DdrMode);
 void AmbaSD_DelayCtrlReset(void);
 void AmbaSD_SetEmmcBusWidth(UINT8 Width);


=================================================================================================
====================
6. tx_api_SMP.h
   tx_api_Uniprocessor.h
   tx_execution_profile.h
   tx_port_SMP.h
   tx_port_Uniprocessor.h
   tx_user.h
[Purpose]
Add support for Newlib

[Patch]
diff --git a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/
ssp/threadx/tx_api_SMP.h b/vendors/ambarella/inc/./ssp/threadx/tx_api_SMP.h
index bf39cc8..383596a 100755
--- a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/ssp/
threadx/tx_api_SMP.h
+++ b/vendors/ambarella/inc/./ssp/threadx/tx_api_SMP.h
@@ -1547,6 +1547,15 @@ UINT        tx_trace_user_event_insert(ULONG event_id, ULONG info_
field_1, ULONG
 #endif


+/* Add a default macro that can be re-defined in tx_port.h to add default processing when
a thread starts. Common usage
+   would be for enabling floating point for a thread by default, however, the additional
processing could be anything
+   defined in tx_port.h.  */
```

```
+
+#ifndef TX_THREAD_STARTED_EXTENSION
+#define TX_THREAD_STARTED_EXTENSION(thread_ptr)
+#endif
+
+
 /* Define safety critical configuration and exception handling.  */

 #ifdef TX_SAFETY_CRITICAL
diff --git a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/
ssp/threadx/tx_api_Uniprocessor.h b/vendors/ambarella/inc/./ssp/threadx/tx_api_
Uniprocessor.h
index b5f1c17..ea35b14 100755
--- a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/ssp/
threadx/tx_api_Uniprocessor.h
+++ b/vendors/ambarella/inc/./ssp/threadx/tx_api_Uniprocessor.h
@@ -1512,6 +1512,15 @@ UINT        tx_trace_user_event_insert(ULONG event_id, ULONG info_
field_1, ULONG
 #endif


+/* Add a default macro that can be re-defined in tx_port.h to add default processing when
a thread starts. Common usage
+   would be for enabling floating point for a thread by default, however, the additional
processing could be anything
+   defined in tx_port.h.  */
+
+#ifndef TX_THREAD_STARTED_EXTENSION
+#define TX_THREAD_STARTED_EXTENSION(thread_ptr)
+#endif
+
+
 /* Define safety critical configuration and exception handling.  */

 #ifdef TX_SAFETY_CRITICAL
diff --git a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/
ssp/threadx/tx_execution_profile.h b/vendors/ambarella/inc/./ssp/threadx/tx_execution_
profile.h
index 580df1d..7377f9b 100755
--- a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/ssp/
threadx/tx_execution_profile.h
+++ b/vendors/ambarella/inc/./ssp/threadx/tx_execution_profile.h
@@ -1,6 +1,6 @@
 /**************************************************************************/
 /*                                                                      */
-/*           Copyright (c) 1996-2010 by Express Logic Inc.        */
+/*           Copyright (c) 1996-2015 by Express Logic Inc.        */
 /*                                                                      */
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 /*  Logic, Inc.  All rights, title, ownership, or other interests       */
@@ -73,12 +73,14 @@

 #ifdef TX_EXECUTION_64BIT_TIME
 typedef unsigned long long            EXECUTION_TIME;
-#define TX_THREAD_EXTENSION_3           unsigned long long  tx_thread_execution_time_to-
tal; \
+typedef unsigned long long            EXECUTION_TIME_SOURCE_TYPE;
+#define TX_THREAD_EXECUTION_TIME        unsigned long long  tx_thread_execution_time_to-
```

```
tal; \
                                                 unsigned long long  tx_thread_execution_time_
last_start;
 #define TX_EXECUTION_MAX_TIME_SOURCE      0xFFFFFFFFFFFFFFFF
 #else
 typedef unsigned long                    EXECUTION_TIME;
-#define TX_THREAD_EXTENSION_3            unsigned long  tx_thread_execution_time_total; \
+typedef unsigned long                    EXECUTION_TIME_SOURCE_TYPE;
+#define TX_THREAD_EXECUTION_TIME        unsigned long  tx_thread_execution_time_total; \
                                                 unsigned long   tx_thread_execution_time_last_
start;
 #define TX_EXECUTION_MAX_TIME_SOURCE      0xFFFFFFFF
 #endif
@@ -86,23 +88,13 @@ typedef unsigned long                    EXECUTION_TIME;

