

May 22, 2013

Mass Production of FPCs with Conductive Paste Connection that Achieves Thinner Circuit Boards and Higher Density Circuit Patterns

~Dramatic improvement in electronic device wiring design flexibility and space-saving performance~

Sumitomo Electric has developed a new flexible printed circuit (FPC with conductive paste connection) with circuit layers that are connected by conductive paste based on the company’s original metal nanoparticle technology. In April this year, Sumitomo Electric Printed Circuits, Inc. started full-scale operation of its mass-production line at Minakuchi Works, and has recently started to ship the newly developed double-sided FPCs.

When compared with conventional FPCs with electroplating connections, FPCs with conductive paste connections enable a reduction in the thickness of circuit boards by up to about 30%, which dramatically improves their flexibility. Because of its capability to increase wiring density by high-precision circuit pattern formation, the newly developed FPC is expected to improve the wiring design flexibility of mobile terminals and other electronic devices and to save space, thereby achieving further evolution of these devices by enhancing their designability, operability, and performance in the future.

Aiming to promote new material and product development, Sumitomo Electric will continue to advance its metal nanoparticle and other original technologies and their applications.

【Flexible printed circuit (FPC)】

An FPC is a flexible wiring material consisting of an insulating film on which an electric circuit (conductor layer) is formed using copper foil. The FPC features thinness, lightness and superior heat resistance, while enabling various parts to be mounted on it. FPCs include single-sided boards (single-layer circuits), double-sided boards (two layers of circuits with insulating film in between), or multi-layer boards (three or more layers of circuits) (see Figure 1). At present, FPCs are widely used for various types of electronic devices including smartphones, tablet terminals, hard disc drives, DVD recorders/players, and home video game machines.

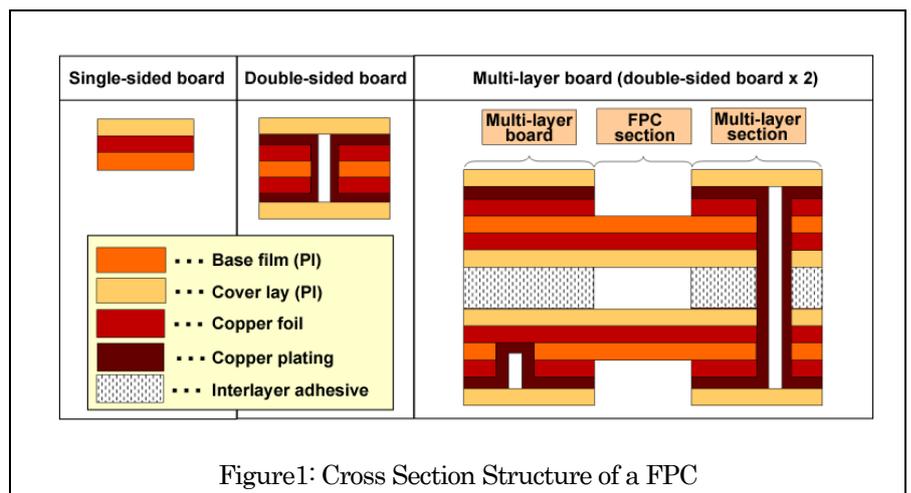
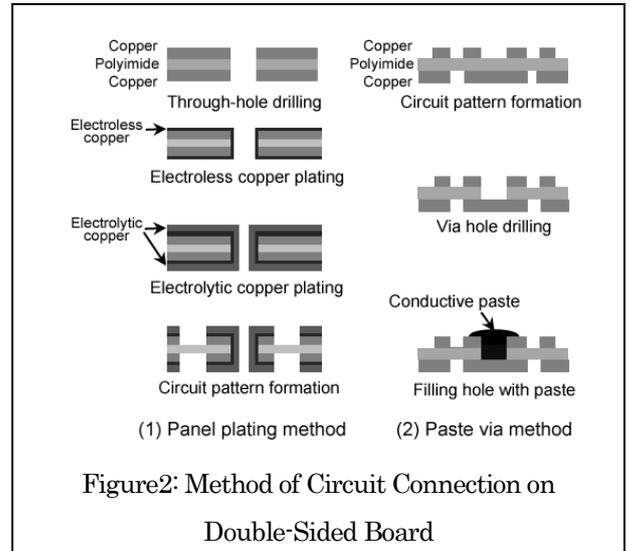


Figure1: Cross Section Structure of a FPC

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【Technique for circuit connection with conductive paste】

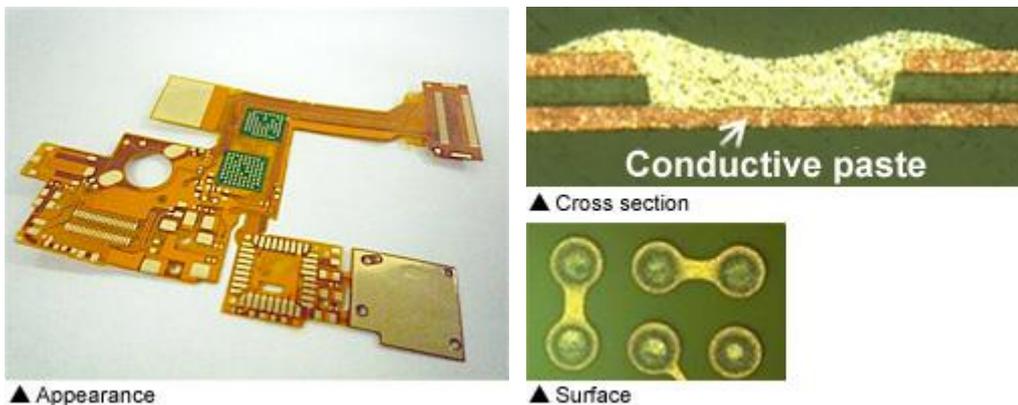
Conventionally, the panel plating method (see Figure 2(1)) consisting of the following three processes (i) drilling holes in the insulating film, (ii) adding two types of conductive copper plating, and (iii) forming a circuit—has been widely used to connect the circuits on a double-sided or multi-layer board. However, this method is limited in forming highly precise circuit patterns due to the irreducible thickness of the plated copper layers.



In contrast, the method for connecting circuits with conductive paste (called paste via method; see Figure 2(2)) consists of the following three processes: (i) forming a circuit, (ii) drilling holes in the insulating film, and (iii) filling the holes with conductive paste. Use of conductive paste containing Sumitomo Electric’s originally developed metal nanoparticles and the development of a technology that can accurately and evenly fill the paste into the via holes enhances circuit connection reliability and ensures stable product quality (patent-pending). Since the paste via method does not use copper plating, it reduces the thickness of circuit boards by nearly 30% compared with that of traditional boards, thereby dramatically improving the flexibility of the circuit boards and permitting the formation of more precise circuits. When compared with the panel plating method, the paste via method has simplified the FPC production process and produces higher quality FPC since the new method does not use copper plating, which has often been one of the causes of defective FPCs.

Sumitomo Electric will promote the overseas expansion of FPC mass production systems and the expansion of FPC sales for use in the liquid crystal panels and touch-sensitive panels of mobile terminals.

【Newly developed FPC with conductive paste connection】



【Profile of Sumitomo Electric Printed Circuits, Inc.】

Description of business	Development and production of FPCs for electronics applications
Head office	30 Hinokigaoka, Minakuchi-cho, Kouka-shi, Shiga pref.
Representative	Junichiro Nishikawa, president and CEO
Established	April 2000
Share capital	¥1,500 million (wholly owned by Sumitomo Electric)