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News Release from DKN Research, Haverhill, Massachusetts

"DKN Research Unveils a Concept to Create the Industry's Thinnest Connectors for High Density Flexible Substrates"

DKN Research, a leading engineering firm specializing in micro electronics and packaging technology, unveiled a new concept to create the industry's thinnest connectors for high density substrates. This giant step forward will make a significant contribution to the never ending miniaturization of mobile electronics devices. DKN Research successfully developed a broad range of technologies associated with printable and flexible electronics and can package a specific program that includes materials and equipment for all customers' application needs. They provide concept model samples along with engineering and design services tailored to fit customer needs in both the U.S. and Europe.

DKN Research (Haverhill, MA) recently unveiled a new concept for Ultra Thin Connectors on high density flexible substrates to showcase the connector's flexibility and optimize a package design process. This was made possible after years of a collaborative research and development relationship with Hirai Seimitsu Kogyo Corporation (Osaka, Japan), an advanced electronic component supplier, and NY Industries Ltd, a flexible substrate manufacturer (Otsu, Shiga, Japan).

Portable electronics products continue to shrink in size and weight, and display devices are getting thinner and thinner. This places an ever increasing demand for semiconductors and passive components to be finer and thinner, and connectors for flexible substrates mounted on printed circuit boards to follow accordingly. These connectors must be finer, thinner, possess a smaller pitch, and have a higher pin count. Unfortunately, conventional structures for connectors dictate the height be no less than 0.6mm, the flexible substrate pitch be no less than 0.2mm, and pin connections no greater than 60~70. A new low profile connecting method must be developed; it is essential to mount/wire using flexible substrates in order to achieve compact and lightweight electronic device technology.

The collaborative relationship between Hirai Seimitsu Kogyo Corp in Osaka, Japan, DKN Research LLC, an advanced engineering company from Haverhill Massachusetts, USA, and NY Industries Ltd., a flexible substrate manufacturer in Otsu, Shiga, Japan, was cultivated to meet these challenges. Their brainstorming relationship resulted in a new UTF Connector series (patents pending). This new connection design that uses ultra thin connectors for flexible substrates is a critical component necessary to meet the challenges to manufacture the next generation of portable electronic devices. So far they have developed a series of various functions, such as SMT soldering type, adhesive fixed type, hinge opening type, and a no soldering type. Once you understand the diversity of this tool in promoting optimum mount designs, you will agree the concept model can be applied to all mounting methods.

The new concept model of UTF Connector has arrayed micro bumps inside a thin cover substrate that is hinged to the frame allowing it to precisely align with the flexible substrate, and securely connect with a PCB or electronic component. A hook type mechanism was also added to a thin metal plate cover to provide uniform

pressure on the back of the bump array; the connector can be mechanically locked with a high level of reliability onto the guide holes of a rigid PCB. This locking mechanism can be easily unlocked, making the high density flexible substrate detachable as often as needed. In other scenarios, several bumps and hooks can be attached to the frame side for alignment and fixed mount applications. The concept model is applicable for SMT soldering, Adhesive fixed or No soldering /mechanically fixed. The fixing method for each custom design during production is determined by selecting a suitable structure.

When a high density flexible substrate is connected to a rigid PCB using the UTF Connector series, the mounted height from the PCB surface is less than 0.3mm. It is less than half of the standard thin connection structures, and almost the same as the smallest chip components.

Micro bumps for the connection are arrayed on UTF Connectors, making larger bump pitches compared to the circuit density on the flexible substrate. This results in an easier mounting process and still maintains a high reliability in the connection. For example, with a 5x10 bump array with a 0.8mm bump pitch, it is possible to make a 50 pin /0.16mm pitch high density flexible substrate connection in an area as small as 7mm x 11mm. It is even possible to make the pitch of the micro bump array less than 0.5mm. Now, a pitch that is less than 0.1mm on a high density flexible substrate connection can be achieved.

Since there is no need to use expensive molds in manufacturing UTF connectors, it is easy to revise its design for mass production. The number of custom design choices for each client is endless. Several evaluation tests on prototypes for possible optimization are currently underway amongst flexible substrate manufacturing companies and mounting companies.

The UTF connector is a custom designed product for customer specific applications. DKN Research provides engineering and design service for both UTF Connectors and substrates according to customers' requests, and can provide concept model samples along with substrates (US $249.00 per set) for customers in the U.S., Europe and Asia except Japan. Detailed information is provided by requests. DKN Research will respond to all inquiries and questions about their new connection technologies.

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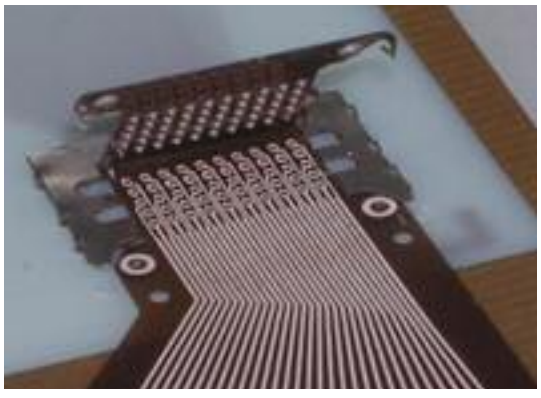

High density flexible substrate connection using a UTF Connector concept model