AES VIETNAM

Cogiscan

* Track Trace Control

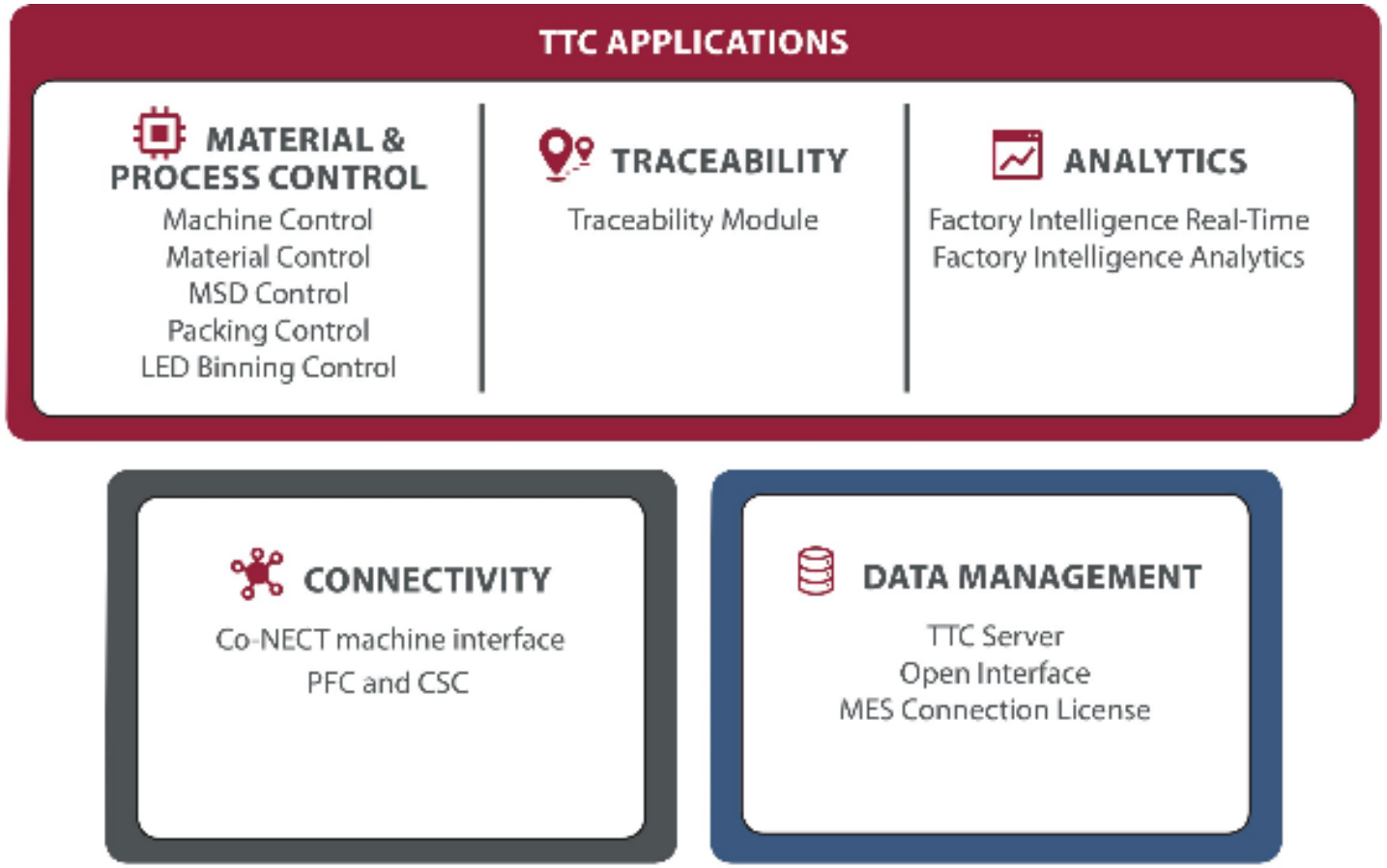
Your competitive edge

Introduction to Cogiscan

- Industry leadership: in Track, Trace, & Control (TTC) & Connectivity solutions for electronics manufacturing
- Founded in 1999; 20 years of innovation in electronics manufacturing
- Global company, headquartered in Bromont, CA (near Montreal)
- Over 250 customers w/ more than 420 factories worldwide
- Trusted partner of equipment & SW providers
- Multiple patents and industry awards

FROST & SULLIVAN

Some of our customers…



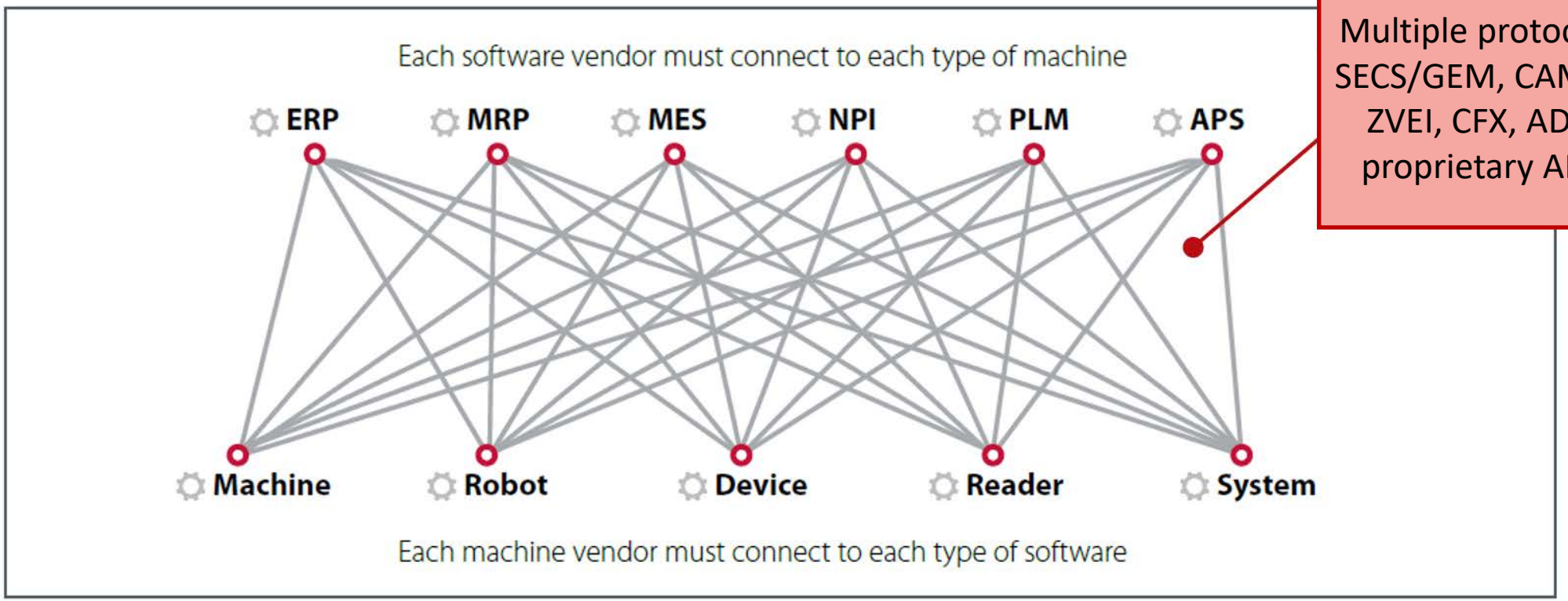
Solution Offering

- **TTC Applications**:
- Material & Process Control
- Traceability
- Analytics

- **Connectivity & Data Management**:
- Co-NECT platform for machine data collection
- Data Management solutions for data contextualization and storage
- Enterprise interfaces for integration with MES, ERP, etc.

