Challenges
Without the right material control system (MCS), manufacturers can end up with lost equipment capacity, operator inefficiencies, lower throughput and declining yields. Production often stops when automated material handling system (AMHS) equipment is reconfigured or added. And, for busy automation managers, it can be a monumental task to tightly integrate and optimize the variety of AMHSs used in many facilities with manufacturing execution systems (MES) and other decision-support applications.

Many AMHS vendors offer MCS solutions, but many of these have limited capability and sub-par production stability. In addition, customized or internal MCS solutions are more fragile in production, more expensive to support and more difficult to update—driving up fab costs.

Solution Description
Applied CLASS MCS 5 is a real-time, material control system for coordinating the transportation and storage of wafers, reticles, LCD panels and other materials in manufacturing facilities. It coordinates and enhances the AMHS and MES to provide automated control of interbay and intrabay movement of material in both 200mm and 300mm production environments. In flat panel display facilities, CLASS MCS 5 controls the movement of large glass substrates through the manufacturing line. Based on advanced scheduling algorithms, and over 25 years’ experience with multiple AMHS vendors, CLASS MCS 5 selects the best path for a lot to reach its destination. CLASS MCS 5 can track material, lots and carriers down to the wafer/reticle/panel level within a fab (both within and outside the AMHS domain).

Industries
- Semiconductor wafer manufacturing
- Display manufacturing
- Organic light emitting diode (OLED) manufacturing

Features
- AMHS and MES vendor independent
- Comprehensive monitoring, including the ability to monitor equipment, remote devices, users, vehicles and system activity
- Extensive and advanced anomaly handling
- Support for internationalization and GUI localization
- Compliant with industry standards, including IB SEM, Stocker SEM and HSMS

Benefits
- Reduces lot travel time
- Reduces AMHS footprint in the fab
- Reduces AMHS device transport times
- Offers ability to change configuration and upgrade with zero downtime
- Easily integrates with all major AMHSs, eliminating restriction of using only one AMHS provider
- Deploys in less than a day

Tabs indicate different areas or floors in a facility.
Each ID, storage, process and transport device icon shows the ID of that device and provides lights to visually show the equipment and communication state of that equipment.
Colors alert you of a status or state change on a device; red indicates that an error or alarm exists on a device, port or carrier in the tab and yellow indicates that the storage device is initializing.
The MCS reporting feature includes several pre-defined templates available for creating reports. This sample bar chart shows completed moves during start, ramp-up, and production phases.

The System Configuration window enables you to easily create a fab diagram and configure stockers, process equipment, transport devices, ID controllers, stations, nodes and communication monitors.

The Customize View command allows operators to display their specific areas of responsibility.

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### CLASS MCS 5 Capabilities for Achieving AMHS Equipment Optimization at a Lower Cost

- **Tight integration with AMHS equipment**: Offers ability to integrate multiple AMHS providers into a single solution, allowing customers to drive down fab costs. Supports all major AMHSs from companies such as Daifuku, Murata (also Asyst/Shinko), Shinsung, Hitachi-Kidan, Formosa, IHI and others. Adding or configuring AHMS equipment does not require software changes or system downtime.

- **Easily communicates with any MES**: Provides an external interface that can be used to communicate with standard and custom MESs on various platforms.

- **Accelerated failover and high-availability**: Includes accelerated failover functionality and high-availability hardware and software architecture, which ensures that critical components are always operational, resulting in less downtime and more uptime. No downtime is required to add or configure AMHS devices, and users can independently install, update and remove components while the system is running.

- **Extensible design**: Provides the ability to extend the capabilities of the system as defined in a development kit, which includes a set of interfaces that allows software engineers to develop components that can be integrated with CLASS MCS 5.

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### Customer Results

The cost of a fab down for minutes or hours can run from tens of thousands of dollars to millions, depending on volume. CLASS MCS 5 customers have reported the following:

- > 99.99% MCS production uptime
- Improved inventory control
- Increased operator efficiency and throughput

With over 250 MCS solutions installed, the Applied Materials MCS team has the experience and capability to support our technology manufacturing customers in every stage of the fab lifecycle.

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The main application window, called Command Station, offers a simple, easy-to-use interface from which you can quickly access various commands to configure and manage the MCS.