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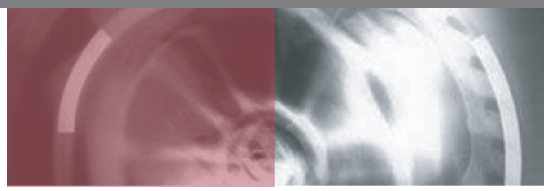
White Paper

Case Study



XY Table

XY Table Motion Control

By Peter McDonald

November 2001

The Challenge

Machine manufacturers need to continually push the performance limits of their products. One trend in the XY positioning table market is to replace stepper motor drive technology with AC servo motors. The promise of this approach is to achieve higher cutting speeds with no reduction in accuracy.

The reality is that attaining higher speeds may require more than a simple change in motor technology. Nuances in the mechanical system -- inertial mismatch, member flex, or drive train compliance -- are more pronounced at higher speed and acceleration, so that as speeds go up, accuracy goes down.

The challenge in this application is to double cutting speed by replacing steppers with servos, without requiring an expensive redesign program for the mechanical gantry. An inertial mismatch of 50:1 through a low compliance reducer gives acceptable accuracy with the existing stepper motors, but no off-the-shelf AC servo motor controls are able to deliver on higher speed without compromising accuracy.

The Solution

Agile Application Engineers integrated a MAX™2030 Multi-Axis Servo Control & Drive Module. The MAX™2030 combines three axis of brushless servo motor drives with a motion control computer into a single module. MAX™2030's integrated data logging and frequency analysis capabilities are used to characterize the XY-table's mechanical response. Control law parameters are modified and downloaded to the MAX™2030, making use of its remote firmware update link. The result is speed and accuracy, as specified without redesigning the mechanical system.

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