3D Scanning & Metrology

DLP®
TEXAS INSTRUMENTS

Get More Speed and Accuracy with Structured Light using DLP® Technology

Texas Instruments

Introduction to 3D Scanning

3D scanning is a fast and accurate optical technique used to capture physical measurements of an object. With the digitized 3D scan data, the dimensions of any object, including surface area, volume, and feature size, can be extracted. 3D scanning has proven to be valuable across a wide array of applications, including dental scanning, machine vision, biometrics, industrial metrology, and many more.

Structured Light is an optical method of 3D scanning where a series of patterns are projected upon an object and a camera or sensor detects the distortions of the patterns. Image processing and triangulation algorithms then convert these distortions into a 3D point cloud. The point cloud can be used directly for analysis of the object or easily exported to a variety of CAD modeling formats.

Developed by Texas Instruments in 1987 and found in projectors around the world, DLP technology gives developers the ability to spatially and sequentially control discrete points of light with speed and precision. Compared with contact coordinate measurements or scanning lasers, structured light systems with DLP can produce 3D data in real-time with high accuracy. Developers also have the ability to independently control each pixel on the Digital Micromirror Device (DMD), allowing for dynamic pattern control to optimize results for multiple objects or operating environments on a single platform.

Example Products

FLASHSCAN 3D

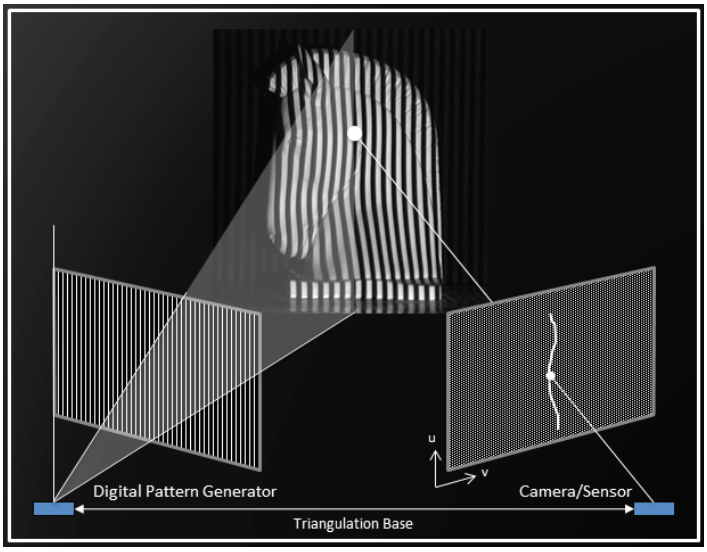


www.flashscan3d.com

SEIKOWAVE



www.seikowave.com



Structured Light Theory of Operation

Key Features and Benefits

- **Fast, programmable pattern rates up to 32 kHz**
  - Acquire 3D scan data in real-time on moving objects
  - Optimize scan speed and accuracy for multiple objects and environments using adaptive pattern sets
  - Leverage high bit depth patterns for improved accuracy
- **Digital switching using reflective, reliable MEMS micromirrors**
  - High contrast patterns to enable accurate scan data
  - Constant performance over time and temperature
  - No motors or fragile moving components required
- **Optically efficient from 365 to 2500nm**
  - Optimal wavelength selection to reduce reflections and analyze a wide range of materials
  - Non-visible, eye-safe scans using NIR light
- **Broad chipset portfolio with range of resolutions, pattern rates, and device sizes**
  - Design 3D scanning systems ranging from high performance to portable low cost

To get started, visit www.ti.com/mems to read our 3D scanning and measurement application notes. We have multiple development kits available to help you start designing your system today.

www.ti.com/mems **2013**

@2013 Texas Instruments, Inc. DLP, the DLP logo and the platform bar are trademarks of Texas Instruments.

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products (also referred to herein as “components”) are sold subject to TI’s terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in TI’s terms and conditions of sale of semiconductor products. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

TI assumes no liability for applications assistance or the design of Buyers’ products. Buyers are responsible for their products and applications using TI components. To minimize the risks associated with Buyers’ products and applications, Buyers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of significant portions of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI components or services with statements different from or beyond the parameters stated by TI for that component or service voids all express and any implied warranties for the associated TI component or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences, lessen the likelihood of failures that might cause harm and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI’s goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed a special agreement specifically governing such use.

Only those TI components which TI has specifically designated as military grade or “enhanced plastic” are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components which have ***not*** been so designated is solely at the Buyer's risk, and that Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

Products		**Applications**	
Audio	www.ti.com/audio	Automotive and Transportation	www.ti.com/automotive
Amplifiers	amplifier.ti.com	Communications and Telecom	www.ti.com/communications
Data Converters	dataconverter.ti.com	Computers and Peripherals	www.ti.com/computers
DLP® Products	www.dlp.com	Consumer Electronics	www.ti.com/consumer-apps
DSP	dsp.ti.com	Energy and Lighting	www.ti.com/energy
Clocks and Timers	www.ti.com/clocks	Industrial	www.ti.com/industrial
Interface	interface.ti.com	Medical	www.ti.com/medical
Logic	logic.ti.com	Security	www.ti.com/security
Power Mgmt	power.ti.com	Space, Avionics and Defense	www.ti.com/space-avionics-defense
Microcontrollers	microcontroller.ti.com	Video and Imaging	www.ti.com/video
RFID	www.ti-rfid.com		
OMAP Applications Processors	www.ti.com/omap	**TI E2E Community**	e2e.ti.com
Wireless Connectivity	www.ti.com/wirelessconnectivity		

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2013, Texas Instruments Incorporated