



# ZIGGY™

## **ZIGGY™ LEAN - Modular Conveyance**

The Modular Conveyance provides the interlocking over the ZIGGY Architecture.

The operational concept is to process an article by sending it through a series of manufacturing steps.

Each step is performed by a Modular Process Units (MPU). The Modular Conveyance (MC) moves the article between MPUs.

Since different articles require different manufacturing steps, the MC is selected— or designed—to meet the needs of the article being manufactured. For example, if the article being manufactured is batteries, the MC will be different from ones used to make Auto Compressors.

Accordingly, WRC works with the end user to select a material handling firm or systems integrator that can supply the MCs needed for their process. The critical consideration is that certain common characteristics are required in order for the MCs to be integrated into a ZIGGY Architecture.

The common characteristics include:

- The MPU and the Modular Conveyance are to operate independently
- Standardized physical interface to allow easy interchangeability of MPUs and to simplify the material handling
- Controls embedded within the MC
- Self-contained MC including sensors, actuators, power supply
- Either a HOLOCON controller or an IEC 61499 Proxy interface to the MC.

The article being manufactured is to be moved by the MC between MPUs in order for the processing steps to be performed.

The MC controls are to be designed to independently perform their operation when instructed by the AGILE Controller and the Mass Customization Controller.

Status and error messages will be passed to the AGILE Controller, and to the Mass Customization Controller.

During start-up, software negotiations will be conducted between the MC, the MPUs, the AGILE Controller, and the Mass Customization Controller addressing the capability of the MC, the MPU and its status. This negotiation provides the AGILE Controller and the Mass Customization Controller with the information they need to manage the overall production line. These negotiations are implemented using Agent- Based Software and are resident in the HOLOCON Controller or IEC 61499 Proxy.

There is a lot of flexibility within the ZIGGY architecture regarding the MC. For example, the MC could be based on an automated conveying system for the highest speed and lowest labor content. Or it could be based on a robotic handling system for complex parts. Some companies have used a roller-based mechanical conveyor using tooling jigs to position the articles as they progress through the cell.

In any of these cases, WRC works with the manufacturer, the integrators, and the equipment suppliers to assure compatibility within the ZIGGY Architecture.

The MC rules are established for a number of reasons:

- The objective is AGILE Manufacturing—as a minimum.
- Possibly, Mass Customization is desired
- In either case, we can be guaranteed that at some point in time a process or product change will be required.
- The primary objective behind the ZIGGY MC rules is to be able to implement changes without disrupting operations elsewhere in the process.

Western Reserve Controls is an established manufacturer of industrial controls. WRC provides the ZIGGY architecture and components to Machine Builders and Systems Integrators that know your production and process requirements.

ZIGGY is protected by the following US patents:

- 6,615,091
- 6,325,198
- 6,478,134
- 6,681,915

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Find more on IEC 61499 Compliant Controllers at <http://www.wrcakron.com/holocon.html>