Optimized Dynamic Scheduling Module

Today's OEMs and Contract Manufacturers face mounting challenges in meeting growing customer demand for greater product diversity, incorporating lean manufacturing standards and new environmental requirements, and managing supply chain issues – all while maintaining rock solid product reliability. To remain competitive, companies must find new ways of optimizing the production operation, in real-time, to maximize productivity, efficiency and product quality, and ultimately, achieve key business goals and increase profit margins.

Module Overview

One of the major changes impacting the electronics assembly process is the shift to a higher mix, lower volume production model. Managing the complexities of this new manufacturing paradigm demands an innovative approach for automating and optimizing scheduling in order to fully maximize your production line output, while minimizing material costs, human intervention and headcount.
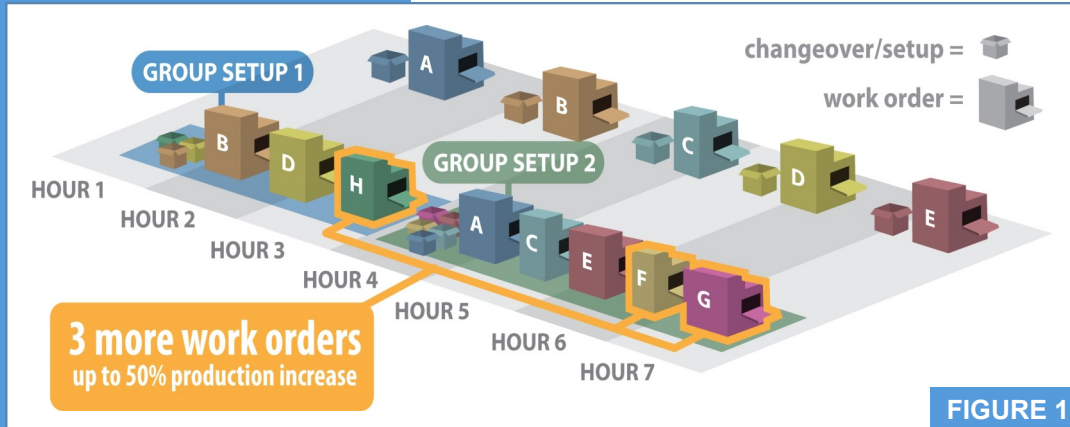

FIGURE 1

Optimal Electronics' powerful Optel Manufacturing Execution System provides these essential capabilities with the *Dynamically Optimized Scheduling Module,* shown in figure 1. This module uses a three-tiered approach to automatically optimize production, based on advanced mathematical algorithms and selected business rules:

First tier: At the first tier, all available work orders are analyzed using a custom engineered heuristic greedy algorithm that optimizes the grouping of work orders, based on commonality, thereby maximizing your production output, minimizing the total number of groups, and drastically reducing changeovers.

Second tier: Optimization at the second tier employs an advanced genetic algorithm that optimizes the sequencing of work order groups based on specified criteria, such as optimizing fixed feeder placement, so that the number and placement of common feeders between groups is maximized and changeover time is minimized.

