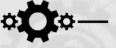## PlantTalk:Build

The PlantTalk:Build module has been designed to assist the line operators with a single piece flow of commodities. This includes providing step-by-step work instructions at each applicable station, scanning and machine interfaces for part and component validation, work-in-process and finished good part labeling, as well as rack completion and shipment verification. This process allows for full lot traceability of all applicable parts and components to the finished good part.

The end-user hardware that is typically used is a combination of compact-frame PCs or thin clients with flat panel monitors (optional touch screens), attached scanners at applicable stations, radio frequency units at every applicable tracking point and barcode label printers. Instructions are displayed in easy-to-follow steps, accompanied by installation images, training videos, manufacturing alerts and color coded station timers.

Production Scheduling Process Overview

In a non-sequenced (batch) program, the application has a production schedule entry, which determines the sequence of different variations of parts to be built, as well as the associated quantity (for example, 100 of part X, then 100 of part Y, etc.). The production quantity is validated against a multiple of the standard pack, and if a part is scrapped in the build process and the production run is not complete, the quantity will automatically increment to ensure that the run is for a complete racks of parts.

In a sequenced operation, the build order process is determined by the sequenced data from the OEM, such a broadcast pulse or an 866 EDI transaction. If needed, the actual build process can be done out of sequence to accommodate line efficiencies, and the actual sequencing of parts will take place at the time of racking.

Build Process Overview

In a typical production flow, the operator places the part in the assembly machine and scans its substrate label. After the part is assembled in the machine (for example, clips are added, etc.), the machine will cycle. This process repeats at every applicable work cell until the final station is reached. At that point in time, the EOL tester or final poka-yoke interface is performed. The finished part will then be placed in the shipping rack and be ready for scanning for verification.

PlantTalk:Build provides operator instructions for each step in the assembly process. Each instruction contains one or more of the following attributes:

- Written description of the instruction step (along with images/instructional videos);
- PLC interface to retrieve a completion bit and/or testing data metrics and to index the main assembly line;
- Tool interface to enable/disable tools and to retrieve process metrics (such as torque values);
- Scan interface to collect scanned data and validate that the expected scan values are received (i.e. the correct component part number is introduced to the assembly).
- Auto process step that will auto pass after user defined # of seconds.

The system enforces that the work instructions are completed in order and that the stations are done in order as well. It ensures that all required steps are completed for each station before the part is allowed to move into and be introduced to the next station and that all operators are logged in and authorized to work at specific stations. All scans and torques are saved to the database to provide full traceability of the instructions processed, including operator credentials, time and date stamps for all critical operations, as well as serial/lot numbers for all critical components.

This process ensures end-to-end traceability and tracking abilities through the manufacturing process. Product traceability implementation limits the impact of the cost of a product recall via automated collection of critical material and product lots. Our system stores historical product manufacturing information that can be easily retrieved on demand.

Dashboards typically deployed include the visual representation of station-by-station status in terms of the cycle times and +/- offsets from the standards with color coded escalations and alerts based on pre-defined milestones. In a broadcast sequence environment, a bank review dashboard is provided to display status against the OEM plant, taking into account shipments in transit.

Reporting is based on the Datanational User Query Tool, which provides a streamlined method of extracting data from the database that can be used for setting up canned reports. From the query tool, the data can be exported into Excel with a push of a button (via a CSV comma delimited file), or be printed to a default printer.