 /* Define basic constants for the execution profile kit.  */

-/*  Example for Cortex-M3 targets:
-#define TX_EXECUTION_TIME_SOURCE          (EXECUTION_TIME) *((ULONG *) 0xE0001004)
-*/
-
-/*
-#define TX_EXECUTION_TIME_SOURCE          (EXECUTION_TIME) 0
-*/
-
-#ifdef TX_ENABLE_EXECUTION_CHANGE_NOTIFY
-#define AMBA_PROFILE
-#endif
-
-#ifdef AMBA_PROFILE
-extern  ULONG     _tx_timer_system_clock;
-#define TX_EXECUTION_TIME_SOURCE          (EXECUTION_TIME) _tx_timer_system_clock
+#if 1
+extern  ULONG _tx_timer_system_clock;
+#define TX_EXECUTION_TIME_SOURCE          (EXECUTION_TIME) _tx_timer_system_clock
 #else
-#define TX_EXECUTION_TIME_SOURCE          (EXECUTION_TIME) 0
+ULONG _tx_thread_smp_time_get(void);
+#define TX_EXECUTION_TIME_SOURCE          (EXECUTION_TIME_SOURCE_TYPE) _tx_thread_smp_time_
get();
+/* #define TX_EXECUTION_TIME_SOURCE          (EXECUTION_TIME) 0 */
 #endif

 /* Define APIs of the execution profile kit.  */
@@ -119,5 +111,8 @@ UINT  _tx_execution_thread_time_get(struct TX_THREAD_STRUCT *thread_
ptr, EXECUTI
 UINT  _tx_execution_thread_total_time_get(EXECUTION_TIME *total_time);
 UINT  _tx_execution_isr_time_get(EXECUTION_TIME *total_time);
 UINT  _tx_execution_idle_time_get(EXECUTION_TIME *total_time);
+UINT  _tx_execution_core_thread_total_time_get(UINT core, EXECUTION_TIME *total_time);
+UINT  _tx_execution_core_isr_time_get(UINT core, EXECUTION_TIME *total_time);
+UINT  _tx_execution_core_idle_time_get(UINT core, EXECUTION_TIME *total_time);

 #endif
diff --git a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/
ssp/threadx/tx_port_SMP.h b/vendors/ambarella/inc/./ssp/threadx/tx_port_SMP.h
index 275ae52..0e215fc 100755
--- a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/ssp/
```

```
threadx/tx_port_SMP.h
+++ b/vendors/ambarella/inc/./ssp/threadx/tx_port_SMP.h
@@ -1,20 +1,20 @@
-/**************************************************************************/
-/*                                                                        */
-/*          Copyright (c) 1996-2014 by Express Logic Inc.                 */
-/*                                                                        */
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-/*   Logic, Inc.  All rights, title, ownership, or other interests        */
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+/*                                                                        */
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+/*                                                                        */
+/*   Express Logic, Inc. reserves the right to modify this software       */
+/*   without notice.                                                      */
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-/*                                                                        */
-/*   Express Logic, Inc. reserves the right to modify this software       */
-/*   without notice.                                                      */
-/*                                                                        */
 /*   Express Logic, Inc.                       info@expresslogic.com      */
 /*   11423 West Bernardo Court                 http://www.expresslogic.com */
 /*   San Diego, CA  92127                                                 */
@@ -24,7 +24,7 @@

 /**************************************************************************/
 /**************************************************************************/
-/**                                                                      */
+/**                                                                      */
 /** ThreadX Component                                                    */
 /**                                                                      */
 /**   Port Specific                                                      */
@@ -33,43 +33,43 @@
 /**************************************************************************/


-/**************************************************************************/
-/*                                                                        */
-/*   PORT SPECIFIC C INFORMATION                          RELEASE         */
-/*                                                                        */
-/*      tx_port.h                                      SMP/Cortex-A9/IAR  */
-/*                                                       5.1              */
```