Third tier: Two final custom genetic algorithms are used in the third tier to achieve the best machine setup to minimize component placement time for SMT machines. Optimization of component placement on the board is performed within the constraints of the optimized schedule generated in the first two tiers.
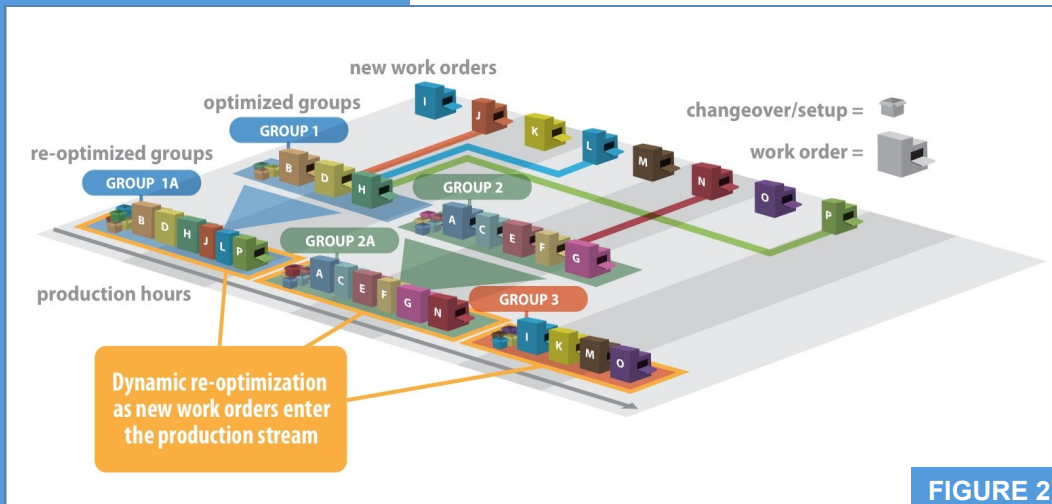
FIGURE 2

Dynamic re-optimization as new work orders enter the production stream

new work orders

optimized groups

GROUP 1

re-optimized groups

GROUP 1A

production hours

changeover/setup =

work order =

GROUP 2

GROUP 2A

GROUP 3

Unlike other software grouping approaches that only enable the grouping of two or three work orders in a static one-time event, Optel's Optimized Dynamic Scheduling module provides innovative dynamic re-optimization capabilities. As new work orders arrive, shown in figure 2, the system automatically re-optimizes the previously generated groupings that have not been kitted – resulting in continuously re-optimized production runs. This new Dynamically Optimized manufacturing environment enables your production operation to efficiently accommodate changing requirements – such as hot jobs or unanticipated component packages – by re-optimizing production on the fly to maximize manufacturing output.

Summary of Features and Capabilities

The PCB manufacturing execution process implemented in Optel is driven by a production schedule generated from work orders released by your manufacturing plant's ERP system. Optel's Optimized Dynamic Scheduling Module accommodates work order scheduling for multiple mixed-vendor and mixed-technology assembly lines. This module supports optimized family setups (common parts), single work order setups, and combined family and single board setups – enabling you to more easily adapt your assembly process to handle a wide variety of production environments, regardless of mix or volume requirements. Optel also optimizes the fixed feeder setup, rather than just the groups; thus, the range of assemblies that can be included in a group is much broader, further increasing production and flexibility.

Optimized Production Scheduling and Programming Features

- Online, optimized, real-time production schedules for each assembly line
- Three-tiered, dynamic, algorithmically optimized approach for minimizing total setups and changeover time between setups
- State-of-the-art optimization algorithms for many types of SMT machines
- Support for different setup strategies based on different production objectives, such as minimized production time, minimized feeder changes, earliest due date
- Real-time, dynamic rescheduling and efficient hot job handling
- Independent scheduling of top and bottom sides
- Inter/Intra-line workload balancing, including multi-vendor machine environments
- Automatic generation of routing, line setup, and machine setup Instructions
- Centralized global component library
- Integration with Optel's Material Management, Traceability and Quality Modules
- On-the-fly generation of machine programs for single assemblies, grouped setups or mixed setups for mixed machine vendor SMT lines

About Optimal Electronics Corporation

Optimal Electronics is a global provider of innovative manufacturing execution system (MES) solutions for the electronics assembly industry.

Optimal Electronics' flagship product, Optel, provides a fully integrated, modular shopfloor control system for production improvement, materials management, traceability and quality management.

With Optel's real-time visibility, you gain greater control and management insight for better planning, decision-making and execution across every aspect of the production process.

To learn more about the Optel MES solution or to schedule your free **Optimized Scheduling Analysis**, contact Optimal Electronics at: 512-372-3415 or info@optelco.com

Optimal Electronics
13915 N. Burnet Road - Suite 312
Austin, TX 78728
Phone: 512-372-3415
www.optelco.com