



ORACLE III

Plasma Etch & Deposition System

The Oracle III is the smallest full production cluster system on the market. It consists of a central vacuum transport (CVT), vacuum cassette elevator and up to four process modules. These process modules are docked to the central loadlock and run in production-mode or can be operated independently as stand-alone systems. The Oracle III can be configured for either the lab environment (single wafer loading) or for full production (vacuum cassette elevators) making it the most flexible system on the market.

Applications

Because the Oracle III accommodates up to four separate process modules, there are many possible RIE/ICP etch and PECVD deposition process combinations. Multiple process modules can be run at the same time. Processes are safely run without atmospheric contamination since all chambers are vacuum loadlocked. The Oracle III comes with full process support both prior to and subsequent to purchase. For a more detailed discussion of applications and processes, please visit www.triontech.com.



Oracle III shown with 1 vacuum cassette elevator and 2 process modules

Cluster Tool Features

Central Vacuum Transport

Safe and contamination-free processing requires the process to be isolated from the surrounding environment. The way to do this is with a vacuum load-locked cluster consisting of a robotic arm, load-locked transfer cluster and reactor isolation valve. The central vacuum transport (CVT) comes with a direct drive, pick and place robot. Each CVT can accommodate up to 4 reaction chambers and up to 2 vacuum cassette elevators.

Manual Loadlock

The manual loadlock port allows the manual loading of a single wafer for R&D, pilot line or to run priority wafers.

Vacuum Cassette Elevator

The vacuum cassette elevator (VCE) allows high throughput, cassette-to-cassette capability for production applications. The Oracle III can have 1 or 2 VCEs plus a manual load port.

Touch Screen Operator Interface

A color flat panel display with touch screen interface provides the operator with full process information at all times. The software guides the operator through each sequence in a logical fashion and gives touch control of all process conditions.

AC Distribution Module

The AC distribution module automatically distributes predefined power quantities to the various internal components. When the Emergency Power Off button is tripped, the RF power is shut off and all valves involved with gas delivery are automatically closed and the machine automatically powers down to a safe standby mode. This system includes separate power controls for the main AC and peripherals.

Process Module Features

Reactor

The cathode and anode are both machined out of single blocks of aluminum. After critical inspection they are hard anodized for protection from process chemistries. The bottom electrode is available in either 200mm or 300mm sizes and depending on electrode configuration, can process single wafers from 3" - 300mm. Process gases are introduced into the chamber either by an annular ring or a showerhead manifold.

Automatic Matching Network	The uniquely designed matching network is built in as an integral part of the bottom electrode assembly to ensure accurate tuning, low transmission loss and virtually no RF radiation outside the network itself. The network uses a phase magnitude sensor and amplifiers to provide instantaneous feedback for quick precise tuning.
RF Generator	The system comes standard with a 600 watt, 13.56 MHz solid state RF generator.
PC Process Controller	The PC process controller provides simple and reliable system control. The graphical software package creates programs in block diagram form. Process recipes are stored on the hard drive or can be stored on USB flash drives allowing each operator to maintain individual recipes.
Automatic Pressure Control	Every Trion system includes a butterfly pressure control valve operated directly by the process controller. This provides independent pressure control separate from all other process parameters.
Gas Delivery System	State-of-the-art technology is utilized to ensure the utmost integrity and purity. Each reaction chamber accommodates up to 8 mass flow controllers and all plumbing utilizes surface mount, C-seal technology or orbital welded VCR fittings.
Safety	The system meets all SEMI S2-0703 safety requirements. A third party safety review is available upon request.
Facilities	Facility schematics can be provided upon request.

Advanced Options

Custom Gas Cabinets	Trion provides remote gas cabinets with self-closing doors, which house gas delivery and purge systems for corrosive or toxic gases controlled by the on-board computer. The system automatically purges the process supply lines with nitrogen when the system is placed in standby mode. This extends the life of the mfc's, regulators, valves and associated plumbing. Included are automatic "at-the-bottle" shut off valves and stainless steel lecture bottle holders.
Pumping Systems	Each reaction chamber requires its own pump. Trion can supply these as needed according to your requirements. There are mechanical, dry turbo pump options available. You may choose to provide your own pump(s) or they can be purchased directly from Trion. All pump options provided by Trion are proven systems chosen to best meet your specific process needs.
Temperature Control	For certain processes an external chiller or heater/chiller may be recommended. By controlling the reactor temperature (bottom electrode), process reproducibility is greatly enhanced and the etch by-products more readily volatilized.
Endpoint Detection Systems	Trion offers both optical and laser endpoint detection options which allows the user to measure film thickness changes in-situ during the etch process. These systems are integrated into and controlled by Trion software.
Inductively Coupled Plasma	Trion's ICP is a proven option for applications requiring a downstream, high-density plasma source. It dramatically reduces radiation damage and contamination from RIE sputtering and greatly increases selectivity to other films. It allows for higher plasma densities as power is transferred into the bulk plasma via the magnetic field resultant from inductive coupling. This enables processing at lower pressure, which has a number of significant benefits. It allows for anisotropy in high aspect ratio structures and reduces micro-loading effects. Trion's ICP source will result in improved etch rates, profile control, uniformity and selectivity with a dramatic reduction in RIE radiation damage.
Electrostatic Chuck	Maintaining cooler substrate temperatures during etching is often critical. Trion's electrostatic chuck holds the wafer securely to the chuck by electrostatic forces while flowing a small quantity of helium onto the backside of the wafer, providing greatly enhanced heat transfer.