

Banpil granted new patent in electrical interconnects: Patent portfolio extended to RF applications and ready to license to system vendors for high frequency and low power RF and Radar system development

Banpil Interconnects suppresses high frequency signal loss by more than 90% with less than one-tenth the power of conventional interconnects

SANTA CLARA, Calif., July 1, 2009 -- Banpil Photonics, Inc., a leading company in expanding the boundaries of optics and electronics through innovations, today announced that it has been awarded a new patent that extends its high-speed metallic (electrical) interconnects platform technology to cover Radio-Frequency (RF) applications.

The Banpil invention is a novel phase-shifter (also known as delay line) technology that will decrease the dielectric loss such that a signal will be transmitted at a much higher frequency. This high performance delay line is a passive device. For example, if it is used with standard PCB material e.g. FR4, the estimated loss at 20 GHz at the end of 12 inches is less than 1 dB whereas, a 12 inch long state-of-art delay line in standard FR4 based PCB at 20 GHz will have more than 10 dB of signal loss.

The low loss enabled by Banpil's innovation in delay-line allows transmitting either high power/low power signal with significantly low-loss, not possible in standard active delay-line devices. This delay line can be greatly simplified for microwave delay lines and can be of help when designing tunable delay lines utilizing low-cost FR4 PCB material. Alternatively, this delay line can also be fabricated monolithically on the semiconductor substrate and integrated with other active devices to increase the functionality and also make variable delay line incorporating with other devices such as switches.

Currently, it is possible to make a passive delay line using a transmission-line structure and conventional dielectrics, and tunable using switches. The primary drawbacks concerning this type of delay line are insertion loss dominated by the dielectric materials and a longer delay time. Insertion loss can be minimized if a low loss tangent dielectric material is used. However, under current technologies the cost of the low loss tangent dielectrics is sufficiently high-cost, which limits their usage to high-end systems.

"It is highly desirable to have delay lines that are passive and can offer characteristics such as low insertion loss, compact in size, and low cost," said Banpil CEO Dr. Achyut Dutta. "Additionally, it is desirable to have delay lines, which have high signal handling capability and are tunable, yet cost-effective and

friendly for manufacturing. Banpil is very pleased and proud to offer this innovation to RF system vendors following our patent award.”

Banpil’s invention can be used in RF radar systems, phase-array-antenna systems, communication systems, and generally in any system where signals are to be delayed and/or created in phase. The most significant application is within an electronically steerable phased array antenna, in which the phase of a large number of radiating elements is controlled in order to force the electromagnetic wave to add up to form a particular angle with the array.

In this decade an explosive growth of the wireless market and its dependence on RF ICs has been observed. There is new expansion in aerospace, cellular, WiMax, Wi-Fi, and global positioning satellite (GPS). New applications such as ultra-wideband (UWB) wireless and collision avoidance are contributing as well. Market research firm IC Insights, expected the associated RF-components, especially compound semiconductor based components market to more than double to \$4.4 billion in 2008, growing at an impressive 16 percent annually going forward.

Banpil has made sample-level FPC and rigid FR4 delay-line products available for demonstration. The company welcomes opportunities to work with system vendors to explore new or enhanced applications including RF. Banpil is also actively seeking licensees, strategic partnerships with both rigid PCB and FPC manufacturing, and investors.

About Banpil Photonics, Inc.

Banpil Photonics develops and licenses fundamental technology expanding the boundaries of optics and electronics. The company has developed an extensive IP portfolio of high-speed interconnects, multispectral image sensors, and high-efficiency photovoltaic technologies. Banpil innovations enable the development and manufacture of new generations of low-cost, high-speed electrical interconnects for RF, chip-to-chip, chip-to-board, board-to-board, and rack-to-rack applications; multispectral image sensors for automotive & medical imaging, mobile, security, remote-sensing, and communication applications; and photovoltaic technology for solar cell applications. For more information, visit www.banpil.com.

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