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Early 1990s

Evolution of digital servo LSI circuit for CD/CDROM

~ Integrated Circuit ~

In the 1990s, the needs for new storage devices for PCs became strong. The needed memory was low-cost large-capacity with high-speed processing capability, by which traditional devices such as floppy discs and HDDs could be replaced. Under such circumstances, the cassette tapes as the audio contents media (source of Pure Audio) were rapidly replaced by CDs (Compact Disc), and CDs were viewed as new low-cost memory media suitable for portable equipment. And, 650MB CDROM as the large capacity memory got momentum.

The beginning was the launch of CDROM drives of 1x and 2x speed player versions. However, the CD/CDROM servo LSIs were mainly in analogue designs at the time, and there were some problems such as manufacturing process and cost, and high-speed capability. These problems were then solved by digital servo and variable speed playback technologies.

1) Manufacturing process and cost

Analog servo: Servo adjustment of optical system PUH and motor system were done in the manufacturing line for each set.

Digital servo: Adjustment was executed by LSI itself, and manufacturing line adjustment became unnecessary and the number of parts were greatly reduced.

(About 80 for analog servo and about 40 for digital)

2) Higher speed

By using the Mabuchi motor to control the rotation of the CD, playback and high-speed search (access) in x4 and higher speed became possible.

By the technology of playback at variable rotation speed of disc (variable speed playback technology), fluctuations of motor control were absorbed.

With the development of the above technologies, high speed evolution of CDROM was realized.

In addition, it was also the time of spread of PC, and the requirement for high-speed transfer/installation of large volume software/contents to the PC became stronger (eg, the appearance of Windows 3.1 and a handy installer of large volume image data, use of amusement such as video games). Along with this move, demand for high-speed CDROM became stronger and higher-speed CDROMs were developed accordingly.

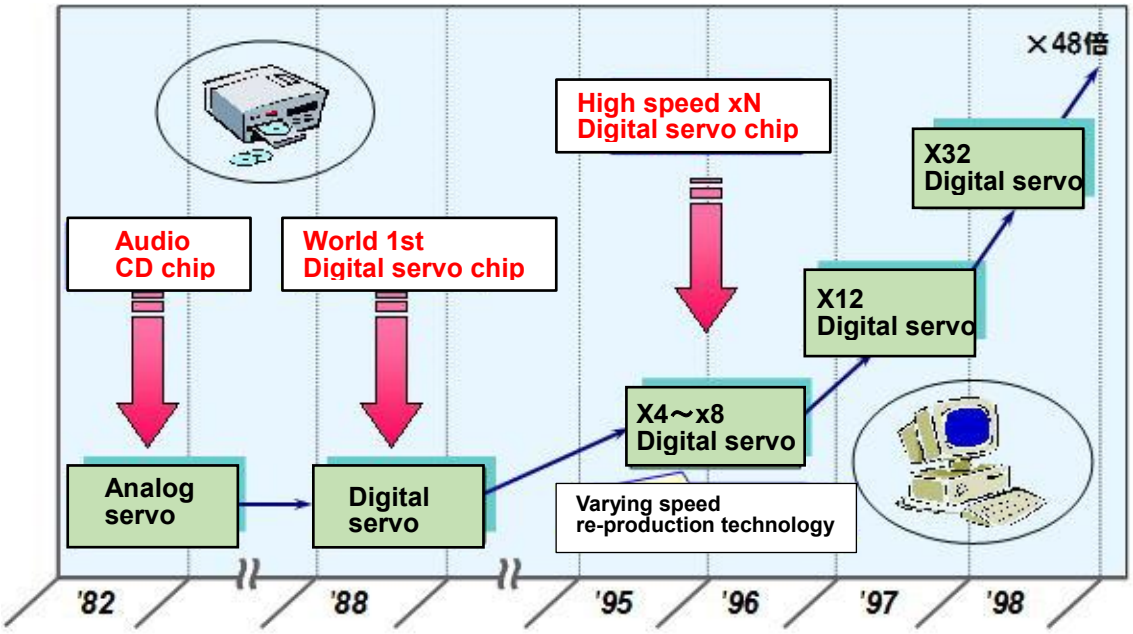

Figure: Evolution of CDROM by-X Speed
(By courtesy of Toshiba)

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