Connectivity Solutions

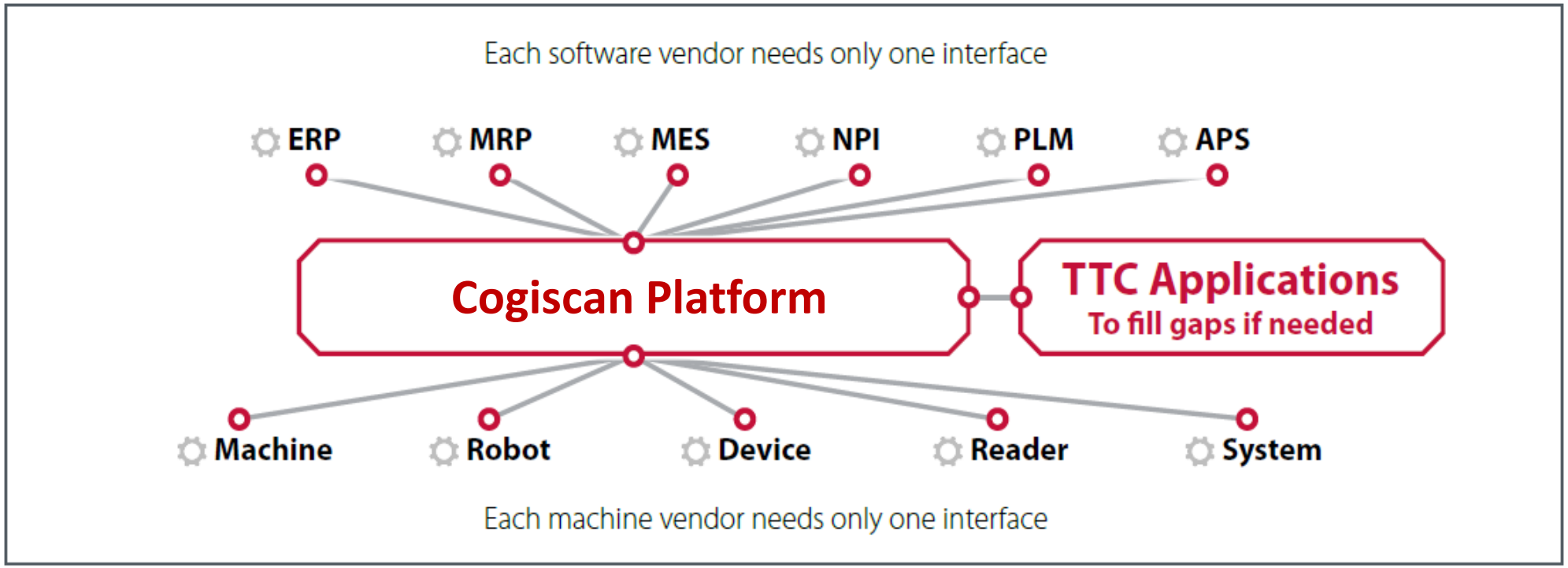
Current Situation



Multiple protocols, e.g., SECS/GEM, CAMX, OML, ZVEI, CFX, ADAMOS, proprietary APIs, etc.

Connectivity Solutions

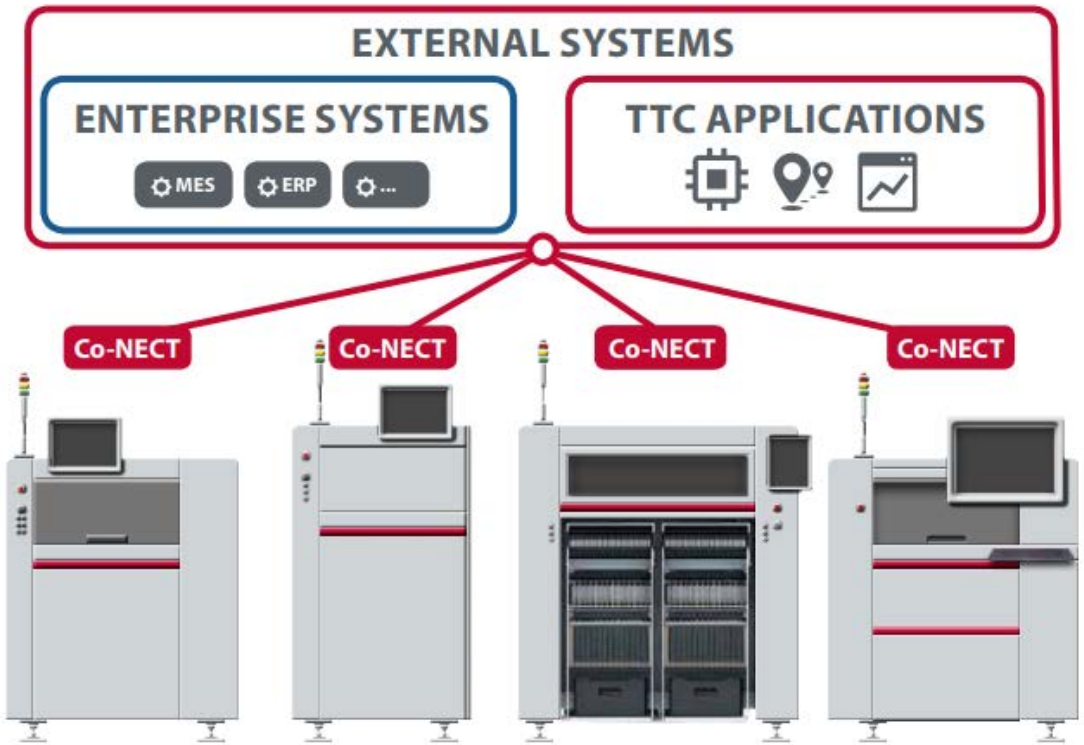
Single Connection Point with Cogiscan Platform



