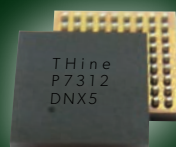**THine**® **CEL**

16Mega Pixel
Image Signal Processor

THP7312

THine
P7312
DNX5

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
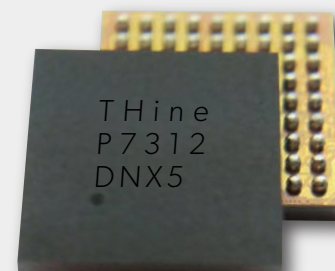top quality pictures and movies in your mobile devices.

THine Electronics, Inc.
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-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)

THP7312

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-IR

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
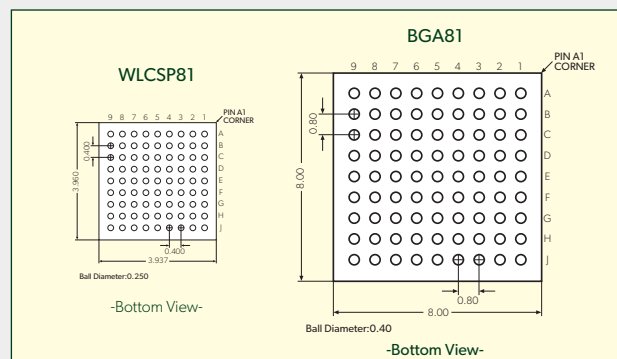- Auto Scene Detection
- Auto Fog Detection

Others

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

- Special Effects
  Monochrome, Sepia, Reverse,
  Rich Color, Watercolor,
  Wide Monochrome , Smart Sepia,
  Blue Man, Emboss, Part Color,
  Pin Hole, Soft Focus, Miniature

- Peripheral Control
  - VCM, Piezo, SMA and STM
  - Mechanical Shutter, Zoom Lenses, Zoom Tracking
  - LED Flash, Xenon Flash

Specification

Pixel Count	16Mega Pixel
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 10〜30 MHz)
Sensor I/F	MIPI(4lane)RAW12/10/8bit + MIPI(2lane)RAW12/10/8bit, 1Gbps/lane Parallel RAW12/10/8bit I2C Master (Up to 400KHz)
Host I/F	MIPI (4lane), YUV420/422, JPEG, or RAW8bit, 1Gbps/lane Parallel, YUV422, JPEG or RAW8bit I2C Slave (Up to 400KHz)、SPI Slave
External I/F	GPIO、SPI Master (Quad interface)

Package Dimension (WLCSP81 / BGA81)

BGA81

WLCSP81

PIN A1 CORNER

9 8 7 6 5 4 3 2 1

3.960

0.400

A B C D E F G H J

3.937

0.400

Ball Diameter:0.250

-Bottom View-

9 8 7 6 5 4 3 2 1

PIN A1 CORNER

0.80

8.00

0.80

8.00

A B C D E F G H J

Ball Diameter:0.40

-Bottom View-

OV13850-13MP Camera Module

LED Board

Image Sensor Board

THine® ISP Board

Cypress® CX3™ Board

Debug Port

USB 3.0
Interface

13MP USB Camera Reference Design Kit

- An application example for THP7312 and THL6523

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, medial, 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.

- Press Release, Cypress Semiconductor and THine Electronics. Aug. 12, 2015

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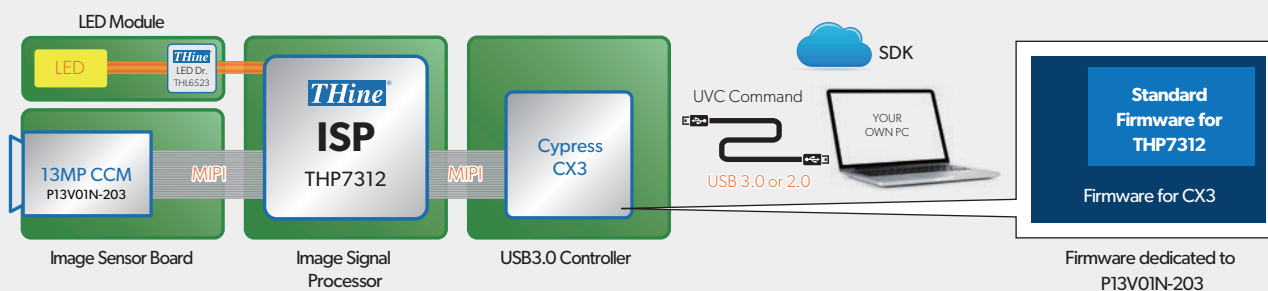
13MP USB Camera Reference Design Kit

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

LED Module

LED — THine LED Dr. THL6523

13MP CCM P13V01N-203 — MIPI — THine ISP THP7312 — MIPI — Cypress CX3

Image Sensor Board | Image Signal Processor | USB3.0 Controller

SDK

UVC Command

YOUR OWN PC

USB 3.0 or 2.0

Standard Firmware for THP7312

Firmware for CX3

Firmware dedicated to P13V01N-203

Availability

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

		Whom to ASK	Cypress	e-con	THine	Web Site
1	Test/Evaluation	RDK	–	●	–	http://www.e-consystems.com/Cypress-CX3-THine-ISP-13MP-RDK.asp
2	Design	SDK for RDK Schematics*	–	●	–	http://www.e-consystems.com/Cypress-CX3-THine-ISP-13MP-RDK.asp
		Schematics for ISP	–	–	●	http://www.thine.co.jp/en/rfs_13mp_camera/
3	Prototype/MP	CX3	●	–	–	http://www.cypress.com/part/cyusb3065-bzxi
		THP7312	–	–	●	http://www.thine.co.jp/products/num_details/THP7312.html
		P13V01N-203	–	–	●	https://www.thine.co.jp/en/contact_us01/

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