

LEP400 Etch Depth Monitor

Hit Your Target Plasma Etch Depth

First Time & Every Time ✓

Intellectrics LEP400 Laser Endpoint Detector is THE real-time plasma etch process control solution of choice for a wide range of applications including semiconductors, optoelectronics, MEMS, failure analysis and general thin film removal.

The instrument offers in-situ etch depth monitoring with excellent noise rejection and reduced set-up costs for both production and R&D environments. The system includes a user-friendly Windows™-based environment for input, control and visualisation. **EtchDirector**® software calculates the etch rate and etch depth in real time enabling enhanced control of process termination in the most demanding situations.

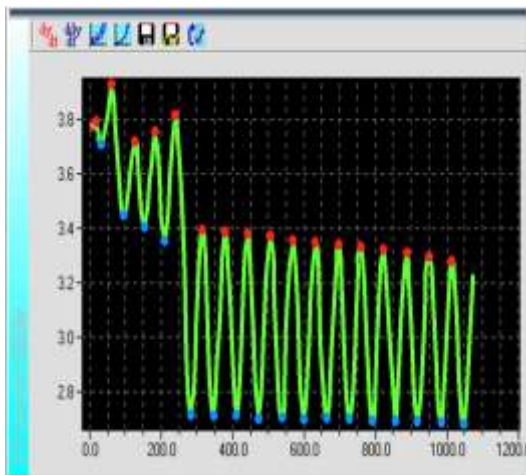
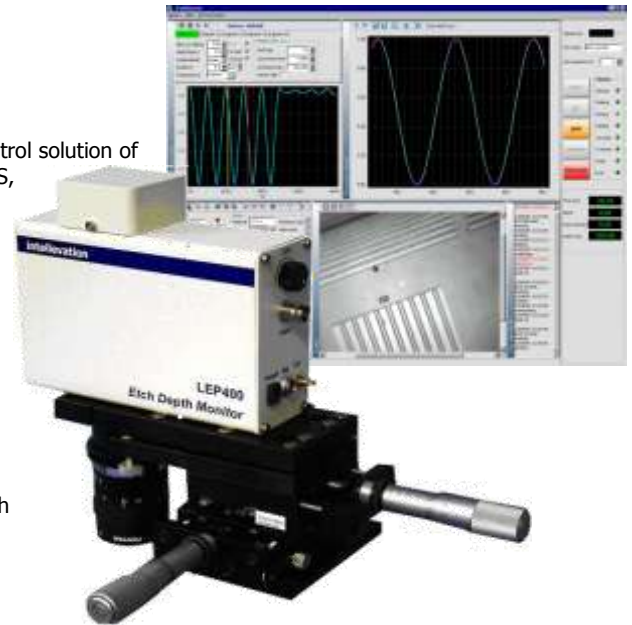
The LEP400 is designed to operate either as a standalone tool, or to be integrated into an OEM etch tool through a simple and robust communications interface.

Overall Measurement Performance

Accuracy & Precision: Depends upon etch process conditions. Example Process: Etch Rate = 100 nm min⁻¹, sample rate = 5 Hz

Intrinsic Etch Depth Accuracy: ± 0.67 nm

Intrinsic Etch Depth Precision: ± 0.17 nm



Benefits

The LEP400 enables dry etch users to decrease process development time & manufacturing costs AND increase yield & product performance through:

- Real time, in-situ measurement and control
- Predictive modelling software – reduce material waste & process development time
- Operates in Interferometry AND Reflectometry modes
- Monitors etch proceeding through bulk layers, doesn't rely on material interfaces
- Data reprocessing mode to decrease process optimisation time
- User friendly Windows® driven interface – fast and intuitive
- Integration to etch tool for automated operation
- Remote control for through-wall cleanroom implementation
- Fast data acquisition and high noise rejection for accurate termination

The LEP400 Puts YOU in Control!

In its standard mode, the system consists of an optical head, containing a laser source, detector and CCD camera, and a rack mounting electronics module.

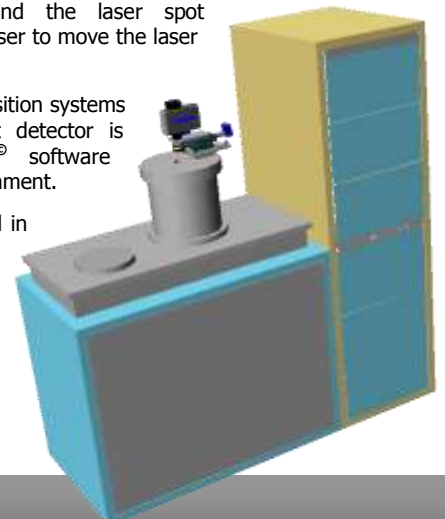
The optical head is mounted on the top plate of a plasma etch system. The CCD camera enables the user to see the sample and the laser spot simultaneously, and an X-Y stage enables the user to move the laser spot to the desired location.

The electronics module contains the data acquisition systems and communications interface. The endpoint detector is controlled using proprietary **EtchDirector**® software running under a user friendly Windows® environment.



EtchDirector® contains a powerful modelling feature which enables the signal variation to be predicted in advance of the etch in both interferometry and reflectometry modes. This is particularly useful for complex wafer stacks, which may contain several hundred layers, saving expensive and time consuming calibration runs. The software also contains an extensive library of material parameters and allows the user to enter new material parameters as needed.

EtchDirector® also contains a range of powerful endpoint detection algorithms enabling a user to tailor an end-point recipe to a specific process across a wide range of applications. The integrated I/O capability and user-friendly DIGIO software enables the user to seamlessly integrate the LEP400 into their plasma etch system adding functionality, automation and ease of mind!



