

Tetris is a very popular falling blocks puzzle game, released on a large spectrum of platforms. Alexey Pajitnov originally designed and programmed the game in June of 1985, while working for the Dorodnicyn Computing Centre of the Russian Academy of Sciences in Moscow, during the days of the Soviet Union. Pajitnov has cited pentominoes as a source of inspiration for the game. He derived its name from the Greek numerical prefix "tetra-" meaning four, as all of the pieces contain four segments.



TECHVIEWS

HSDPA Mobile way to the future

EDWARD APURBA SINGHA

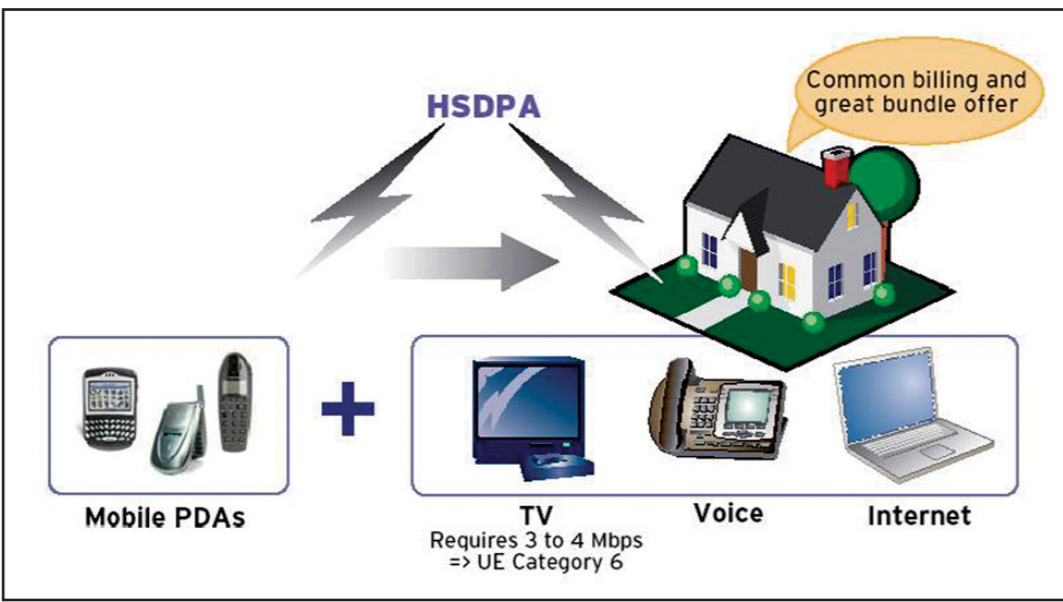
In the wireless world, the predicted dominance of WiMAX technology is overshadowed by the recent upstart of High-Speed Downlink Packet Access or HSDPA (3.5G).

HSDPA will empower UMTS networks by providing higher data rates to end-users. In addition, HSDPA provides lower latency with Round Trip Delays of 70 ms, enabling greater interactive applications like multi-user gaming. The use of HSDPA optimises the investment in the network, as some traffic, normally transported on a dedicated channel, can be supported by HSDPA more efficiently, saving capacity that can be allocated to new users. At least twice as many subscribers per cell should be supported with HSDPA.

HSDPA innovations compared to today's UMTS include increasing range of applications available to the end user, enabling access to broader content because of high-speed downlink transmission, and the increase of data users per cell due to the better spectral efficiency. This will boost the use of applications by the end users, which will generate more revenues for wireless operators. HSDPA will change wireless communications by delivering broadband through wireless access. This is the next big technological advancement needed to increase usage. It will boost usage in business sectors by providing a virtual office environment anywhere with wireless access and it will also trigger usage by the consumer market by offering a greater broadband experience for the end users. HSDPA allows for broadband to be truly mobile for the very first time without the inconvenience of looking for hot spots or wireless access points.

HSDPA will provide the seamless access to all applications already used at home for entertainment like music and video downloads, m

ultiplayer gaming and TV. HSDPA has a great opportunity to enter the triple play market by addressing residential access with a



bundle offer for TV, Internet access and voice and mobile services. HSDPA allows up to 3.6 Mbps peak data rate for a Category 6 Mobile per user with a classical Rake receiver and up to 14.4 Mbps peak data rate for a Category 10 mobile per user with advanced receiver solutions.

Basically, HSDPA introduces a new common High Speed Downlink Shared Channel (HS-DSCH) shared by several users. In addition, it introduces enablers for the high-speed transmission at the physical layer like the use of a shorter TTI (2 ms), the use of adaptive modulation and coding, and the use of fast retransmission based on hybrid ARQ (HARQ) techniques. These key mechanisms are located within the UMTS/BTS.

