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2A20I: Facilitating high-definition media storage with Blu-ray Disc technology (BLAZE)



Effective storage system opens up European lead on high definition TV

Close co-operation between chipmakers, systems designers, video distribution companies and research organisations in the BLAZE project has, among others, resulted in the development of a low cost, flexible system-on-chip solution and associated software for economic high definition television storage, establishing European leadership in the high definition media distribution and storage market. Not only will the results of this project allow Europe to compete on a global basis but they are also providing a boost to the European semiconductor, consumer electronics and content distribution industries.

Advances in display technologies such as liquid crystal displays (LCD), plasma and liquid-crystal-on-silicon are now making large screen televisions economically feasible. This is fuelling a move to high definition (HD) consumer electronics equipment – with high definition television (HDTV) already being deployed rapidly in the USA and Japan. However, availability of consumer equipment has been slowed by lack of an ability to store and play back HD content. It was essential for Europe to develop the microelectronics and embedded firmware for such storage to be able to participate in the huge potential markets for disc recorders/players and personal computer drives. Not only was a complete solution required to allow recording from broadcast and broadband video-on-demand (VOD) services as well as pre-recorded discs, but it was also essential to integrate effective digital rights management (DRM). Robust DRM is essential to make media content delivery profitable and ensure income for all the value-added service providers involved in service deployment.

New efforts need

European participation required new efforts to compete: more investment and a tighter co-operation among players active in this field were equally mandatory. The MEDEA+2A201 BLAZE project set out to design an overall

architecture and develop a single-chip solution for an innovative HD storage system based on the Blu-ray Disc (BD) standard.

BD is the next-generation optical disc format developed by the Blu-ray Disc Association (BDA), a group of leading global consumer electronics, personal computer and media manufacturers that includes Philips and Thomson in Europe. While current DVD optical disc technologies rely on a red laser to read and write data, the new format uses a shorter wavelength blue-violet laser.

The format was developed to enable recording, rewriting and playback of high-definition (HD) video, as well as storing large amounts of data. It offers more than five times the storage capacity of traditional DVDs, holding up to 25 GB on a single-layer disc and 50 GB on a dual-layer disc. This extra capacity combined with advanced video and audio codecs offers an unprecedented HD experience.

Two competing standards

At the start of BLAZE there were two standards in contention: Blu-ray Disc and the High-Definition Digital Versatile Disc (HD DVD). BLAZE was strongly committed to BD but consortium members monitored the competitive situation regularly and made sure that if HD DVD won, not all their efforts would be lost – putting much work into intel-



lectual property (IP) that was suitable for both standards.

Blu-ray came out on top in early 2008 because it is technically better. It offers twice the content of an HD DVD and better content protection and security mechanisms – crucial for effective DRM. In the end, the film industry was convinced that BD would be the best.

The standards battle was long, but the BLAZE team was confident in Blu-ray winning. One success factor was that the MEDEA+ consortium continued this project – stopping half-way would have been a bad message globally. The consortium monitored the market and presented the latest situation to each other every three months.

Recapturing global position

A key to BLAZE's success was development of a stable and robust common architecture initially and ensuring all subsequent developments kept to this. Overall results included:

- Development of a second-generation single system-on-chip (SoC) solution and Linux-based embedded middleware which makes Blu-ray more cost effective;
- Use of the latest 65 nm silicon technology process, resulting in a smaller chip and lower power consumption;
- Investment in a multi-standard video decoder (MSVD) and transcoding that will make possible even more applications using HD video standards such as Blu-ray, HDTV, set-top box (STB), Internet and computer systems;
- Development of a combination broadband/broadcast HD personal video recorder with BLAZE recording interface implementation;
- Development of a stamper tester as the first solution in the industry that increases

yield and decreases costs of disc production; and

- Availability of high speed testing based on a new drive platform and drive control implementation.

Fast commercialisation

With Blu-ray having won the standards battle, fast commercialisation of project results is expected by all partners. STMicroelectronics already sees an important market for cost- and feature-efficient SoCs that displace more expensive and less integrated older chips. Two platforms emerged from BLAZE: the first is already applied to HD STBs, media centres and a multimedia HDD, while the other is being developed for high-end audio and BD players.

Blaze enabled NXP to develop IP for an MSVD using generic interfaces that target applications from Blu-ray to STBs. This IP makes possible scalable performance for specific product embodiments as well as supporting dual decoding. It is used in DVD decoders and in STB components, with good markets foreseen especially in Asia and North America. It is also being integrated in HDTV, mobile device and automotive chips.

Success in the project also provided another major advantage in enabling knowhow to remain in Europe. For example, the NXP Caen plant in France has been able to lead in developing an HD video reference platform in Europe before NXP R&D teams in the Far East.

Following on the success of BLAZE, the MEDEA+ 2A207 Triton project is now working on use of Blu-ray as a carrier for three-dimensional (3D) TV. The high capacity of Blu-ray discs will play a key role in storing the mass of data required.



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PARTNERS:

CEA LETI
DaTARIUS
INPG
MPO
NXP Semiconductors (formerly Philips Semiconductors)
Philips
Secuenzia
STMicroelectronics
Telefónica
Thomson

PROJECT LEADER:

Wiel Louvenberg
Philips Electronics

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COUNTRIES INVOLVED:

Austria
France
The Netherlands
Spain



MEDEA+ Office
140bis, Rue de Rennes
F-75006 Paris
France
Tel.: +33 1 40 64 45 60
Fax: +33 1 40 64 45 89
Email: medeaplus@medeaplus.org
<http://www.medeaplus.org>



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