```
+/***************************************************************************/
+/*                                                                         */
+/*   PORT SPECIFIC C INFORMATION                            RELEASE        */
+/*                                                                         */
+/*     tx_port.h                                        SMP/Cortex-A9/IAR  */
+/*                                                         5.1             */
 /*                                                                         */
-/*   AUTHOR                                                                */
-/*                                                                         */
-/*     William E. Lamie, Express Logic, Inc.                               */
-/*                                                                         */
-/*   DESCRIPTION                                                           */
-/*                                                                         */
-/*     This file contains data type definitions that make the ThreadX      */
-/*     real-time kernel function identically on a variety of different     */
-/*     processor architectures.  For example, the size or number of bits   */
-/*     in an "int" data type vary between microprocessor architectures and */
-/*     even C compilers for the same microprocessor.  ThreadX does not     */
-/*     directly use native C data types.  Instead, ThreadX creates its     */
-/*     own special types that can be mapped to actual data types by this   */
-/*     file to guarantee consistency in the interface and functionality.   */
-/*                                                                         */
-/*   RELEASE HISTORY                                                       */
-/*                                                                         */
-/*     DATE              NAME                      DESCRIPTION             */
-/*                                                                         */
-/*  12-12-2012     William E. Lamie        Initial SMP/Cortex-A9/IAR       */
-/*                                         Support Version 5.0             */
-/*  05-01-2014     William E. Lamie        Modified comment(s), added      */
-/*                                         wakeup macro, added VFP         */
-/*                                         support, removed leading        */
-/*                                         underscore of protection        */
-/*                                         structure members, and          */
-/*                                         updated version ID,              */
-/*                                         resulting in version 5.1         */
-/*                                                                         */
-/***************************************************************************/
+/*   AUTHOR                                                                */
+/*                                                                         */
+/*     William E. Lamie, Express Logic, Inc.                               */
+/*                                                                         */
+/*   DESCRIPTION                                                           */
+/*                                                                         */
+/*     This file contains data type definitions that make the ThreadX      */
+/*     real-time kernel function identically on a variety of different     */
+/*     processor architectures.  For example, the size or number of bits   */
+/*     in an "int" data type vary between microprocessor architectures and */
+/*     even C compilers for the same microprocessor.  ThreadX does not     */
+/*     directly use native C data types.  Instead, ThreadX creates its     */
+/*     own special types that can be mapped to actual data types by this   */
+/*     file to guarantee consistency in the interface and functionality.   */
+/*                                                                         */
+/*   RELEASE HISTORY                                                       */
+/*                                                                         */
+/*     DATE              NAME                      DESCRIPTION             */
+/*                                                                         */
+/*  12-12-2012     William E. Lamie        Initial SMP/Cortex-A9/IAR       */
```

```
+/*                                                 Support Version 5.0          */
+/*   05-01-2014     William E. Lamie        Modified comment(s), added     */
+/*                                                 wakeup macro, added VFP      */
+/*                                                 support, removed leading     */
+/*                                                 underscore of protection     */
+/*                                                 structure members, and       */
+/*                                                 updated version ID,          */
+/*                                                 resulting in version 5.1     */
+/*                                                                              */
+/***************************************************************************/

 #ifndef TX_PORT_H
 #define TX_PORT_H
@@ -98,12 +98,12 @@

 /* Define ThreadX SMP initialization macro.  */

-#define TX_PORT_SPECIFIC_PRE_INITIALIZATION
+#define TX_PORT_SPECIFIC_PRE_INITIALIZATION


 /* Define ThreadX SMP pre-scheduler initialization.  */

-#define TX_PORT_SPECIFIC_PRE_SCHEDULER_INITIALIZATION
+#define TX_PORT_SPECIFIC_PRE_SCHEDULER_INITIALIZATION


 /* Enable the inter-core interrupt logic.  */
@@ -146,7 +146,7 @@

 #ifdef TX_INCLUDE_USER_DEFINE_FILE

-/* Yes, include the user defines in tx_user.h. The defines in this file may
+/* Yes, include the user defines in tx_user.h. The defines in this file may
    alternately be defined on the command line.  */

 #include "tx_user.h"
@@ -155,6 +155,7 @@

 /* Define compiler library include files.  */

+#include <stdio.h>
 #include <stdlib.h>
 #include <string.h>
 #ifndef __GNUC__
@@ -165,7 +166,7 @@
 #endif


-/* Define ThreadX basic types for this port.  */
+/* Define ThreadX basic types for this port.  */

 #define VOID                                        void
 typedef char                                        CHAR;
@@ -177,6 +178,11 @@ typedef unsigned long                               ULONG;
 typedef short                                       SHORT;
 typedef unsigned short                              USHORT;
```

```
+#include "tx_execution_profile.h"
+
+#ifndef TX_THREAD_EXECUTION_TIME
+#define TX_THREAD_EXECUTION_TIME
+#endif  /* TX_THREAD_EXECUTION_TIME */

 /* Define the priority levels for ThreadX.  Legal values range
    from 32 to 1024 and MUST be evenly divisible by 32.  */
@@ -201,12 +207,12 @@ typedef unsigned short                              USHORT;
 #define TX_TIMER_THREAD_STACK_SIZE              1024        /* Default timer thread stack
size   */
 #endif

