

**e-Shuttle Realize 65nm e-beam IC Prototyping Service
- World's first e-beam direct-write of interconnect layers -**

Yokohama, February 3, 2010 - e-Shuttle, Inc., in cooperation with Fujitsu Microelectronics Limited and Advantest Corporation, have achieved as a world first, e-beam direct-writing of the line patterns of the interconnect layers of an IC, in addition to previously realized direct-writing of the via layers. Utilizing this e-beam direct-write technology, e-Shuttle and Fujitsu Microelectronics have started offering an IC prototyping service in 90nm as well as 65nm. With these results, the writing and device creation abilities of single e-beam lithographic technologies have been verified. e-Shuttle will also develop further enhancements that utilize the multi-beam technologies of lithographic equipment that use multiple e-beams for writing.

For advanced IC development, the lithographic mask costs can double when moving into a smaller process technology node, so IC vendors are closely watching e-beam direct-write technology, as no masks are needed. e-Shuttle is utilizing Advantest's F3000 e-beam direct-write lithography equipment, and has been providing 65nm prototyping services since March 2008. The use of this prototyping service is gradually expanding, including industry-academic collaborative projects.

Previously, the IC prototyping service was able to provide e-beam direct-writing on only the via layers on an IC. However, e-Shuttle was successful in realizing e-beam direct-writing - for the first time in the world - on the interconnect layers of an IC. Also, with lengthening of the lifetime of the electron source, as well as a more stable writing performance, yields were realized that do not differ from optical lithography. Utilizing this technology, e-Shuttle and Fujitsu Microelectronics have started to provide IC prototyping services at 90nm and 65nm. In addition, it is expected to be able to use this technology on the bulk layers of an IC as well, which will reduce the steps and expand the IC prototyping services.

These results at 65nm validate the usefulness of single e-beam lithographic technology in creating IC devices. To increase through-put further, there have been developments of lithographic equipment using multiple e-beams and multi-column cells for writing. e-Shuttle is also further enhancing its technology capabilities to be able to utilize these multi-beam writing technologies.

e-Shuttle, in cooperation with Fujitsu Microelectronics, in addition to providing existing IC prototyping and small-volume foundry services, will also provide this e-beam technology when manufacturing some of the engineering samples. This service will provide a smooth shift from e-beam-created prototypes to volume production in conventional optical lithography.

e-Shuttle has created a new scheme for IC prototyping and manufacturing with this e-beam

direct-writing technology, which will provide a mask-less, low cost, fast turn-around IC manufacturing service with lower environmental costs. Going forward, with technology collaboration with industry partners, e-Shuttle will continue to play a key role in the IC prototyping business.

Press Contact:

e-Shuttle, Inc

Inquiry form: <https://www-s.fujitsu.com/jp/group/fml/en/release/inquiry.html>

Customer Contact:

e-Shuttle, Inc

Inquiry form: <https://www-s.fujitsu.com/global/services/microelectronics/contact/form.html>

About e-Shuttle

Headquartered in Yokohama, Japan, e-Shuttle, Inc., was founded by Fujitsu Microelectronics Limited and Advantest Corporation on November 1, 2006, to develop EBDW technologies for 90-, 65- and 45-nanometer process technologies, and to establish and offer semiconductor prototyping services, SiExpress™. For more information, visit http://www.e-shuttle.co.jp/index_e.html