

# ZIGGY™

## ZIGGY™ LEAN - Mass Customization Controller

The Mass Customization Controller is the brains of 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) under the direction of the AGILE Controller. Meanwhile, the Mass Customization Controller maintains a recipe for different items that can be built and an itinerary for building those items.

The Mass Customization Controller is an agentbased software program that runs on an embedded computer running a realtime operating system. It communicates over Ethernet with each of the MPUs. Using the knowledge that is dynamically maintained, it understands the capabilities of each of the MPUs and it understands the status of each item being produced.

From the itinerary and the recipe, the Mass Customization Controller dynamically assigns to each item under production a recipe.

As the individual item is being processed, it then instructs the individual MPUs how to operate. For example, the line may be producing red widgets. An order arrives for three bluewidgets. If the Mass Customization Controller determines that the blue widget making MPU is available, it will set an itinerary for three widgets to not be processed by the red MPU, but instead be processed by the blue MPU. Three pieces— *made to order*.

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***Production matching demand. No excess inventory. No inventory shortages.***

Happy customers and management— because of the overall operational efficiency of the ZIGGY process.

**How it works**

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.

The Mass Customization Controller learns everything it needs to learn from a properly implemented MPU. This means that the Mass Customization Controller is a standardized- software package that can be applied across a wide range of manufacturing applications.

The result is:

- Lower initial cost
- Faster implementation
- Shorter time to market
- Lower ongoing expenses
- The use of open standards means that factory- floor support is readily available
- Simpler integration with balance of plant information systems.

Illustrated are operational displays for defining recipes and for running itineraries.

A recipe will identify each MPU. Associated with each MPU is a directive on how the MPU is to operate on the item. For example, the directive may be to inhibit. Or it could be to operate three times—or only once. In this manner, the cumulative effect of the sequence and the operations determine what product is built.



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.

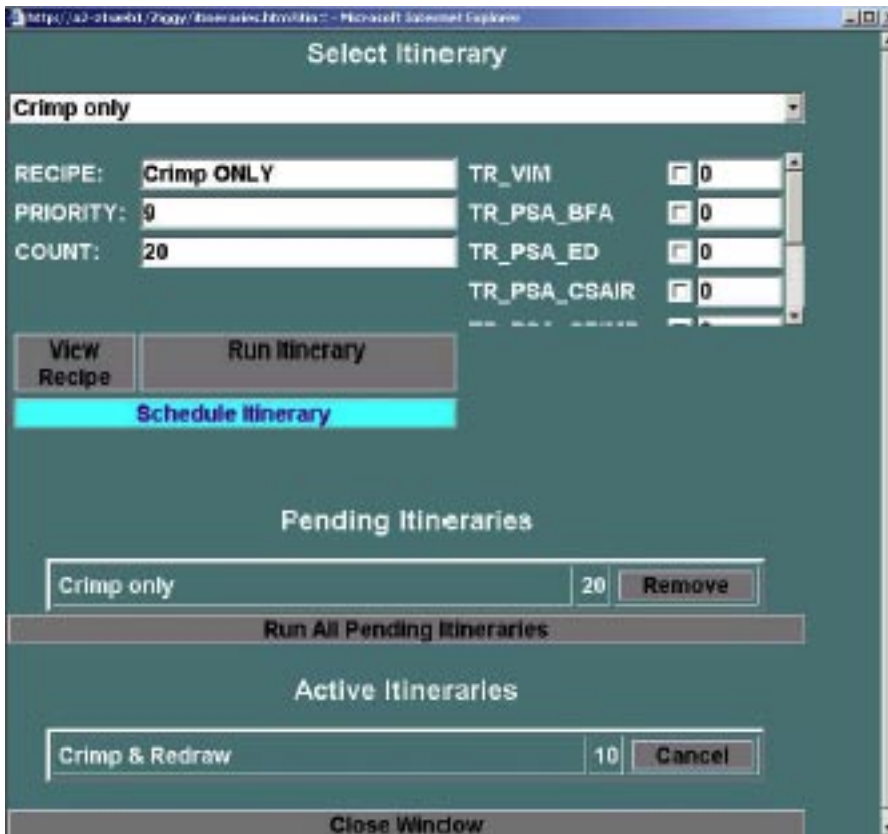
ZIGGY is protected by the following

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>



Also provided is an Itinerary. The itinerary identifies the recipe to be followed, how many items, the priority of making these items, when it is to be scheduled to run, and its current status.

One can think of an itinerary as a work order with the recipe being the pick list of materials and operations.

ZIGGY can be integrated with the Company's Manufacturing Execution Software (MES) provided by companies such as SAP, Oracle, or Rockwell Automation.

Since ZIGGY is written in open-architecture languages and follows open-architecture software rules, the interface is typically provided using SQL calls to the plant database.

WRC will work with the System Integrator to provide the linkages necessary to meet the production strategy of the end user.

## Typical MES Architecture (Bottom up)