-#ifndef TX_TIMER_THREAD_PRIORITY
-#define TX_TIMER_THREAD_PRIORITY                0           /* Default timer thread prior-
ity     */
+#ifndef TX_TIMER_THREAD_PRIORITY
+#define TX_TIMER_THREAD_PRIORITY                0           /* Default timer thread prior-
ity     */
 #endif


-/* Define various constants for the ThreadX ARM port.   */
+/* Define various constants for the ThreadX ARM port.   */

 #ifdef TX_ENABLE_FIQ_SUPPORT
 #define TX_INT_DISABLE                          0xC0        /* Disable IRQ & FIQ inter-
rupts      */
@@ -216,8 +222,8 @@ typedef unsigned short                               USHORT;
 #define TX_INT_ENABLE                           0x00        /* Enable IRQ interrupts
*/


-/* Define the clock source for trace event entry time stamp. The following two item are
port specific.
-    For example, if the time source is at the address 0x0a800024 and is 16-bits in size,
the clock
+/* Define the clock source for trace event entry time stamp. The following two item are
port specific.
+    For example, if the time source is at the address 0x0a800024 and is 16-bits in size,
the clock
    source constants would be:

 #define TX_TRACE_TIME_SOURCE                    *((ULONG *) 0x0a800024)
@@ -276,22 +282,23 @@ typedef unsigned short                              USHORT;


 /* Define the TX_THREAD control block extensions for this port. The main reason
-    for the multiple macros is so that backward compatibility can be maintained with
+    for the multiple macros is so that backward compatibility can be maintained with
    existing ThreadX kernel awareness modules.   */

-#define TX_THREAD_EXTENSION_0
-#define TX_THREAD_EXTENSION_1
+#define TX_THREAD_EXTENSION_0
+#define TX_THREAD_EXTENSION_1
 #ifdef   TX_ENABLE_IAR_LIBRARY_SUPPORT
 #define TX_THREAD_EXTENSION_2                                    ULONG       tx_thread_vfp_en-
```

```
able; \
-                                                              VOID        *tx_thread_iar_
tls_pointer;
+                                                              VOID        *tx_thread_iar_
tls_pointer;
 #else
 #define TX_THREAD_EXTENSION_2                                 ULONG       tx_thread_vfp_en-
able;
 #endif

-#if 0
-#define TX_THREAD_EXTENSION_3
+#ifdef   CONFIG_SSP_THREADX_NEWLIB
+#define TX_THREAD_EXTENSION_3                                 TX_THREAD_EXECUTION_TIME \
+                                                              struct _reent   impure_data;
 #else
-#include "tx_execution_profile.h"
+#define TX_THREAD_EXTENSION_3                                 TX_THREAD_EXECUTION_TIME
 #endif

 /* Define the port extensions of the remaining ThreadX objects.  */
@@ -309,7 +316,8 @@ typedef unsigned short                           USHORT;
    additional is needed for this port so it is defined as white space.  */

 #ifndef TX_THREAD_USER_EXTENSION
-#define TX_THREAD_USER_EXTENSION    UINT UserValue;
+#define TX_THREAD_USER_EXTENSION    UINT UserValue; \
+                                    ULONG AmbaExtValue;
 #endif


@@ -318,18 +326,17 @@ typedef unsigned short                        USHORT;


 #ifdef   TX_ENABLE_IAR_LIBRARY_SUPPORT
-#define TX_THREAD_CREATE_EXTENSION(thread_ptr)                        thread_ptr -> tx_
thread_iar_tls_pointer =  __iar_dlib_perthread_allocate();
+#define TX_THREAD_CREATE_EXTENSION(thread_ptr)                        thread_ptr -> tx_
thread_iar_tls_pointer =  __iar_dlib_perthread_allocate();
 #define TX_THREAD_DELETE_EXTENSION(thread_ptr)                        __iar_dlib_perthread_
deallocate(thread_ptr -> tx_thread_iar_tls_pointer); \
-                                                                      thread_ptr -> tx_
thread_iar_tls_pointer =  TX_NULL;
+                                                                      thread_ptr -> tx_
thread_iar_tls_pointer =  TX_NULL;
 #define TX_PORT_SPECIFIC_PRE_SCHEDULER_INITIALIZATION                 __iar_dlib_perthread_
access(0);
 #else
-#define TX_THREAD_CREATE_EXTENSION(thread_ptr)
-#define TX_THREAD_DELETE_EXTENSION(thread_ptr)
+#define TX_THREAD_CREATE_EXTENSION(thread_ptr)
+#define TX_THREAD_DELETE_EXTENSION(thread_ptr)
 #endif
 #define TX_THREAD_COMPLETED_EXTENSION(thread_ptr)
 #define TX_THREAD_TERMINATED_EXTENSION(thread_ptr)

