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Sony Disc & Digital Solutions Inc.

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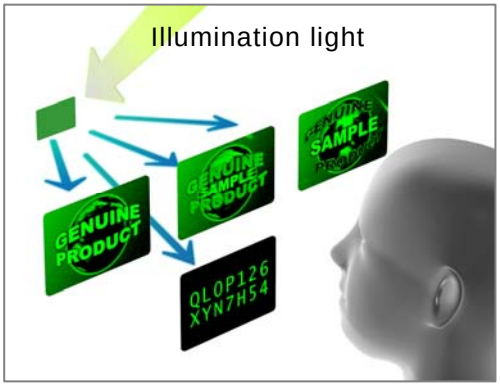
Research & Development

Sony Disc and Digital Solutions ('SDAD') Inc. develops mass production technology for highly-secure holograms which store unique identification codes

Tokyo, Japan, May 7, 2010 - Sony Disc and Digital Solutions ('SDAD', President: Dieter Daum; Headquarters at Shinagawa-ku, Tokyo) today announced the development of new mass production technology which adds an additional layer of security to Lippmann holograms※1 by recording individually distinct identification codes. Lippmann holograms with individually distinct identification codes are extremely resistant to counterfeiting and forgery, and are most suitable for credit cards, smart IC cards and authentication stickers.

In addition to developing and mass producing Lippmann holograms with individually distinct identification codes, SDAD also envisions launching a new business whereby it will operate an authentication server via the internet, for CRM (Customer Relationship Management) and 'trace-and-track' services which utilize the individually assigned code on the holograms. SDAD will eventually introduce the Lippmann holograms with individually distinct identification codes as authentication stickers for Sony products. It will deliver sample holograms to product manufacturers in May 2010.

【Sony's holograms with individually distinct identification codes】



(The left)
Sony's holograms can display smooth three-dimensional motion pictures horizontally and numerical codes vertically.

(The above) Photograph of the holograms

【Background of Development and Next Step】

Recently, there has been an increase in the production and sales of counterfeit products and illegal imitations - in addition to credit cards, ID cards and bank notes - which violate intellectual property rights. In reaction to the progression of illegal fabrication technology, the demand for highly secure hologram technology, with faster and more accurate authentication has rapidly increased.

The mass production technology for individually coded holograms, which is based on Sony's optical recording and digital image processing technologies, has been researched and developed for years. In addition, Sony's optical disc production technology has been applied to the mass-production and quality control processes of the Lippmann holograms. By

utilizing its advanced manufacturing facilities and master-form production equipment, and taking advantage of its know-how such as effective material control, SDAD and Sony DADC which operates a global supply chain for the Entertainment and Information industries, aim to build a world class hologram manufacturing and sales business. In the future, SDAD will also explore the application of Lippmann holograms with individually distinct identification codes, which can store animation and motion picture, for advertising and marketing.

●Key Features of Sony's holograms:

1. **Developing mass production technology for highly-secure holograms which store unique identification codes**
   Conventional Lippmann holograms were mass-produced by contact copy in which the master forms of these holograms were optically replicated. This conventional method allows for the simple mass production of identical holograms, but does not allow for the mass production of holograms containing individually variable information. However, SDAD has successfully developed mass production equipment with the optical recording capability to record an individual identification code into Lippmann holograms during mass production. SDAD will mass produce Lippmann holograms with up to 21 encrypted digits in a single hologram.

2. **Master-form Production by Holographic Stereogram Technology※2**
   SDAD will use master-forms of holograms which are made by holographic stereogram technology with digital image processing which records more than one hundred images onto a single hologram sheet. Therefore it can store flying logos (three-dimensional computer graphics) and moving animation. Lippmann holograms can be applied as advertising and marketing tools because it can display photographic images, pictures, and computer graphics. This was not possible with conventional holograms made by irradiating laser to modeling objects.

【The sample of master-forms of holograms by holographic stereogram technology】
※The holograms below are sample images. They might be different from the holograms actually seen.

< Computer graphics >

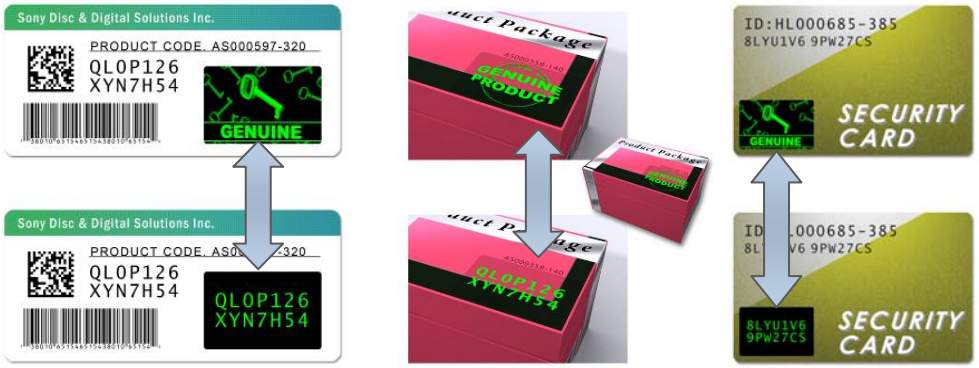

<Animation>


< Photographic images >

3. **Higher Level of Security Function**
   Based on the differentiated technology described above, SDAD is readily able to mass produce unique Lippmann holograms that display smooth three-dimensional motion pictures horizontally and numerical codes vertically. Such uniquely featured holograms are extremely difficult to replicate and thereby offer the highest level of security for anti-counterfeit measures.

【Application example】

※The holograms below are sample images. They might be different from the holograms actually seen.



<Labels> <Packages> <ID Cards>

4. Operation of Authentication Server System and Offering Solution Services

SDAD plans to operate an authentication server to identify individually coded holograms and to explore new business opportunities for CRM (Customer Relationship Management) and 'trace-and-track' services.

※1 Lippmann Hologram :

An optical interference fringe is formed by refractive index modulation in the special photo-sensitive material. When white-light is illuminated onto the photo-sensitive material, a holographic image appears through a diffractive phenomenon. The Lippmann hologram's unique features include a three-dimensional effect – in both horizontal and vertical directions (called "full parallax") – and natural full color presentation even with vertical parallax. Conventional embossed holograms are formed by fine concavo-convex interference fringes and are incapable of recording images with vertical parallax. The unique production materials and the manufacturing process make the Lippmann holograms extremely difficult to counterfeit.

※2 Holographic Stereogram Technology :

It is a three-dimensional imaging technology that displays different images depending on the standpoint from which the hologram is viewed.
Stereogram technology which uses a lenticular lens (array of cylindrical lenses) can display two to tens of viewpoint images through light refraction.
On the other hand, a holographic stereogram can express more than 100 different images within a thin medium of only a few tens of μ m through light diffraction.

About Sony DADC

Sony DADC is a leading disc and digital solution provider for the entertainment, education and information industries, offering world-class optical media replication services, digital and physical supply chain solutions and software services. The world's largest optical media production network consists of twenty-three optical media production, distribution and digital facilities worldwide. Production facilities are located in Austria, UK, United States, Canada, Mexico, Brazil, India, Australia, Hong Kong, China and Japan.

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