Basically, the downlink HS-DSCH channel is shared in a number of SF 16 codes and time. Within each 2 ms TTI, a constant spreading factor of 16 is used with a maximum of 15 parallel

channels for the HS-DSCH. These channels may all be assigned to one user during the TTI, or may be split among several HSDPA users. There is no more power control with HSDPA and the High Speed Downlink Shared Channel is transmitted at a constant power, while the modulation, the coding and the number of codes are changed to adapt to the variations of radio conditions. According to the real time knowledge (every 2 ms) of the radio conditions for each user, HSDPA matches the exact throughput to the radio bandwidth available for every user during the communication, which means higher average throughput and higher spectrum efficiency.

By taking the best of the radio spectrum in a real-time process, the adaptive modulation and coding enables "bursty" traffic, hence higher average throughput. This end-user experience will depend on the number of HSDPA users in the cell, but three to five times higher throughput is expected on the field with HSDPA. It also reduces the interference variation due to link adaptation based on variations in the modulation/coding scheme instead of variations of the transmit power.

It is this use of the 16 QAM modulation and the use of



data rates as four bits are transmitted per symbol.

In the indoor environment, the small cell size, the very good and controlled coverage, and low mobility lead to a very high spectrum efficiency and very high data rate per user. Even if the 16 QAM modulation is very sensitive to the radio conditions, this modulation will be used most of the time in an indoor environment. In addition, there is a very low impact on PA power for HSDPA operation, which means the downlink throughput is not significantly affected by the minimum power required for the signalling HS-SSCH channel. However, when dealing with outdoor configurations, the broadband performances are much more challenging due to higher interference at the cell edge and larger cell size compared to indoor coverage for WLAN-type services. Practically, there is a significant impact on PA power for HSDPA operation, i.e., lower downlink throughput due to required power for HS-SSCH. Therefore, HS-SSCH power control is required to reduce impact on HSDPA throughput. HSDPA with MIMO implementation increase the throughput. MIMO increases the capacity due to the multi-stream transmission and code reuse with multiple antennas on both the transmitter and receiver sides.

WiMAX is convenient for long haul data communication and it eliminates the need of expensive leased lines. Aside from this, WiMAX is capable of covering huge geographical areas with theoretical speed of about 70 Mbps. In developing countries, where rural/remote areas remain outside the broadband coverage, can get advantage from WiMAX deployment. Although the speed of HSDPA is not high as WiMAX, it ensures a smoother and quicker deployment than WiMAX. HSDPA utilises the existing cellular network, whereas WiMAX requires completely new infrastructure to initiate the service. In essence, HSDPA is truly mobile than WiMAX.

Information of this article was collected from the following sources:
Nortel HSDPA white paper, www.iec.org

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TECHNEWS

Memory chip breakthrough for electronic devices

AFP, San Francisco

A team of scientists has announced a breakthrough in computer memory technology that heralded more sophisticated and reliable MP3 players, digital cameras and other devices.

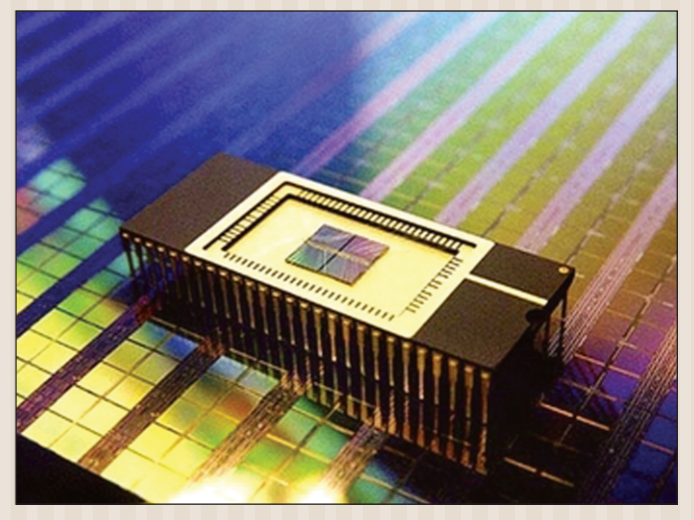
Scientists from IBM, Macronix and Qimonda said they developed a material that made 'phase-change' memory 500 to 1,000 times faster than the commonly used 'flash' memory, while using half as much power.

"You can do a lot of things with this phase-change memory that you can't do with flash," IBM senior manager of nanoscale science Spike Narayan told AFP.

"You can replace disks, do instant-on computers, or carry your own fancy computer application in your hand. It would complement smaller technology if manufacturers wanted to conjure things up."

Technical details of the research were to be presented to engineers gathered at the 2006 International Electronic Devices Meeting in San Francisco.