-
 /* Define the ThreadX object creation extensions for the remaining objects.  */
```

```
 #define TX_BLOCK_POOL_CREATE_EXTENSION(pool_ptr)
@@ -352,8 +359,8 @@ typedef unsigned short                            USHORT;
 #define TX_TIMER_DELETE_EXTENSION(timer_ptr)


-/* Determine if the ARM architecture has the CLZ instruction. This is available on
-   architectures v5 and above. If available, redefine the macro for calculating the
+/* Determine if the ARM architecture has the CLZ instruction. This is available on
+   architectures v5 and above. If available, redefine the macro for calculating the
    lowest bit set.  */

 #ifdef __GNUC__
@@ -367,10 +374,9 @@ typedef unsigned short                          USHORT;

 #if __CPU_MODE__ == 2

-
 #define TX_LOWEST_SET_BIT_CALCULATE(m, b)     m = m & ((ULONG) (-((LONG) m))); \
                                               b = (UINT) __CLZ(m); \
-                                              b = 31 - b;
+                                              b = 31 - b;
 #endif
 #endif
 #endif /* __GNUC__ */
@@ -386,13 +392,13 @@ struct TX_THREAD_STRUCT;
 typedef struct TX_THREAD_SMP_PROTECT_STRUCT
 {
     ULONG                     tx_thread_smp_protect_in_force;
-    struct TX_THREAD_STRUCT *
+    struct TX_THREAD_STRUCT *
                               tx_thread_smp_protect_thread;
     ULONG                     tx_thread_smp_protect_core;
     ULONG                     tx_thread_smp_protect_count;
-
+
     /* Implementation specific information follows.  */
-
+
     ULONG                     tx_thread_smp_protect_get_caller;
     ULONG                     tx_thread_smp_protect_sr;
     ULONG                     tx_thread_smp_protect_release_caller;
@@ -409,7 +415,7 @@ ULONG                       _tx_thread_smp_current_state_get(void);
 ULONG                       _tx_thread_smp_time_get(void);


-/* Determine if SMP Debug is selected.  If so, the function prototype is setup. Other-
wise, the debug call is
+/* Determine if SMP Debug is selected.  If so, the function prototype is setup. Other-
wise, the debug call is
    simply mapped to whitespace.  */

 #ifdef TX_THREAD_SMP_DEBUG_ENABLE
@@ -462,11 +468,29 @@ void                        _tx_thread_smp_debug_entry_insert(ULONG
id, ULONG su
 void    tx_thread_vfp_enable(void);
 void    tx_thread_vfp_disable(void);
```

```
+#ifdef  CONFIG_SSP_THREADX_NEWLIB
+
+#ifdef  TX_GLOBAL_VFP_ENABLE
+#define TX_THREAD_STARTED_EXTENSION(thread_ptr)                        _REENT_INIT_
PTR(&(thread_ptr->impure_data)); \
+                                                                  tx_thread_vfp_en-
able();
+#else
+#define TX_THREAD_STARTED_EXTENSION(thread_ptr)                        _REENT_INIT_
PTR(&(thread_ptr->impure_data));
+#endif
+
+#else
+
+#ifdef  TX_GLOBAL_VFP_ENABLE
+#define TX_THREAD_STARTED_EXTENSION(thread_ptr)                   tx_thread_vfp_en-
able();
+#else
+#define TX_THREAD_STARTED_EXTENSION(thread_ptr)
+#endif
+
+#endif

 /* Define the version ID of ThreadX.  This may be utilized by the application.  */

 #ifdef TX_THREAD_INIT
-CHAR                            _tx_version_id[] =
+CHAR                            _tx_version_id[] =
                                    "Copyright (c) 1996-2014 Express Logic Inc. * ThreadX
SMP/Cortex-A9/IAR Version G5.6.2.5.1 SN: test *";
 #else
 extern  CHAR                    _tx_version_id[];
diff --git a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/
ssp/threadx/tx_port_Uniprocessor.h b/vendors/ambarella/inc/./ssp/threadx/tx_port_
Uniprocessor.h
index c171702..eca4b84 100755
--- a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/ssp/
threadx/tx_port_Uniprocessor.h
+++ b/vendors/ambarella/inc/./ssp/threadx/tx_port_Uniprocessor.h
@@ -80,7 +80,6 @@

 #ifdef TX_INCLUDE_USER_DEFINE_FILE

-
 /* Yes, include the user defines in tx_user.h. The defines in this file may
    alternately be defined on the command line.  */