EtchDirector[®] - Powerful, Intuitive Windows[®]-based Interface

End Point Window

Set filtering mode and end point detection mode - including Simplex, Model & Kink modes - for robust operation across a wide range of applications. OverEtch capability for surface cleanup.

Material Library Window

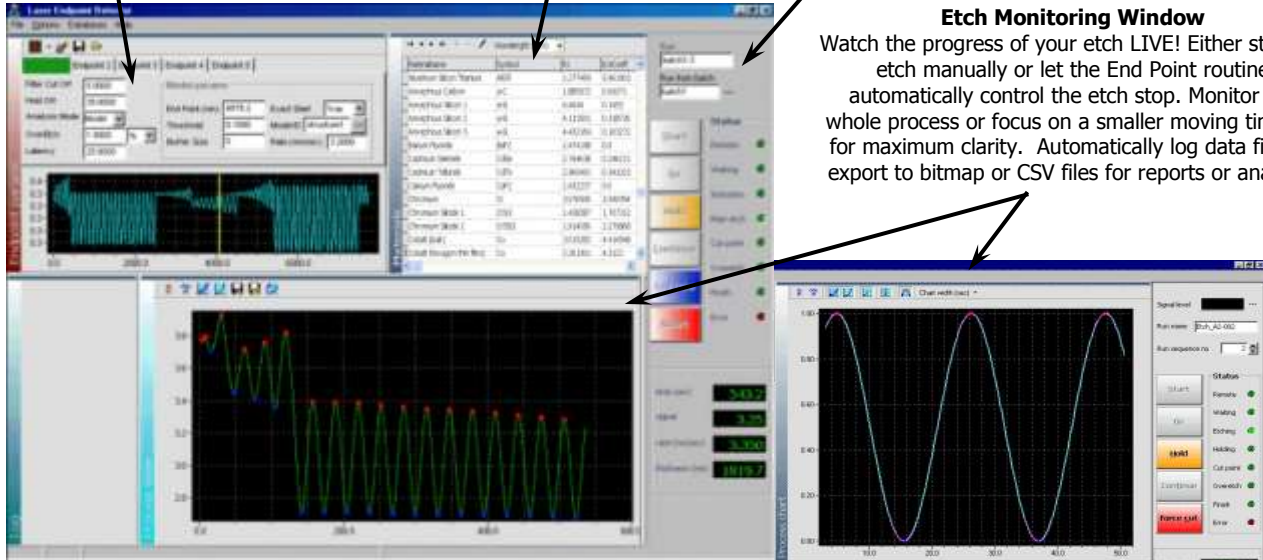
Enter layer optical properties directly from the extensive on-board Material Library or add your own material variations. >250 materials supplied as standard. User can add hundreds more.

Control Window

Full and intuitive access to all of the critical process control functions. Enables the user to easily switch between automatic and manual control for maximum ease of operation.

Etch Monitoring Window

Watch the progress of your etch LIVE! Either stop the etch manually or let the End Point routine automatically control the etch stop. Monitor the whole process or focus on a smaller moving timeslot for maximum clarity. Automatically log data files or export to bitmap or CSV files for reports or analysis.



Layer Structure & Modelling Window

Program simple substrates or complex wafer stacks containing hundreds of layers. Intuitive interface enables rapid entry of QW stacks. EtchDirector contains advanced algorithms to calculate the theoretical response and apply it to control the actual etch run. Watch the predicted etch proceed off-line before committing to etch thereby gaining valuable insight and optimise processes rapidly avoiding expensive calibration runs.



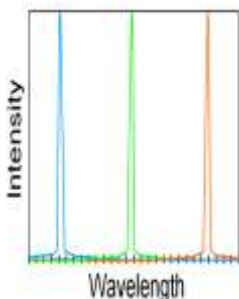
Additional Software Features

Separate Reprocess & Simulation Modes give the user maximum flexibility & control. Real time processing capability for off-line process design and optimisation on stand-alone PCs. DIGIO client software for rapid control and setup of extensive I/O.

Sample Viewing Window

The on-board vision system enables the user to view the sample being etched and the laser spot simultaneously. The user can then place the laser spot on any desired location for maximum effect.

Product Options:



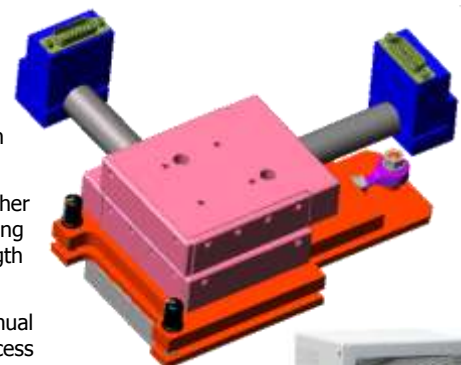
The LEP400 Series comes in a number of different configurations to satisfy the etching needs of a wide range of diverse materials as well as the diverse needs of a wide range of applications - from flexible research and development labs to the stringent requirements of high volume production facilities. The options available include;

Laser Wavelength: The standard system utilises a 670nm laser but other wavelength options are available depending on the material system being etched.....our sales team will be happy to help you select the best wavelength for your application.

X-Y Mounting Stage: This can either be manual or motorised. The manual option provides a low cost and flexible option for development labs where access to the etch machine is readily available. The motorised option enables the system to be fully aligned remotely in through-the-wall cleanroom environments....ideal for high-volume production facilities.

Vision System: Alignment of the laser spot can either utilise a low cost B&W monitor (ideal for development labs) or a video capture system that displays the camera image on the remote VDU (ideal for remote operation in production environments)

A range of other options are available for interfacing and integration into OEM dry etch tools. Please contact our Technical Team to discuss your application.



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