Researchers expected the discovery to anoint phase-change memory the successor to flash memory as the electronics industry continues a relentless quest to



A hand out photo released by Samsung Electronics shows two gigabit flash memory chips. A team of scientists has announced a breakthrough in computer memory technology that heralded more sophisticated and reliable MP3 players, digital cameras and other devices.

ory to encounter significant scaling limitations in the near future. Today we unveil a new phase-change memory material that has high performance even in an extremely small volume."

The new material was a complex semiconductor alloy that resulted from collaborative research at IBM's Almaden Research Center in the Silicon Valley city of San Jose, California.

Qimonda memory technology firm is based in Germany and Macronix is a "non-volatile" memory company located in Taiwan.

trical charge contained in a tiny region of a cell.

The fastest and most economical memory designs -- SRAM and DRAM, respectively -- use inherently leaky memory cells, so they must be powered continuously and, in case of DRAM, refreshed frequently as well.

These "volatile" memories lose their stored information whenever their power supplies are interrupted.

At the heart of phase-change memory is a tiny chunk of alloy that can be changed rapidly between an ordered, crystalline phase and a disordered, amorphous phase.

Because no electrical power is required to maintain either phase of the material, phase-change memory is "non-volatile."

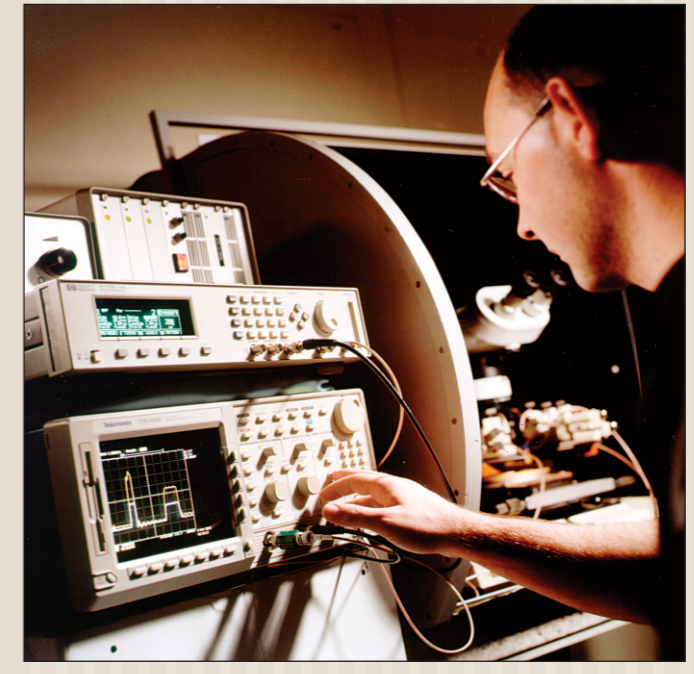
"This is a much more robust memory technology," Narayan said. "It will be used more and more as flash gets into more and more trouble at small dimensions."

While the semiconductor alloy from Almaden is new, phase-change technology has been around for decades and has been used in DVDs and CDs, according to researchers.

Samsung and Intel have both been working with phase-change memory devices, according to Narayan.

"We have demonstrated the potential of the phase-change memory technology on very small dimensions laying out a scalability path," said Qimonda vice president Wilhelm Beinvoigt.

"Phase-change memories have the clear potential to play an important role in future memory systems."



make devices smaller and more powerful.

