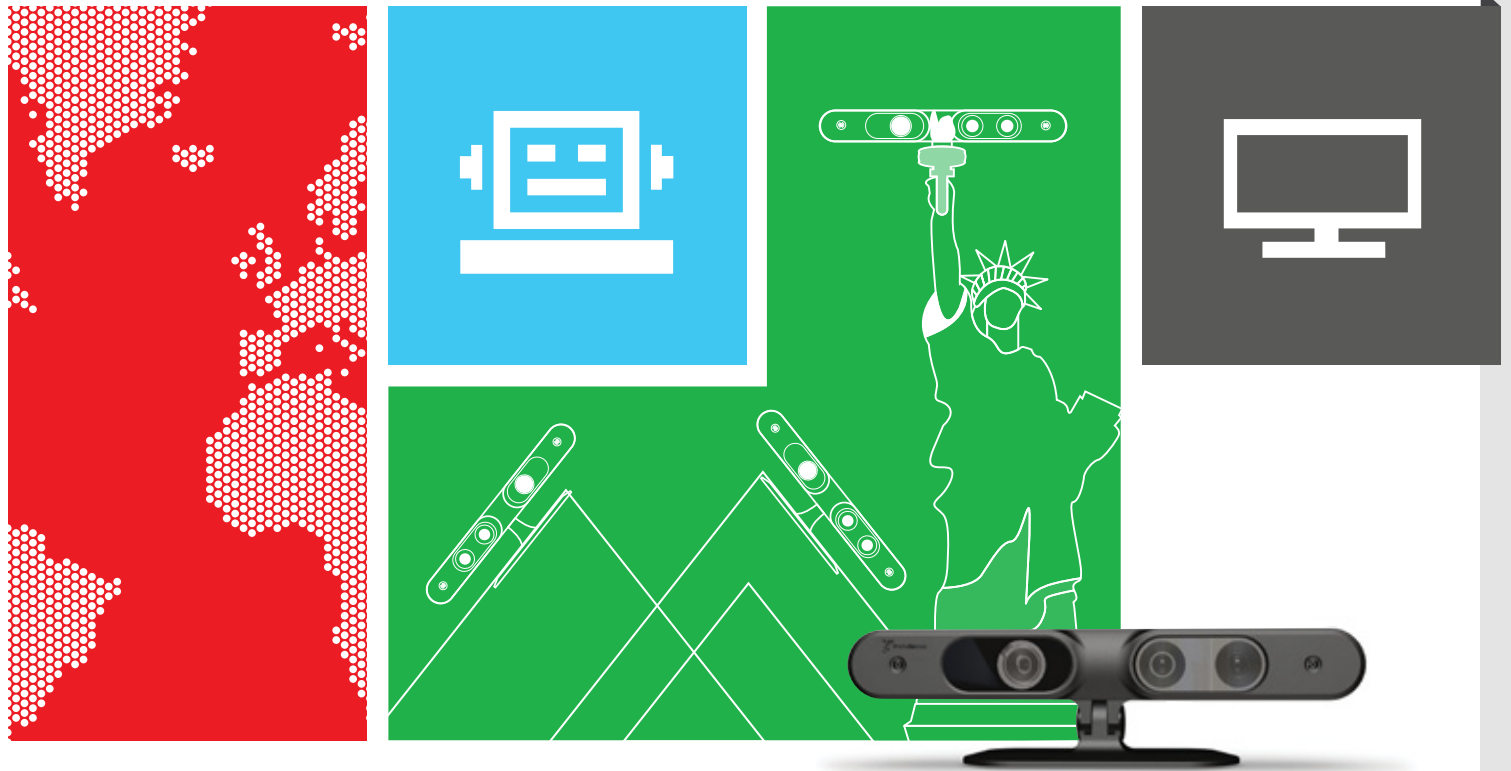# PrimeSense™
Natural Interaction®

PRIMESENSE™ 3D SENSORS

PRIMESENSE IS CHANGING THE WAY WE INTERACT WITH DIGITAL DEVICES

PrimeSense 3D Sensors are giving digital devices the gift of sight, enabling Natural Interaction® between people and devices and between devices and their surroundings. Our Natural Interaction solutions power over 20 million devices worldwide; but that's only the start. Using cutting-edge technology, our sensors are robust, accurate and affordable and they are used in mass-market commercial devices. Today, our patented technological breakthroughs have made us the leading provider of high-performance, low-cost 3D machine vision solutions. With more options than ever – mid-range, close range, a peripheral and an embedded sensor – we can support all your 3D sensing needs.

