13MP USB Camera Reference Design Kit

Features
(1) “The smaller, the better.” By using a camera module for mobile devices, the significantly small size as large as a golf ball offers the wide range of applications.
(2) “It’s available now!” Its kit is available for purchase online, allowing users to evaluate this solution quickly.
(3) “Time to market!” The optimized ISP firmware is embedded in the reference design kit, enabling users to treat it as the final product, rapidly leading to mass production.

Key Functions
✓ Many Output Sizes
   ✓ 13M 21fps
   ✓ 4K2K 30fps
   ✓ Full-HD(1080p) 60fps
   ✓ and more
✓ Maximum frame rate: 120fps
✓ YUV422, JPEG Output Selectable
✓ Auto Exposure
✓ Auto Focus
✓ Auto White Balance
✓ UVC Compatible (Brightness, Hue, and more)
✓ LED Control
✓ Either USB3.0 and 2.0 mode supported

Basic Structure

Availability
Please access e-con Systems to get the Ascella kit. Other materials should be asked for the following companies.

| Test/Evaluation | IC Kit | Software | LED Module | Test Evaluation
<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Test/Design</td>
<td>RDK</td>
<td>–</td>
<td>ISC</td>
<td>THine</td>
</tr>
<tr>
<td>2. Design</td>
<td>SDK for RDK Schematics*</td>
<td>–</td>
<td>ISC</td>
<td>THine</td>
</tr>
<tr>
<td>3. Hardware</td>
<td>THP7312</td>
<td>–</td>
<td>ISC</td>
<td>THine</td>
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</tbody>
</table>

Product Overview
The THP7312 is an image signal processor with a well-tuned, high-speed pipelined and power saving hardware engine interfaced with a variety of CMOS image sensors in digital camera modules especially for mobile devices, such as smart phones. The THP7312 controls AE, AWB and AF functions with its hard-wired circuits. You can utilize the THP7312’s original noise reduction and a variety of image correction functions as a means to get top quality pictures and movies in your mobile devices.

CEL Headquarters
4500 Patrick Henry Drive
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THine Electronics, Inc.
http://www.thine.co.jp/en/
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Email: sales@thine.co.jp
16Mega Pixel Image Signal Processor

Features
- High-Speed and High-Quality Image Processing with Low Power Consumption Achieved by THine’s Specialized Hardware
- Real-Time Movie Image Stabilizer and HDR
- Support RGB-IR sensor
- High performance 3A and customer functions achieved by powerful 32bit RISC MPU
- Smallest Package (WLCSP81 3.937mm x 3.960mm x 0.615mm, 0.4mm pitch)

Function Support

Adaptive Image Signal Processing
- Black Level Correction (by Color)
- Static and Adaptive Correction of Consecutive Defect/Dust Pixels
- Lens Shading Correction
- De-mosaic
- Support Alternate Row HDR
- Support RGB-IR

Auto Functions
- Auto Exposure (Multi-Point)
- Auto Focus (Multi-Point, Continuous)
- Auto White Balance
- Auto Flicker Cancel
- Auto Strobe Light Dimmer
- Auto Scene Detection
- Auto Fog Detection

Others
- Face Detection
- Movie Image Stabilizer
- De-fog
- Dual PFL
- JPEG Encoding
- Digital Zoom (Super Resolution)
- Resize x3 (MIPI Virtual channel)
- Horizontal Mirror

Overview
Cypress Semiconductor Corp. and THine Electronics, Inc. introduced industry’s fastest USB 3.0 camera reference design kit with 13-megapixel resolution at 21 frames per second. The new Ascella design kit is based on Cypress’s EZ-USB® CX3 USB 3.0 camera controller and THine’s THP7312 image signal processor (ISP). With optimized firmware, a software development kit, reference circuit schematics and related materials, the kit accelerates customers’ time-to-market without expensive initial costs for developing camera firmware. The kit delivers high resolution performance and advanced functions such as auto-focus and live video streaming for a broad range of consumer, industrial, medical, educational, and automotive applications. The Asella USB 3.0 Camera Reference Design Kit is available through e-con Systems, a leading product design services company specializing in advanced camera solutions.

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World’s Leading Company In Mixed Signal Technologies
16Mega Pixel Image Signal Processor

Features
• High-Speed and High-Quality Image Processing with Low Power Consumption
  Achieved by Thine’s Specialized Hardware
• Real-Time Movie Image Stabilizer and HDR
• Support RGB-R sensor
• High performance 3A and customer functions achieved
  by powerful 32bit RISC MPU
• Smallest Package (WLCSP81 3.937mm x 3.960mm x 0.615mm, 0.4mm pitch)

Function
Sensor Support
• Black Level Correction (by Color)
• Static and Adaptive Correction of Consecutive Defect/Dust Pixels
• Lens Shading Correction
• De-mosaic
• Support Alternate Row HDR
• Support RGB-R

Adaptive Image Signal Processing
• Noise Reduction
• Edge Enhancement
• Multi Axis Color Correction
• Gamma Correction
• Dark Area Correction
• Memory Color Correction

Auto Functions
• Auto Exposure (Multi-Point)
• Auto Focus (Multi Point, Continuous)
• Auto White Balance
• Auto Flicker Cancel
• Auto Strobe Light Dimmer
• Auto Scene Detection
• Auto Fog Detection

Others
• Face Detection
• Movie Image Stabilizer
• De-fog
• Dual PLL
• JPEG Encoding
• Digital Zoom

Periphery
• Noise Reduction
• Edge Enhancement
• Multi Axis Color Correction
• Gamma Correction
• Dark Area Correction
• Memory Color Correction

Specs
Pixel Count
16Megapixel
Frame Rate
16fps@16Mpixel, 21fps@13Mpixel, FHD 1080p-60fps / HD 720p-120fps
Package
WLCSP81 (3.937mm x 3.960mm x 0.615mm, 0.4mm pitch)
BGA81 (8mm x 8mm x 1.2mm, 0.8mm pitch)

Supply Voltage
CORE 1.2V, I/O 1.8V, 2.8V or 3.3V selectable
Operating Freq.
300MHz (EXT Clock 10 ʙ 30 MHz )
Sensor I/F
MIPI(4lane)RAW12/10/8bit + MIPI(2lane)RAW12/10/8bit, 1Gbps/lane
Parallel RAW12/10/8bit
Host I/F
MIPI (4lane), YUV420/422, JPEG, or RAW8bit, 1Gbps/lane
Parallel, YUV422, JPEG or RAW8bit
External I/F
SPI Slave

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<td>Prototype/MP</td>
<td>THP7312</td>
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<td>P7312DNX5</td>
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