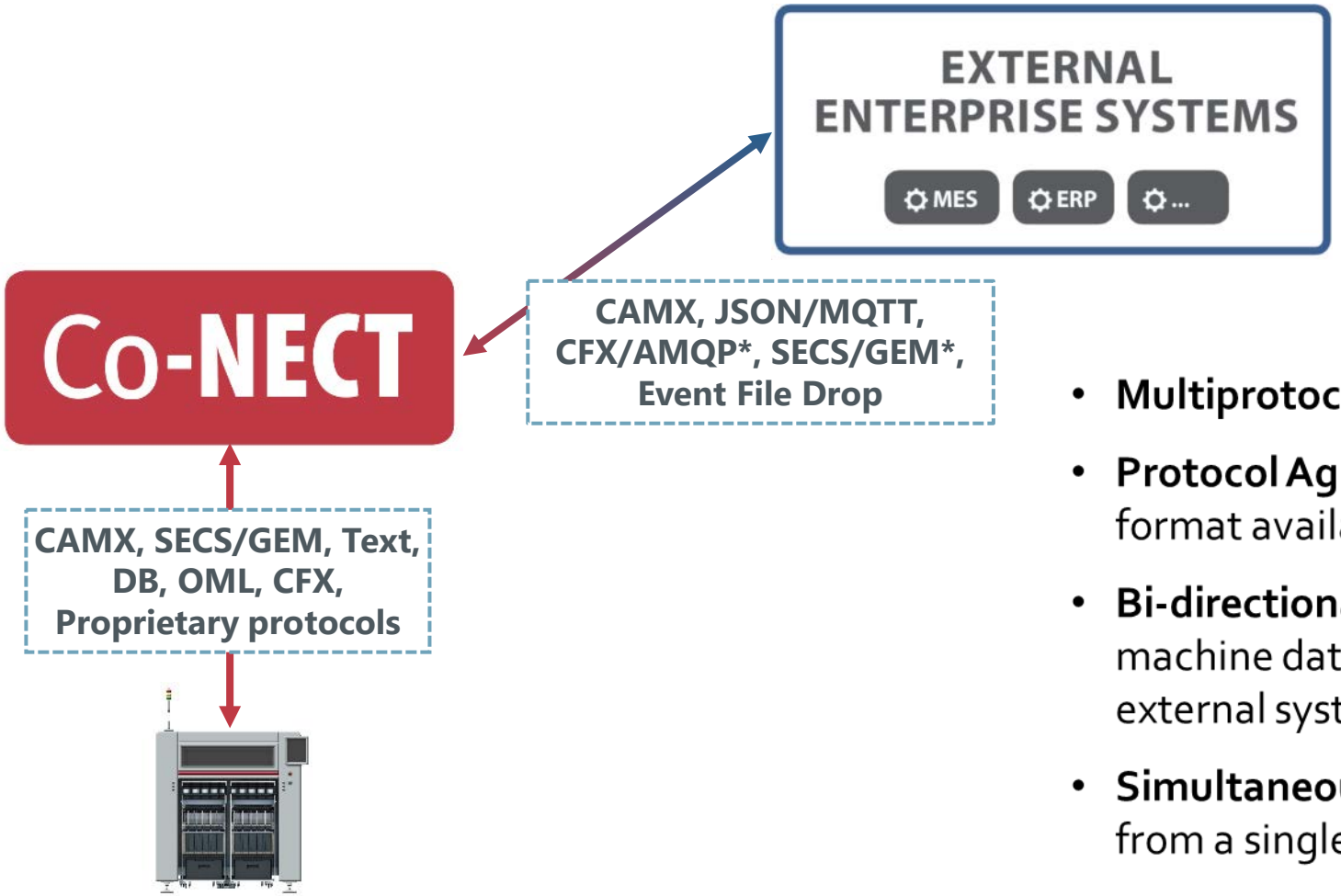
Co-NECT Machine Integration

Direct interface with > 50 brands of assembly equipment

- Incl. laser mark, labeling, paste printers, dispensers, placement machines, reflow ovens, SPI, AOI, in-circuit test, functional test, material storage systems, wave / selective solder, x-ray inspection, LCR meters
- Vast library of specialized interfaces for each machine type, supporting hundreds of equipment models
- New adapters added regularly
- Benefit: automate, standardize and centralize machine data collection



Co-NECT How it works



- **Multiprotocol:** for both data input and output
- **Protocol Agnostic:** collects any machine data format available
- **Bi-directional communication**: receives machine data input and takes commands from external systems back to connected machines
- **Simultaneous output:** multiple protocols sent from a single interface

* Currently under development

Co-NECT Data collection

Machine Type	Data Collected **
Printer	Program Name, Process Data, Machine State, Paste Verification, Traceability Data
SPI & AOI	Program Name, Test Results, Defect Data, Traceability Data
Placement Machine	Recipe, Program Name, Changeover Request, Machine State, Reference Designator Info., Material Tracking, Low Level Warning, Feeder Load-Unload Events, Board Start Event, Mispick Events, Feeder Location, Traceability Data
Oven	Program Name, Process Control, Machine State, Traceability Data
Wave & Selective Solder	Program Name, Process Data, Automatic Changeover, Traceability Data
Inventory Storage Tower	Raw Material Initialization, Material Deletion, Material Quantity Updates, Material Load & Unload, Automatic Material Request

** Available machine data is dependent on machine's vendor, model, and software

The Industry's Largest Library of SMT Machine Interfaces

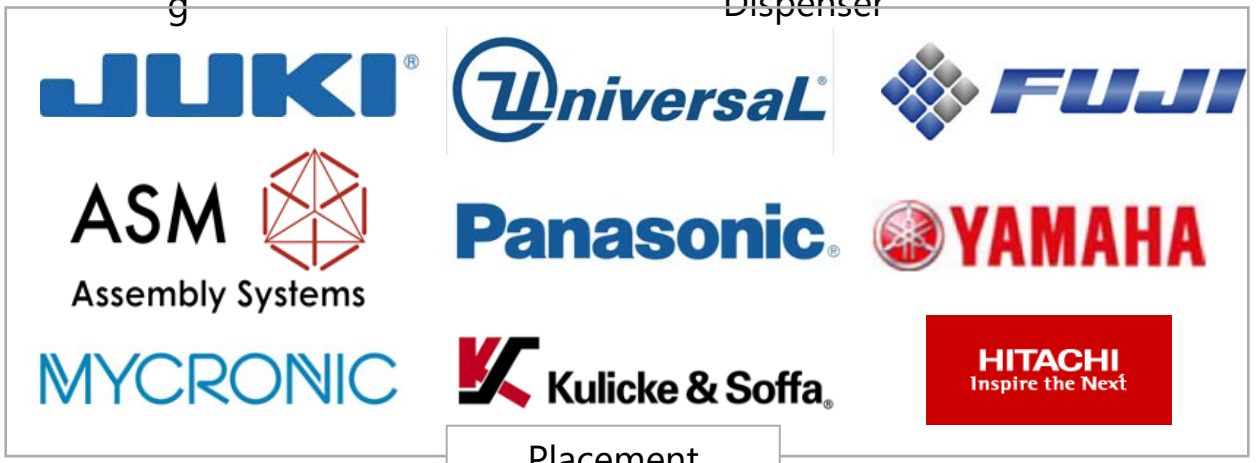
(Partial Listing)

