# Model-Free Adaptive Control for
# Semiconductor Processes & Tools

## Semiconductor Apps

- **Wastewater** – pH control.
- **Furnace** - Multi-zone temp control with time-optimal performance.
- **Deposition** – Tight vacuum, gas flow, and pressure control.
- **Etching** – Consistent chemical composition, pH, and flow control.
- **CMP** – Robust slurry flow control.
- **RTP** – High-speed temp control.
- **Motion** – High-speed adaptive & persistent motion control.

## MFA Controllers

- **Time-Optimal MFA** to control wafer furnace temperature.
- **Nonlinear MFA** to control nonlinear processes.
- **MIMO MFA** to control various multivariable systems.
- **MFA pH** to control pH process.
- **High-Speed MFA Motion Controllers** for servo control.
- **MFA control solutions** for Humanoid robots.

## MFA Benefits

- **Higher yield** achieved by faster and more consistent control.
- **Faster time-to-market** for new product R&D since no process models are required.
- **Lower operating costs** and longer up time by eliminating controller manual tuning.
- **More efficient use of tools** due to minimal calibration and conditioning.
- **Best "cost of ownership"** achieved when embedding MFA in your tools.

## Model-Free Adaptive (MFA) Control – a Widely Deployed AI Technology

| MFA Features | MFA Inside Story | Key Points | Description |
|---|---|---|---|
| Controls Complex Systems | | Adaptive | Adaptive weighting factors are updated to help minimize error e(t)=SP-PV. |
| No Precise Process Models | | Robust | Provides a wider robust range than PID and many other controllers. |
| No Process Identification |  | Speed | No time consuming model training; controls process immediately. |
| No Controller Design | | Stability | Guarantees closed-loop stability for passive processes. |
| No Complicated Manual Tuning | | Ease of Use | Easy to configure, launch, and maintain. |

## MFA Control Products for Semiconductor Industry

| **Embedded MFA for** OEM Partners and Tool Builders. | **CyboCon Software** Flagship MFA control software | **MFA Control Toolset** Embedded MFA software for LabVIEW. |
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## CyboSoft Partnership Principle

- Team up with the leaders in each market segment or application area.
- Sincerely assist our partners to be successful.
- Build a long-term win-win relationship.

## CyboSoft Partnership Criteria

- Synergy.
- Partner seeks competitive advantage by improving automatic control, sensing, and optimization.
- Significant return-on-investment.