HOW IT WORKS

PrimeSense 3D sensing technology gives digital devices the ability to observe a scene in three dimensions. It translates these observations into a synchronized image stream (depth and color) – just like humans do.

It then takes those synchronized images and translates them into information such as:

- **Identification** of people their body properties, movements and gestures

- **Classification** of objects such as furniture, packages, etc.

- **Measurements** such as size or volume

- **Location** of walls and floor

We call this depth sensing, which is made possible through the cutting-edge technology embedded in our sensors and middleware.
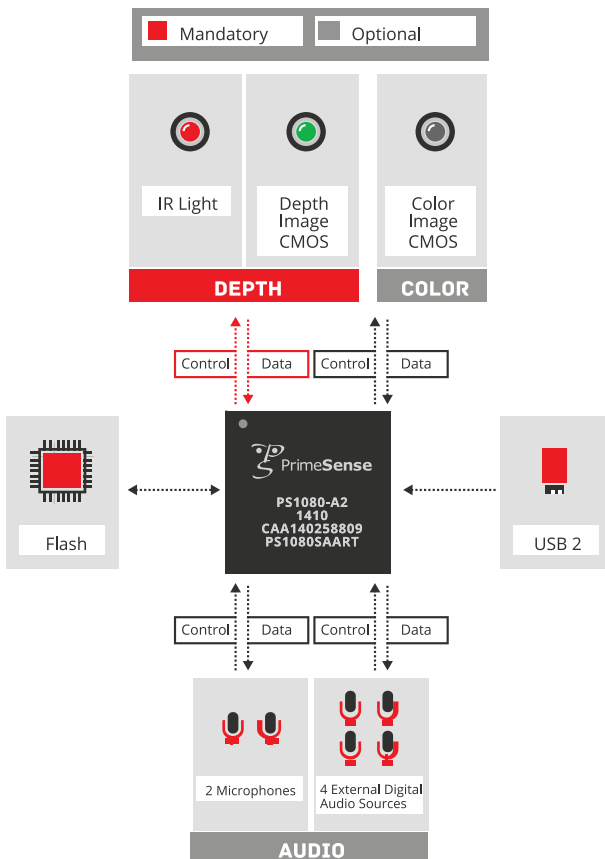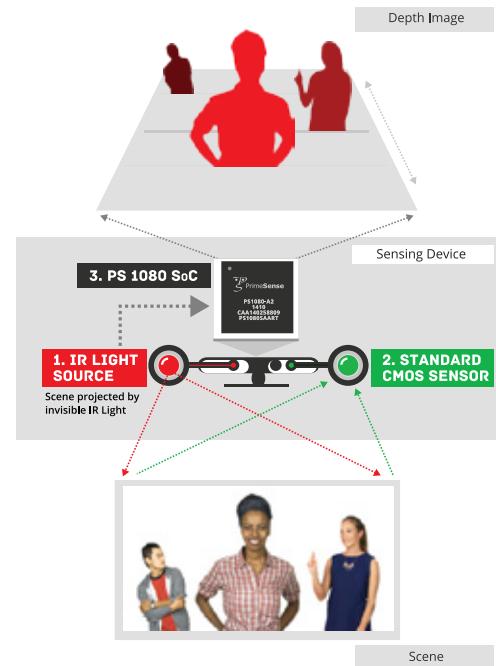

PRIMESENSE LIGHT CODING™ TECHNOLOGY

PrimeSense's Light Coding patented technology solutions make 3D depth sensing possible. It works by coding the scene with near-IR light, which is invisible to the human eye. The solution then uses a standard off-the-shelf CMOS image sensor to read the coded light back from the scene. This is the process that enables depth acquisition and what makes PrimeSense solutions so accurate.

Using the CMOS image sensor, PrimeSense SoC Carmine™ (PS1080) and next gen SoC Capri™ (PS1200) execute sophisticated parallel computational algorithms to decipher the received light coding infrared patterns, in order to produce a VGA size depth image of a scene. With a USB interface used to pass all data to the host, the SoC has minimal CPU requirements as all depth acquisition algorithms run on the SoC itself.