Inspection & Test

Material Storage &

Marking/Labeling

Printer / Dispenser



Placement

Reflow / Solder

Co-NECT OEM partnerships

"We look to Cogiscan to help us be that connectivity for a lot of our interfaces. We use them for our intelligent feeder system, and they've developed the 'Co-NECT' software that allows us to connect to storage towers, and also now with CFX." **Bill Astle, President & CEO**

"In addition to CFX, Universal relies on the Co-NECT platform to support other required protocols, such as CAMX or SECS/GEM, as well as customer-specific integration requirements." **Todd Vick, Director of Marketing**

"The reason why we chose Cogiscan is that there are so many standards out there, that there is no real standard. We need to communicate with all machines..." **Brian**

Co-NECT OEM partnerships

"By collaborating with Cogiscan we are able to implement their robust off-the-shelf Co-NECT interfaces for all major brands of SMT equipment, so our customers can easily integrate our solutions within any production environment." **Matteo Padoan, COO**

"Keysight's PathWave …combined with Cogiscan's Track, Trace and Control solutions enables data collection and acquisition throughout the entire electronics PCBA manufacturing line…" **Daniel Mak, Sr. R&D Director**

"For me, the key strengths of Cogiscan are service, technology, and quality… In our drive to Industry 4.0, we think having Cogiscan as a partner is absolutely essential." **Mark Clemons, Business Unit Manager - Printers**

Material Control: Benefits

- **Reduce waste** by eliminating unnecessary movement of material, tools and employees
- **Optimize production performance** by minimizing line downtime and improving line changeover time
- **Improve quality** by guaranteeing the correct components and process conditions are used
- **Reduce inventory costs** through accurate material consumption data in order to prevent unnecessary procurement of material

> **"We now know exactly where every component is located, so we don't have to go look and search for lost or misplaced components."**

Paul Jaussi, Manufacturing Engineering Manager at Biamp Systems

Material Initialization & Labeling

Register and label incoming material for full tracking and control throughout its lifecycle

Features:

- Integration with customer ERP, MRP or MES
- Generate common internal label for use throughout the factory, esp. SMT
    - Cogiscan- or customer-defined labels
- Generate or assign unique IDs for tracking of individual material containers (reels, etc.)

Benefits:

- Fully identify material for traceability, location & quantity tracking, single-scan operations, MSD control, etc.
- Avoid duplication of data entry
- Reduce risk of human error in labeling of material

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Paul Jaussi, Manufacturing Engineering Manager at Biamp Systems

