

Andrew NDT Engineering Corp.

Andrew NDT and Galil Slash Costs In Wafer Production

Andrew NDT and Galil have combined technologies to reduce the million-dollar price tag on a key procedure in the manufacture of wafers for the semiconductor industry. The new approach gives accurate, stable readings without complex mechanics.

During production, a very thin film must be deposited on the wafers used in integrated circuits. Until now, producing the 300-millimeter wafers has been challenging because of the need to measure these thin film deposits without destroying the wafers themselves.

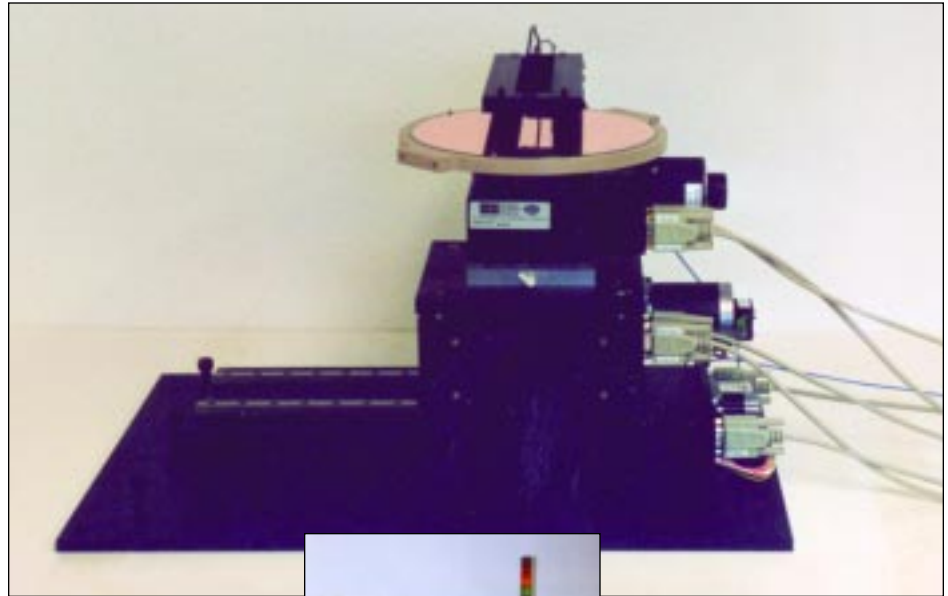
Some complex metrology machines used to measure these critical depositions cost more than a million dollars. Other methods use thermal waves that are often unstable.

Andrew NDT's patented new approach solves both problems with a special capacitance probe that measures the thin film deposition without actually touching the wafer. This prevents any damage to the wafer and at the same time eliminates requirements for complex mechanics and expensive calibration. The resulting machine is robust and easy to manufacture.

The new capacitance technology does not depend on mechanics, but on the precise distance between a capacitance sensor and the wafer. The wafer is positioned from 0.1 inch to 0.001 inch away from the sensor. A four-axis Galil PCI bus controller—the DMC-1840—moves each wafer to the sensor along xyz and theta axes, precisely positioning each wafer to an accuracy of ± 0.5 micron.

When the wafer is in position, an electromagnetic field radiates into the layer of thin film, which then reflects back a field to the sensor. The Galil controller accepts this analog feedback from the sensor. When the data are compared with precise position and energy measurements, the film's thickness can be calculated precisely.

Andrew NDT chose a Galil controller not only for its pinpoint accuracy but also for its reliability. Machines tested with Galil controllers have run more than 100,000 cycles with no mishaps. Andrew engineers also found



Andrew NDT's metrology machines tested with Galil controllers have run more than 100,000 cycles with no mishaps.

Galil's intuitive language easy to use, with no problems writing the interface to their existing software.

The current Andrew system uses stepper motors, but a future system will use servo motors to improve speed and smoothness. Stepper speed is 200 wafers per hour. Servos will double the speed to 400 wafers per hour. ■

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