

## SIX AXES WAFER FLATNESS MEASURING MACHINE

### **The Problem:**

A manufacturer of semi-conductor equipment has a requirement for a system that will measure surface flatness of the wafer prior to the VLSI process. The measurement system must be precise and extremely reliable. In this particular application there are additional requirements for the system to operate from either a host computer or in a stand alone mode. Also the Capacitive (Non-contact) probe is highly sensitive to electromagnetic fields so there can be NO NOISE on the line during the measurement sample time.

### **The Answer:**

Three DAX-422 (dual axis) stand-alone, controller, driver, power supply modules are installed in a "Party Line" mode using a single RS-422 communications port. One DAX controls the wafer transport and magazine. A second DAX services the wafer loader and "Z" probe positioning device. The third module controls the X-Y sampling positioning table. Motion commands are executed by the appropriate axis, based on a unique "Name" assignment established during set-up.

As a wafer is unloaded from the magazine and transported onto the X-Y table, the "Z" probe is commanded to position itself over a reference height surface. At this point all DAX modules go into a "Quiet Mode", (the Chopper Drive current is automatically disabled during the sensitive measurement sample time) and the probe calibration is initiated to Zero. The X-Y table positions the wafer to the first target area to be sampled. At each sampling the "Quiet Mode" is invoked until Data passes to the computer for collection and analysis.

During command execution, the Home and Limit switch inputs on the DAX modules are continuously monitored to test for safety or process interruptions. After a wafer is accepted or rejected a signal from the DAX actuates an indicator lamp on the control panel to alert the operator to load the next magazine.

Once the motion control parameters are fully established, the programs are downloaded into DAX resident non-volatile memory and the system is taken off-line to be operated in a stand-alone mode from the control panel.