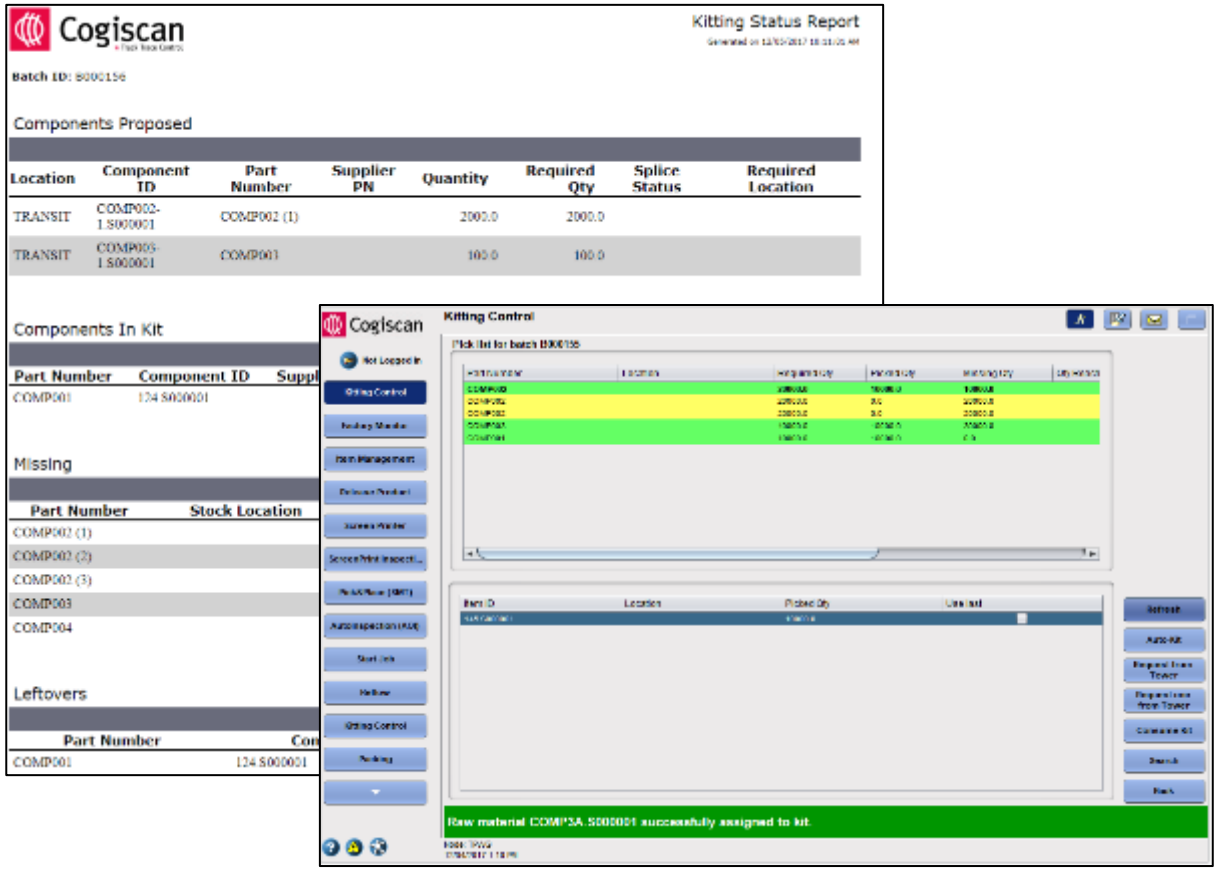
Inventory Tracking

Material to Location

Kitting Control

Automate and error-proof material kitting for production jobs

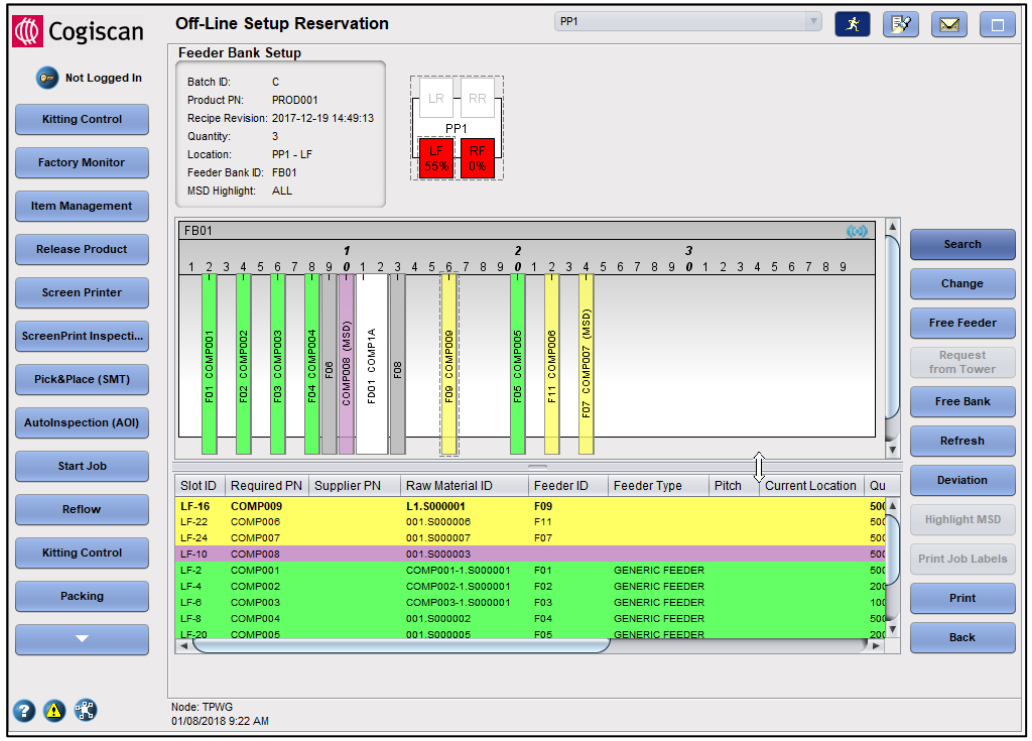
- Improve the kitting process by verifying:
  - Material shortages prior to production
  - Automatic reservation of material to the assigned kit
  - No accidental use of unauthorized material
  - FIFO rules are followed
  - Required quantity of components are available for job completion
  - Automatic pull requests will be sent to the Storage Tower



Setup & Process Control Module

Rest assured you're always running the correct process

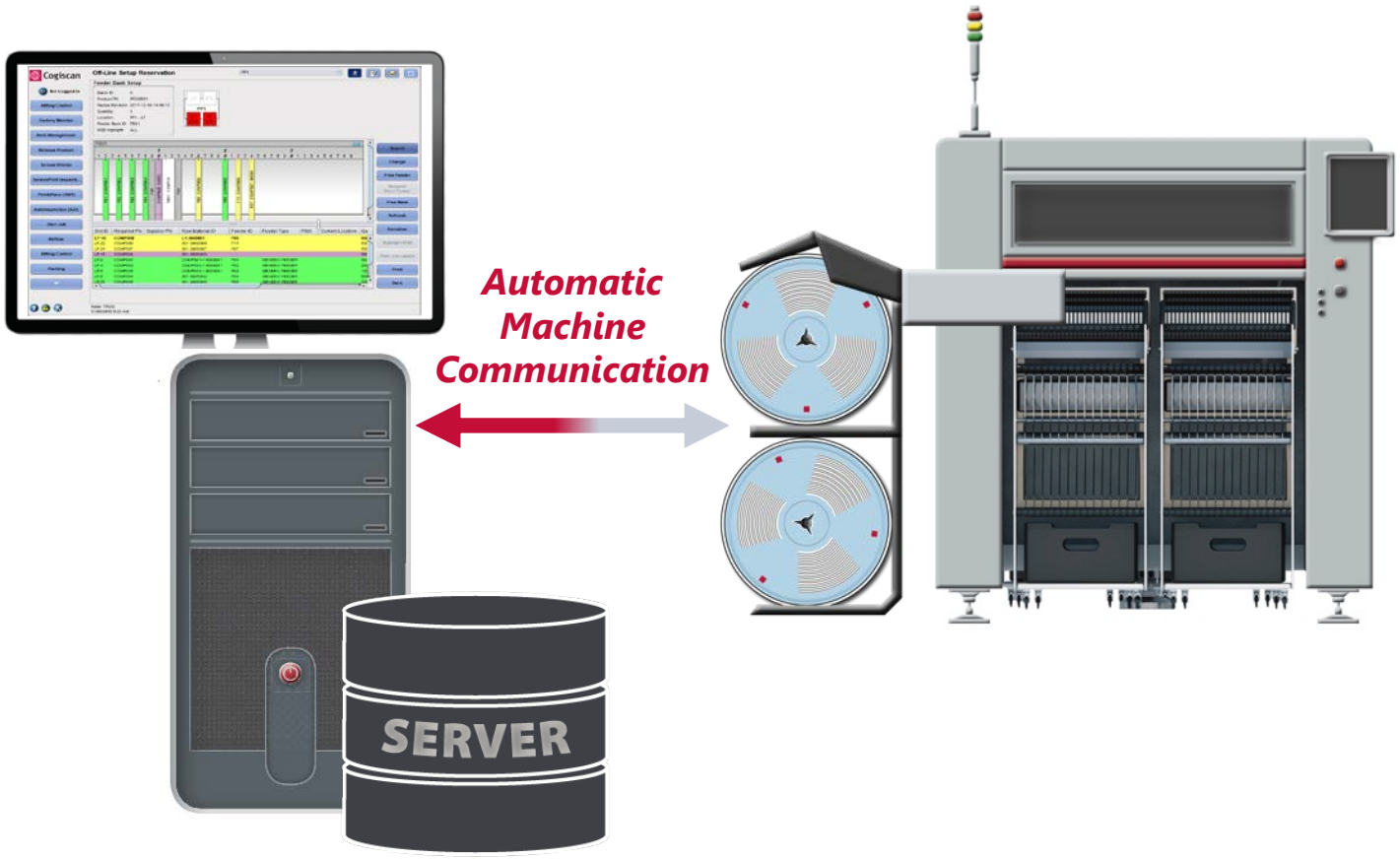
- Line level solution for set-up validation on SMT machines as well as manual processes
- Validates every element including:
  - Components
  - Tooling, incl. feeders
  - Consumables
  - Machine program
- Flexible configuration options:
  - Setup validation with a common interface
  - Optimized step-by-step operator instructions
  - Both offline and online machine setup validation