@@ -90,6 +89,7 @@

 /* Define compiler library include files.  */

+#include <stdio.h>
 #include <stdlib.h>
 #include <string.h>
 #ifndef __GNUC__
@@ -112,6 +112,11 @@ typedef unsigned long                         ULONG;
 typedef short                                 SHORT;
 typedef unsigned short                        USHORT;
```

```
+#include "tx_execution_profile.h"
+
+#ifndef TX_THREAD_EXECUTION_TIME
+#define TX_THREAD_EXECUTION_TIME
+#endif  /* TX_THREAD_EXECUTION_TIME */

 /* Define the priority levels for ThreadX.  Legal values range
    from 32 to 1024 and MUST be evenly divisible by 32.  */
@@ -223,10 +228,12 @@ typedef unsigned short                            USHORT;
 #define TX_THREAD_EXTENSION_2                             ULONG    tx_thread_vfp_en-
able;
 #endif

-#if 0
-#define TX_THREAD_EXTENSION_3
+#ifdef  CONFIG_SSP_THREADX_NEWLIB
+#define TX_THREAD_EXTENSION_3                            TX_THREAD_EXECUTION_TIME \
+                                                         struct _reent   impure_data;
+#else
+#define TX_THREAD_EXTENSION_3                            TX_THREAD_EXECUTION_TIME
 #endif
-#include "tx_execution_profile.h"

 /* Define the port extensions of the remaining ThreadX objects.  */

@@ -243,7 +250,8 @@ typedef unsigned short                            USHORT;
    additional is needed for this port so it is defined as white space.  */

 #ifndef TX_THREAD_USER_EXTENSION
-#define TX_THREAD_USER_EXTENSION     UINT UserValue;
+#define TX_THREAD_USER_EXTENSION     UINT UserValue; \
+                                     ULONG AmbaExtValue;
 #endif


@@ -263,7 +271,6 @@ typedef unsigned short                            USHORT;
 #define TX_THREAD_COMPLETED_EXTENSION(thread_ptr)
 #define TX_THREAD_TERMINATED_EXTENSION(thread_ptr)

-
 /* Define the ThreadX object creation extensions for the remaining objects.  */

 #define TX_BLOCK_POOL_CREATE_EXTENSION(pool_ptr)
@@ -374,6 +381,24 @@ void   _tx_thread_interrupt_restore(UINT old_posture);
 void    tx_thread_vfp_enable(void);
 void    tx_thread_vfp_disable(void);

+#ifdef  CONFIG_SSP_THREADX_NEWLIB
+
+#ifdef  TX_GLOBAL_VFP_ENABLE
+#define TX_THREAD_STARTED_EXTENSION(thread_ptr)                          _REENT_INIT_
PTR(&(thread_ptr->impure_data)); \
+                                                                 tx_thread_vfp_en-
able();
+#else
+#define TX_THREAD_STARTED_EXTENSION(thread_ptr)                          _REENT_INIT_
PTR(&(thread_ptr->impure_data));
```

```
+#endif
+
+#else
+
+#ifdef  TX_GLOBAL_VFP_ENABLE
+#define TX_THREAD_STARTED_EXTENSION(thread_ptr)                    tx_thread_vfp_en-
able();
+#else
+#define TX_THREAD_STARTED_EXTENSION(thread_ptr)
+#endif
+
+#endif

 /* Define the version ID of ThreadX.  This may be utilized by the application.  */

@@ -386,4 +411,3 @@ extern  CHAR                    _tx_version_id[];


 #endif
-
diff --git a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/
ssp/threadx/tx_user.h b/vendors/ambarella/inc/./ssp/threadx/tx_user.h
index 1e79609..2b35ec9 100755
--- a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/ssp/
threadx/tx_user.h
+++ b/vendors/ambarella/inc/./ssp/threadx/tx_user.h
@@ -284,6 +284,7 @@
 */

 #define TX_MAX_PRIORITIES                       256
+#define TX_ENABLE_FIQ_SUPPORT

 #define TX_GLOBAL_VFP_ENABLE            /* Enable VFP on all threads by default */
```

A1.5   Image Kernel