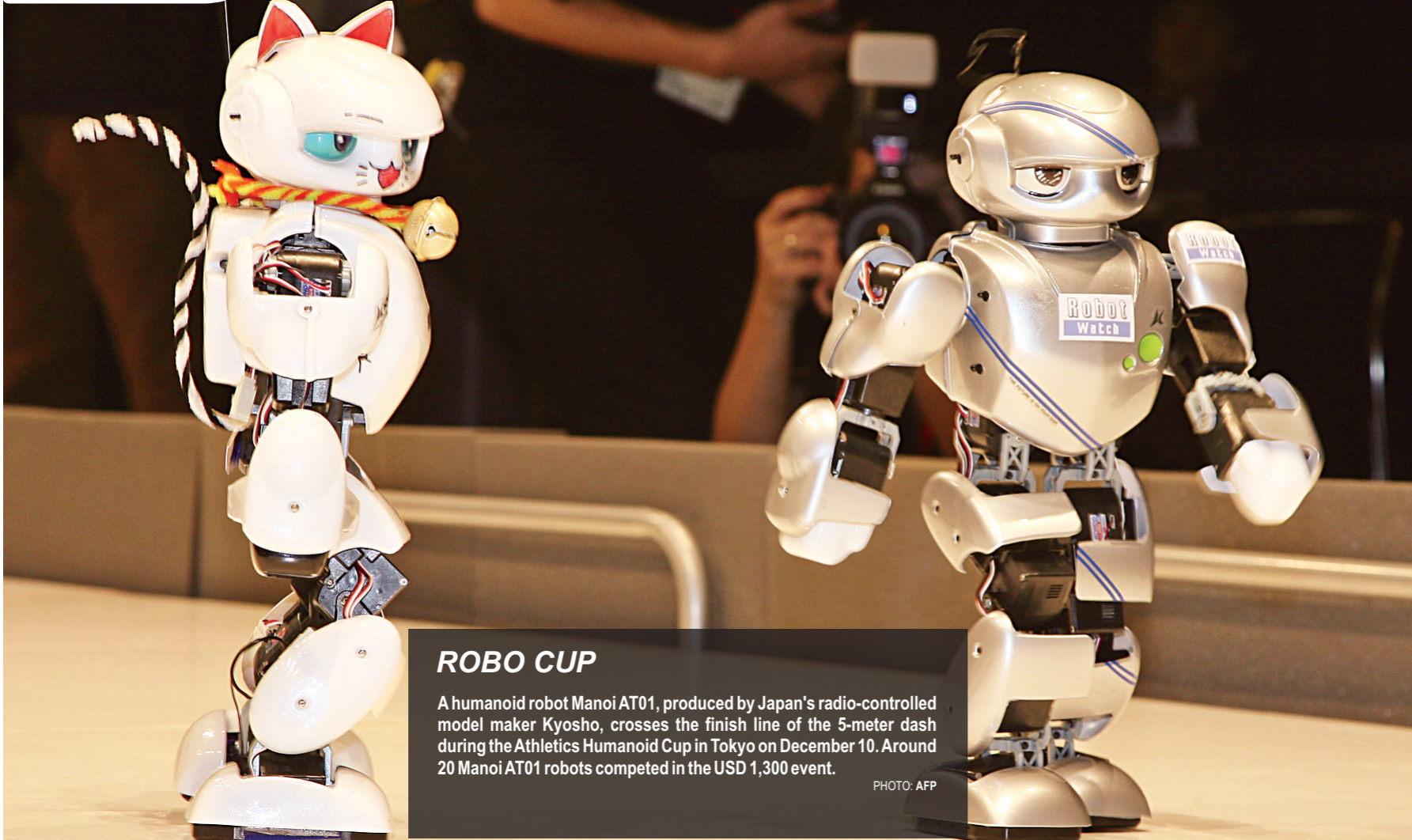
"These results dramatically demonstrate that phase-change memory has a very bright future," said IBM vice president of technology T.C. Chen.

"Many expect flash mem-

Computer memory cells store information as sequences of digital "zeros" and "ones" in structures that can be rapidly switched between two distinctive states.

Most computer memory devices are based on the presence or absence of elec-

PHOTOFOCUS



ROBO CUP

A humanoid robot Manoi AT01, produced by Japan's radio-controlled model maker Kyosho, crosses the finish line of the 5-meter dash during the Athletics Humanoid Cup in Tokyo on December 10. Around 20 Manoi AT01 robots competed in the USD 1,300 event.

PHOTO: AFP

TECHNEWS

ASUS R1F Smart balance between mobility and performance

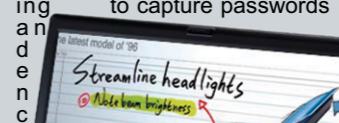
STARTECH DESK

THE Asus R1F tablet PC notebook offers a smart balance of mobility and performance with comprehensive security features that protect with both software as well as hardware solutions, providing a secure and convenient computing experience for business professionals on the go, says a press release.

Asus protected computing starts with fingerprint authentication that grants strict access only to the designated owner. With one swipe, the electronic imaging mechanism reads the fingerprint pattern from the live layer of skin, bypassing any common skin surface conditions that can impair the accuracy of the reading.

With Asus Security Protect Manager, users can choose to setup multi-factor authentication requirements for data access of different security level. Both passwords and fingerprints can be used as the method of verification. Passwords are encrypted and stored

in the hardware-based Trusted Platform Module (TPM) ensuring end-to-end security and avoid attacks by hackers looking to capture passwords



and encryption. The R1F Series offers a wide aspect visual enjoyment while remaining compact for high mobility. The 180-degree convertible LCD screen allows easy presentation and data sharing during meetings or at gatherings.

Increase productivity and efficiency with handwritten input capability! Together with InfoPen software, users can

record and edit images or documents as easy as on a piece of paper with color and highlighter options. The DigiPen stylus also has an eraser end and mouse control buttons so that users can now navigate a wide range of applications with single-handed ease.

To encourage the consumers, the product has an installment facility associated with "Brac Bank" loan scheme. The Notebook has a price-tag of Taka 1,50,000/-.