Setup Control Module

Flexible configuration options available to support any machine type

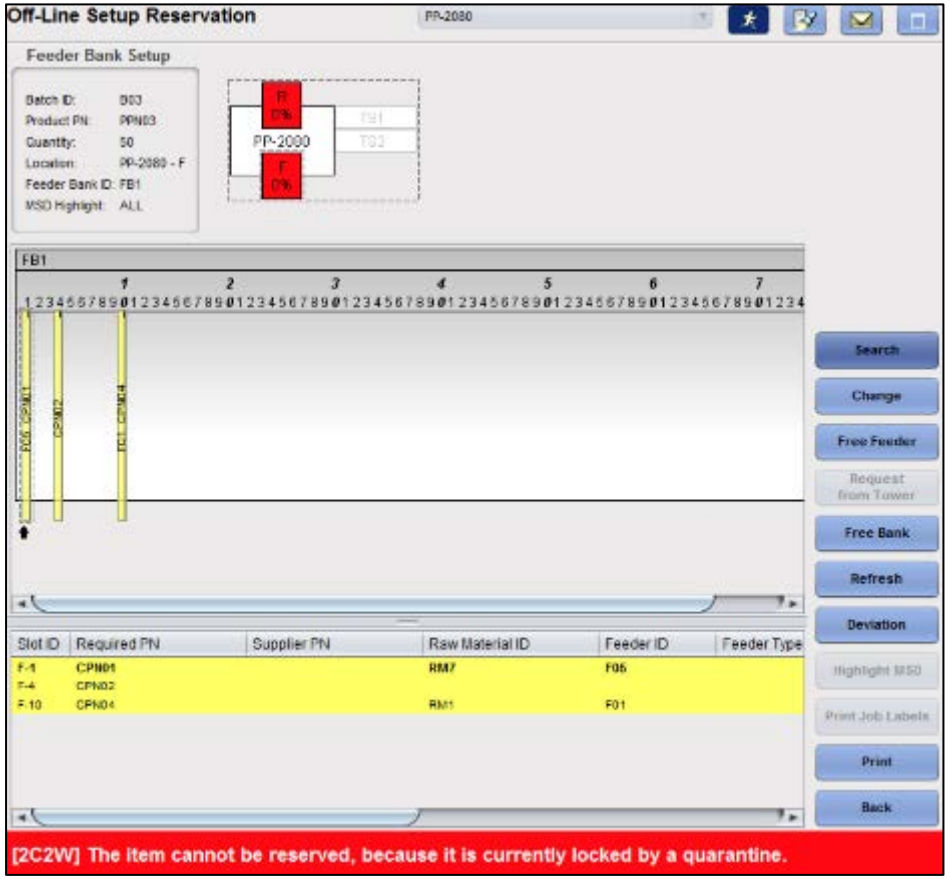
- A simple and low-cost barcode-based solution for legacy machines without smart feeders:
- For machines with smart feeders, the *Co-NECT* machine interface is used to harvest feeder event data:
  - Setup performed by either Cogiscan or machine vendor's software – all data will be synchronized directly within *TTC Server*



Quarantine Control

Ensure products will not be built with unwanted or defective materials

- Blocks any quarantined materials from being used
- Prevents the usage of quarantine components during both online and offline set-up
  - Components are “LOCKED”
- Includes automatic alarms to help stop production if any machines are loaded with quarantined materials



Screen Printer Setup Control

Eliminate defects due to the incorrect setup of solder paste and tooling

Features:

- Uniquely identify solder paste containers and tooling
- Validate solder paste, stencil, squeegee, tooling
- Compatible with all major brands & models

Benefits:

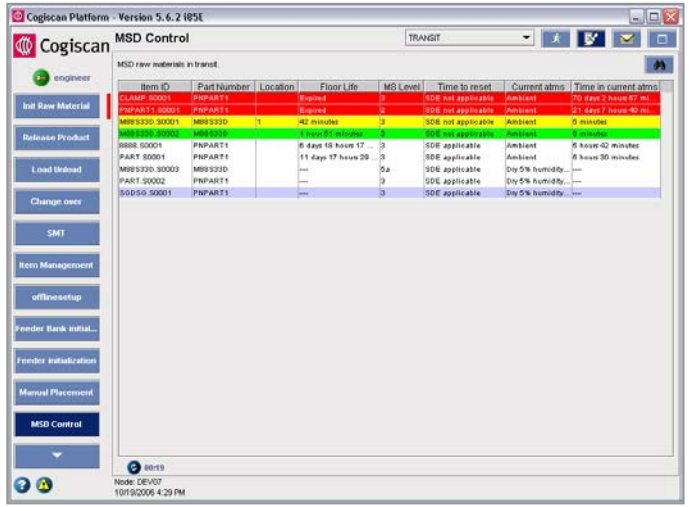
- Eliminate human error
- Reduce changeover time
- Complete traceability
- Avoid mixing Pb and Pb-Free

MSD Control

Automate the management of moisture-sensitive devices in compliance with JEDEC standards

Features:

- Track reels/trays containing MSDs throughout the entire lifecycle
- Provide real-time status and physical location on the assembly line, dry cabinet, re-sealed dry bag and oven
- Calculate remaining floor life in real-time
- Provide warnings and alarms before expiration
- Interlock the line when MSDs are expired with PFC
- Tracks MSDs on double-sided PCBAs

