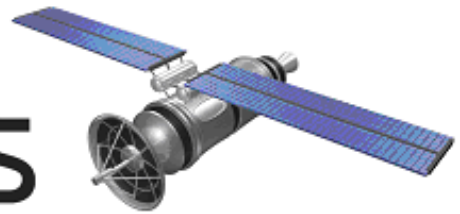


# FutureHorizons



The Global Semiconductor Industry Analysts

## FH MONDAY

4 December 2017

### Startup Demonstrates ReRAM Retention, Endurance

An Israel-based semiconductor startup has reported positive results with its ReRAM technology. Weebit Nano recently published preliminary evaluation results of endurance and data retention measurement on 4Kb arrays on 300nm cells. In a telephone interview with EE Times, CEO Coby Hanoch said the results successfully conclude the 300nm 4Kb characterization

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### IBM: Copper Interconnects Here to Stay

LAKE WALES, Fla. — When aluminum interconnects became too slow for complementary metal oxide semiconductors (CMOS) at the 180 nanometer node, IBM led the way to the now universally used copper interconnects starting in 1997.

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### Qualcomm Sheds Light on Licensing Policy

5G technology licensing rates, the same as the firm charged for 4G, offer perspective on Qualcomm's dispute with Apple and wireless industry grumbling. While 5G standards are still being set by the 3GPP, two companies have now announced planned license rates for their intellectual property (IP).

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### TALK TO US



### RISC-V Spins into Drives, AI

SAN JOSE, Calif. — Storage giant Western Digital announced that it will standardize on RISC-V processors and has invested in Esperanto Technologies, a startup designing high-end SoCs and cores using the open-source instruction set architecture

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### MEMS Design Shrinks Speakers to Chip Scale

LAKE WALES, Fla. — Microelectromechanical-system-based audio speakers for earbuds, smartphones, wearables and other Internet of Things (IoT) devices have proved a tough row to hoe.

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## **Startup Demonstrates ReRAM Retention, Endurance**

TORONTO — An Israel-based semiconductor startup has reported positive results with its ReRAM technology.

Weebit Nano recently published preliminary evaluation results of endurance and data retention measurement on 4Kb arrays on 300nm cells. In a telephone interview with EE Times, CEO Coby Hanoch said the results successfully conclude the 300nm 4Kb characterization. The measurement was done under a variety of temperature and duration conditions at 150, 200 and 260 degrees Celsius, monitoring the ability of the ReRAM cells to maintain their resistivity levels within industry acceptable ranges.

Hanoch said 260 degrees Celsius is significant since it's the temperature used when soldering chipsets into printed circuit boards. Weebit Nano's 4Kb array kept its programmed data after 30 minutes at 260°C, exceeding the soldering requirement of 15 minutes at this temperature.

## **IBM: Copper Interconnects Here to Stay**

LAKE WALES, Fla. — When aluminum interconnects became too slow for complementary metal oxide semiconductors (CMOS) at the 180 nanometer node, IBM led the way to the now universally used copper interconnects starting in 1997.

Now, on its 20th anniversary, many other interconnects are being proposed to replace copper, notably graphene. IBM, however, claims that slight tweaks to copper deposition will give it an enduring edge all the way to the end of the road for CMOS.

Big Blue is touting "copper forever" at the IEEE Nanotechnology Symposium this week in Albany, with more details expected to be revealed at the IEEE International Electronic Devices Meeting (IEDM) in San Francisco.

"Graphene is not readily manufacturable, and furthermore end-to-end comparisons show graphene does not flow uniformly and can't achieve the low resistances of enhanced copper interconnects," IBM Fellow Dan Edelstein told EE Times in an exclusive preview of his Nanotechnology Symposium talk.

## **Qualcomm Sheds Light on Licensing Policy**

5G technology licensing rates, the same as the firm charged for 4G, offer perspective on Qualcomm's dispute with Apple and wireless industry grumbling.

While 5G standards are still being set by the 3GPP, two companies have now announced planned license rates for their intellectual property (IP). While this seems unusual when it is not clear which patents will be included in the final specifications, the leaders in the wireless industry typically contribute the most to the standards because of their extensive investments in wireless technology research. This includes companies like Ericsson and Qualcomm.

In March, Ericsson announced plans to license its 5G IP for \$5 per handset, but indicated that this could go as low as \$2.50 in emerging markets. Now, Qualcomm has also announced rates for 5G that also shed some light on other aspects of the company's licensing model.

## **RISC-V Spins Into Drives, AI**

SAN JOSE, Calif. — Storage giant Western Digital announced that it will standardize on RISC-V processors and has invested in Esperanto Technologies, a startup designing high-end SoCs and cores using the open-source instruction set architecture. The two moves suggest that RISC-V has emerged as a viable — but not yet mature — alternative to ARM and the x86.

Long-term, WD expects that it could ship as many as 2 billion RISC-V chips a year inside its hard-disk and solid-state drives. Privately, the company also revealed that it is working on machine-learning accelerators for inference, probably related to its unspecified investment in Esperanto.

## **MEMS Design Shrinks Speakers to Chip Scale**

LAKE WALES, Fla. — Microelectromechanical-system-based audio speakers for earbuds, smartphones, wearables and other Internet of Things (IoT) devices have proved a tough row to hoe. But USound GmbH (Graz, Austria) now says it will be first to market with a family of MEMS audio speakers, with production volumes planned for the first quarter.

USound calls its MEMS speaker Ganymede and says it will offer a reference design, called Magaclite, by the end of this year. The devices have been fitted to high-end sunglasses and are being developed for earbuds; smartphones; and multdriver, high-fidelity above-ear speakers.