```
1. AmbaDSP_ImgFilter.h
diff --git a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/
ssp/dsp/AmbaDSP_ImgFilter.h b/vendors/ambarella/inc/./ssp/dsp/AmbaDSP_ImgFilter.h
index 3545984..7f36a28 100755
--- a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/ssp/dsp/
AmbaDSP_ImgFilter.h
+++ b/vendors/ambarella/inc/./ssp/dsp/AmbaDSP_ImgFilter.h
@@ -610,6 +610,7 @@ typedef enum _AMBA_DSP_IMG_CALC_WARP_CONTROL_e_ {
     AMBA_DSP_IMG_CALC_WARP_CONTROL_SENSOR_V_FLIP   = 0x20, /* vflip by sensor not iDSP
*/
     AMBA_DSP_IMG_CALC_WARP_CONTROL_DMA_V_FLIP      = 0x40, /* vflip by DMA */
     AMBA_DSP_IMG_CALC_WARP_CONTROL_HYB_STIT_EIS    = 0x80, /* Hybrid Stitch EIS */
+    AMBA_DSP_IMG_CALC_WARP_CONTROL_IS_SUPERVIEW    = 0x100,
 } AMBA_DSP_IMG_CALC_WARP_CONTROL_e;

 [Purpose]
```

1. To support superview function can work together with dzoom or EIS

----
diff --git a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/
ssp/dsp/AmbaDSP_WarpCore.h b/vendors/ambarella/inc/./ssp/dsp/AmbaDSP_WarpCore.h
index e7c53e1..a6163c4 100755
--- a/vendors/ambarella/inc/../../../../../rtos2_62004/rtos/vendors/ambarella/inc/ssp/dsp/
AmbaDSP_WarpCore.h
+++ b/vendors/ambarella/inc/./ssp/dsp/AmbaDSP_WarpCore.h
@@ -124,6 +124,9 @@ int AmbaDSP_WarpCore_SetDspVideoMode(AMBA_DSP_IMG_MODE_CFG_s *pMode,
UINT32 DspV
 #define AMBA_DSP_IMG_WARP_VIDEO_EXPRESS   (1 << 4)
 #define AMBA_DSP_IMG_WARP_VIDEO_HYBRID   (1 << 5)

+#define AMBA_DSP_IMG_WARP_VIDEO_REMAP_MAXHORGRID   (80)
+#define AMBA_DSP_IMG_WARP_VIDEO_REMAP_MAXVERGRID   (60)
+
 typedef enum _AMBA_DSP_IMG_WARP_SET_VIDEO_MODE_e_ {
     AMBA_DSP_IMG_WARP_SET_VIDEO_EXPRESS_MODE_NONSTITCH = AMBA_DSP_IMG_WARP_VIDEO_EXPRESS
| AMBA_DSP_IMG_WARP_VIDEO_EIS_DIS | AMBA_DSP_IMG_WARP_VIDEO_NONSTITCH,
     AMBA_DSP_IMG_WARP_SET_VIDEO_EXPRESS_MODE_STITCH   = AMBA_DSP_IMG_WARP_VIDEO_EXPRESS
| AMBA_DSP_IMG_WARP_VIDEO_EIS_DIS | AMBA_DSP_IMG_WARP_VIDEO_STITCH,
@@ -131,7 +134,13 @@ typedef enum _AMBA_DSP_IMG_WARP_SET_VIDEO_MODE_e_ {
     AMBA_DSP_IMG_WARP_SET_VIDEO_HYBIRD_MODE_STITCH   = AMBA_DSP_IMG_WARP_VIDEO_HYBRID
| AMBA_DSP_IMG_WARP_VIDEO_EIS_DIS | AMBA_DSP_IMG_WARP_VIDEO_STITCH,
 } AMBA_DSP_IMG_WARP_SET_VIDEO_MODE_e;

+typedef enum _AMBA_DSP_IMG_WARP_TABLE_TYPE_e_ {
+   AMBA_DSP_IMG_WARP_IS_CALIB_TABLE   = 0,
+   AMBA_DSP_IMG_WARP_IS_SUPERVIEW_TABLE   = 1,
+} AMBA_DSP_IMG_WARP_TABLE_TYPE_e;
+
 int AmbaDSP_WarpCore_SetVertWarpFlipEnb(AMBA_DSP_IMG_MODE_CFG_s * pMode, UINT32 VertWarp-
FlipEnb);
+int AmbaDSP_WarpCore_SetWarpTableType(AMBA_DSP_IMG_MODE_CFG_s *pMode, AMBA_DSP_IMG_WARP_
TABLE_TYPE_e TableType);

 #define AMBA_DSP_IMG_WARP_CONFIG_FORCE_DISABLE   1
 #define AMBA_DSP_IMG_WARP_CONFIG_PRE_CALCULATE   2
@@ -141,4 +150,5 @@ int AmbaDSP_WarpCore_SetDspWarp(AMBA_DSP_IMG_MODE_CFG_s *pMode);
 int AmbaDSP_WarpCore_CalcDspCawarp(AMBA_DSP_IMG_MODE_CFG_s *pMode, UINT32 Config);