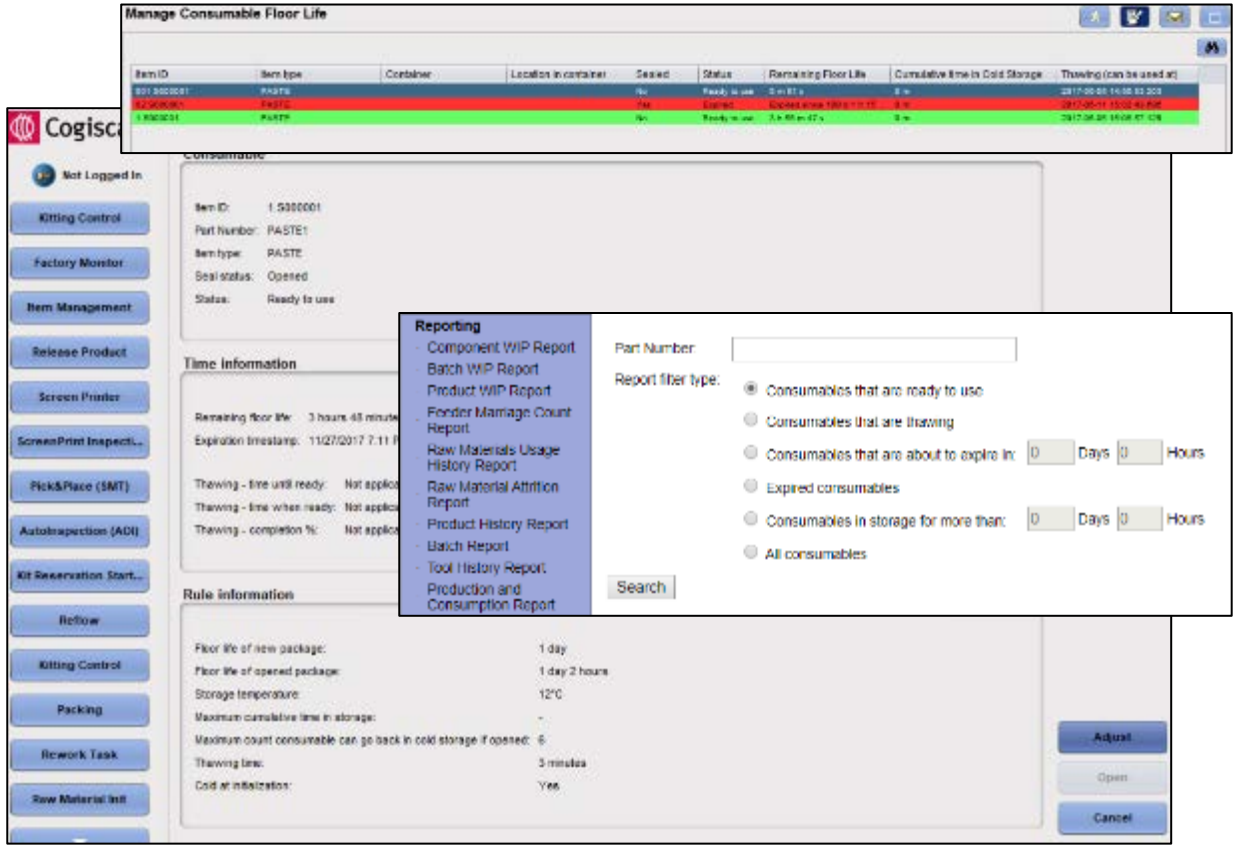


The Industry Standard for MSD Control

Time Sensitive Material Control Module

Automate the management and use of consumables with special requirements

- Improved management of materials with unique handling requirements including:
  - Solder paste
  - Conformal coating
  - Adhesives
  - Other chemicals
- Will stop the machine when any material rules are violated
- Manages floor life and material expiration, as well as cold storage and thawing requirements



SMD Tower Integration

- Seamless integration with Kitting Control, Offline Job Setup, Line setup and Low level Alarms software
  - Work order preparation before changeover
  - Automatic release of reels from tower with a click of a button in the Cogiscan Operator Interface
- Synchronisation of
  - Reel initialization
  - Quantity updates based on component consumption on machine
  - Reels put back to stock

LED BIN Control

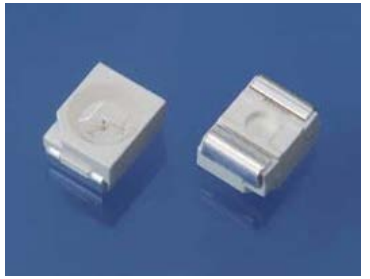
Ensure consistent LED brightness across PCBAs by controlling BIN compatibility

Features:

- Additional validation process during machine/feeder setup
- Prevent mixing incompatible BINs during production and/or activate matching resistors in placement program

Benefits:

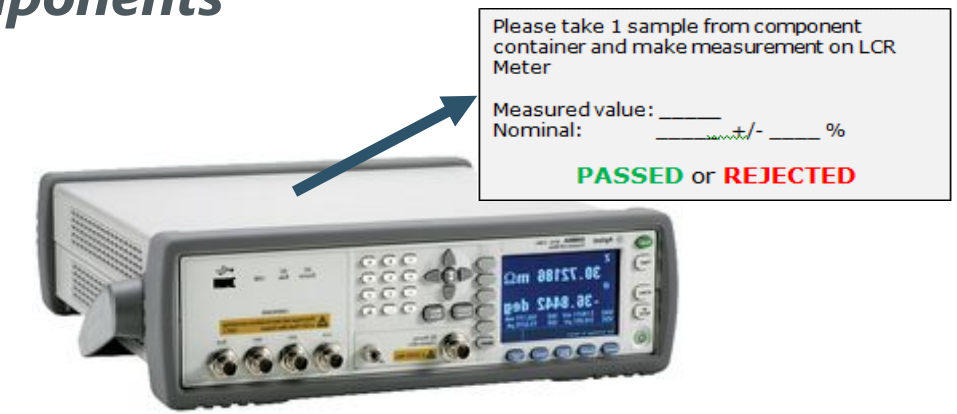
- Eliminate the risk of mixing LED BINs
- Ensure quality/uniformity of LED product
- Eliminate cumbersome manual control procedures