Add all these elements together and you get a solution that's precise, robust and cost effective.
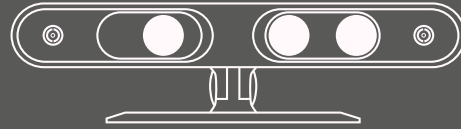
SENSORS MAIN BENEFITS:

- Ultra small form facor, smallest in the world
- Best depth performance
- Thin host
- Low-power
- Proven mass market scalability
- Mass consumer market product price point

SENSORS MAIN FEATURES:

- Field of View 57.5×45
- VGA depth map (640×480)
- Color and audio support
- USB powered
- Standard off the shelf components
- OpenNI compliant

CARMINE 1.08

With the highest-quality Reference Design, Carmine 1.08 supports various applications in numerous industries. It is the most robust, affordable and market proven 3D sensing reference design ever made.

Range 0.8m-3.5m

CARMINE 1.09

This short-range evaluation sensor gives devices the ability to sense their environment accurately up close.

Range 0.35m-1.4m

CAPRI 1.25

Available as an embedded solution for mass production devices, PrimeSense's breakthrough Reference Design Capri 1.25 utilizes the next generation System on Chip, with improved algorithms including multi-modal 3D sensing techniques. Capri provides the most versatile 3D sensing platform in a tiny form factor, making it ideal for embedding in consumer electronics devices such as PCs, All –in-One PCs, tablets, laptops, mobile phones, TVs, consumer robotics and more.

- Using the next-gen Capri PS1200 SoC
- Significant size reduction
- High performance
- Cost reduction
- The only 3D sensor fit to be embedded into consumer devices

CUSTOMIZATION

Solutions for new markets, applications, and use cases often require unique capabilities and customizations to fit a specific need. PrimeSense can modify various features of its 3D sensing solution such as range, field of view, depth resolution, frames per second, and more, to best address your specific needs. Moreover, shape, structure and industrial design can also be customized. Let PrimeSense design the right solution to help you revolutionize your market.

Range
Field of View
Depth resolution
MOS at 1m
Frame / second
Ambient light

OpenNI FOR DEVELOPERS
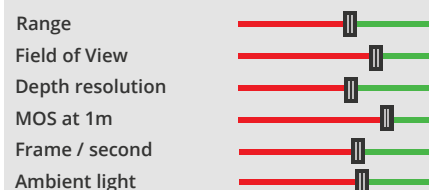
The OpenNI consortium was established in November 2010 as a not-for-profit organization whose purpose is to promote and standardize the compatibility and interoperability of Natural Interaction (NI) devices, applications and middleware. OpenNI is the largest 3D sensing development framework and community. The open source SDK is the recognized standard for developing computer vision middleware and 3D solutions. The OpenNI community provides developers with a full range of software tools along with a vivid ecosystem platform for effective collaboration and promotion.

www.openni.org | arena.openni.org

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WWW.PRIMESENSE.COM   **Get your sensor:** www.primesense.com/developers/get-your-sensor/

PRODUCTS SPECIFICATIONS

PROPERTY		CARMINE 1.08	CARMINE 1.09	UNIT
Operating Temperature		5 – 40	10 – 40	[°C]
Data Interface		USB 2.0 / 3.0	USB 2.0 / 3.0	
Operation Range		0.8 – 3.5	0.35 – 1.4	[m]
Field of View (Horizontal, Vertical, Diagonal)		57.5, 45, 69 (H,V,D)	57.5, 45, 69 (H,V,D)	[deg]
Depth Image Size		640 x 480 (VGA)	640 x 480 (VGA)	[pixel x pixel]
Spatial x/y Resolution (2-Sigma Values)	@2m	3.4		[mm]
	@0.5m		0.9	[mm]
Depth Resolution (2-Sigma Values)	@2m	1.2		[cm]
	@0.5m		0.1	[cm]
Maximal Frames-per-Second Rate		60	60	
Color Image CMOS	@ 30 FPS	640 x 480 (VGA)	640 x 480 (VGA)	[pixel x pixel]
Built-in Microphones		2	2	
Data Format		16	16	[bit]
External Digital Audio Inputs		4	4	[inputs]
Dimensions: Width x Height x Depth		18 x 2.5 x 3.5	18 x 2.5 x 3.5	[cm]
Power Supply		USB	USB	
Maximal Power Consumption		2.25	2.25	[Watt]