 int AmbaDSP_WarpCore_SetDspCawarp(AMBA_DSP_IMG_MODE_CFG_s *pMode);
 int AmbaDSP_WarpCore_SetDspWarpAndCawarp(AMBA_DSP_IMG_MODE_CFG_s *pMode);
+int AmbaDSP_WarpCore_SetEisWarpInfo(AMBA_DSP_IMG_MODE_CFG_s *pMode, AMBA_DSP_IMG_CALIB_
WARP_INFO_s *pEisWarpInfo);
 #endif /* _AMBA_DSP_WARP_CORE_H_ */

 [Purpose]
 1. Image service of warp compensation
 2. To support superview function can work together with dzoom or EIS
==
==================================

Appendix 2   Additional Resources

Please contact an Ambarella representative for digital copies.

- *System*

    ◦ *AMBARELLA_SDK6_API_USB*

    ◦ *AMBARELLA_SDK6_API_AmbaKAL*

    ◦ *AMBARELLA_SDK6_API_B5*

    ◦ *AMBARELLA_SDK6_API_System*

    ◦ *AMBARELLA_SDK6_API_AmbaFS*

    ◦ *AMBARELLA_SDK6_AN_ADC_And_IR_Input*

    ◦ *AMBARELLA_SDK6 AN SD Card Tuning*

    ◦ *AMBARELLA_SDK6_AN_Firmwre_Update_Through_SD_Card*

    ◦ *AMBARELLA_SDK6_AN_Audio_Plugin_Effect*

    ◦ *AMBARELLA_SDK6_AN_DRAM_Tuning*

    ◦ *AMBARELLA_SDK6_AN_USB*

    ◦ *AMBARELLA_SDK6_AN_Build_Environment*

- *AmbaLink*

    ◦ *AMBARELLA_SDK6_API_AmbaLink*

    ◦ *AMBARELLA_SDK6_AN_AmbaLink*

    ◦ *AMBARELLA_SDK6_AN_AmbaLink Migration*

- *Driver*

    ◦ *AMBARELLA_SDK6_AN_Custom_LCD_Driver*

    ◦ *AMBARELLA_SDK6_AN_Custom_Audio CODEC_Driver*

    ◦ *AMBARELLA_SDK6_AN_Custom_Image_Sensor_Driver*

- *Calibration*

    ◦ *AMBARELLA_SDK6_UG_Calibration*

    ◦ *AMBARELLA_SDK6_API_Calibration*

- *Image Quality*

    ◦ *AMBARELLA_SDK6_UG_A12_Amage*

    ◦ *AMBARELLA_SDK6_AN_A12_IQ_Tuning*

    ◦ *AMBARELLA_SDK6_API_Image_Processing*

- *SVC*
  - ◦ *AMBARELLA_SDK6_DS_SVC_MovieRecorder*
  - ◦ *AMBARELLA_SDK6_DS_SVC_StillCapture*
  - ◦ *AMBARELLA_SDK6_DS_SVC_Video_Tuner*
  - ◦ *AMBARELLA_SDK6_DS_SVC_MoviePlayer*
  - ◦ *AMBARELLA_SDK6_DS_SVC_StillPlayback*
  - ◦ *AMBARELLA_SDK6_DS_SVC_3A_Framework*
  - ◦ *AMBARELLA_SDK6_API_A12_Image_Kernel*
  - ◦ *AMBARELLA_SDK6_API_Audio*
  - ◦ *AMBARELLA_SDK6_API_A12_DSP_Support_Package*
  - ◦ *AMBARELLA_SDK6_UG_A12_Migration*

- *Middleware*
  - ◦ *AMBARELLA_SDK6_UG_MW_UnitTest*
  - ◦ *AMBARELLA_SDK6_API_Middleware_Service*
  - ◦ *AMBARELLA_SDK6_API_Middleware_Flow*

- *Connected App*
  - ◦ *AMBARELLA_SDK6_API_Connected_AppLib*
  - ◦ *AMBARELLA_SDK6_DS_Connected_Application*
  - ◦ *A12 Connected_App_Basic_Function_Test*

- *Network*
  - ◦ *AMBARELLA_A-Series_Wireless_Connectivity_API_Remote_Control*
  - ◦ *AMBARELLA_SDK6_AN_Remote_Command_Control_Client*
  - ◦ *AmbaRemoteCam User Guide*

Appendix 3   Important Notice

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Appendix 4   Revision History

NOTE: Page numbers for previous drafts may differ from page numbers in the current version.

Version	Date	Comments
1.0	15 April 2016	Draft Original

Table A4-1.   Revision History.