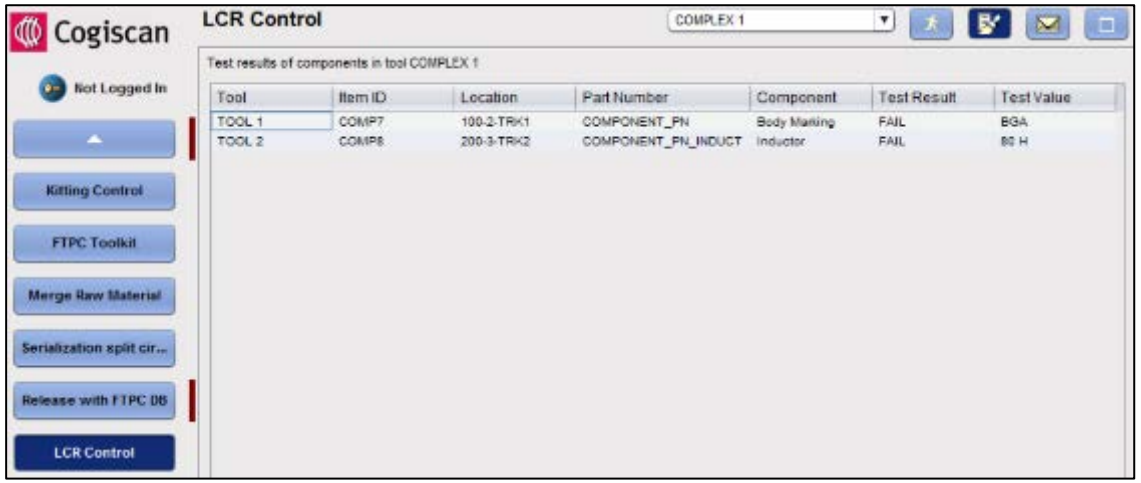


LCR Control Module

Verify the electrical characteristics of components

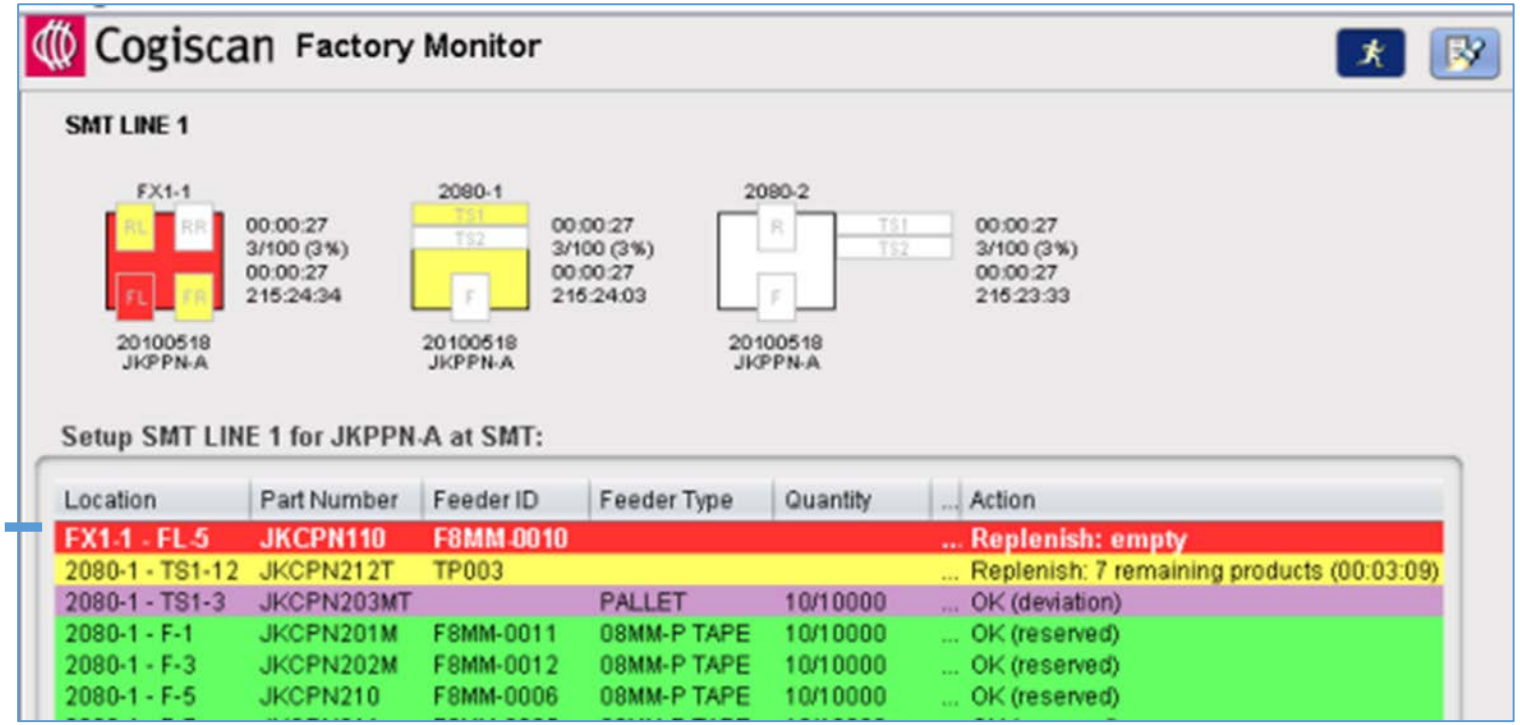
- Ensures component's electrical characteristics are accurate and match their label
- Catches problem components before they are loaded and used for assembly
- Helps to eliminate the risk of using the wrong passive components during production





Low-Level Alarms

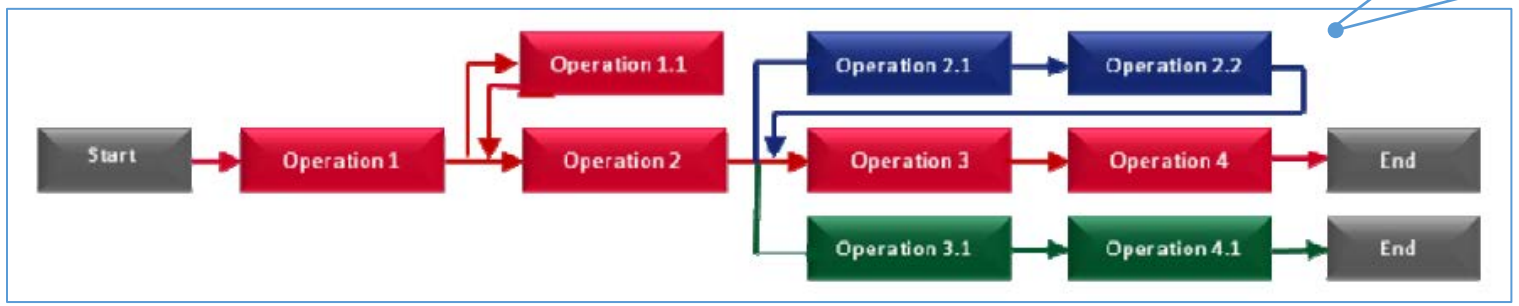
- Avoid line stoppages due to empty feeders
- Improve asset utilization
- Automatically trigger material pull from Automated Storage Tower

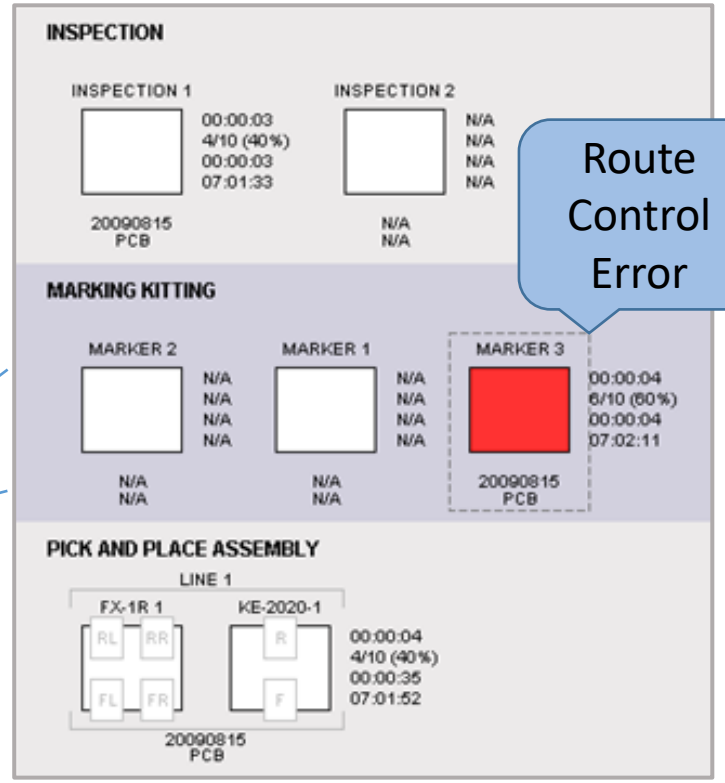


Route Control

Eliminate errors by ensuring products follow the correct production route

- Define valid production routing for each product
- Ensure that all products follow the correct sequence of production operations based on the routing
- Issue alarms when a product is at the wrong operation
- Prevent the product from entering the wrong station using the Product Flow Controller

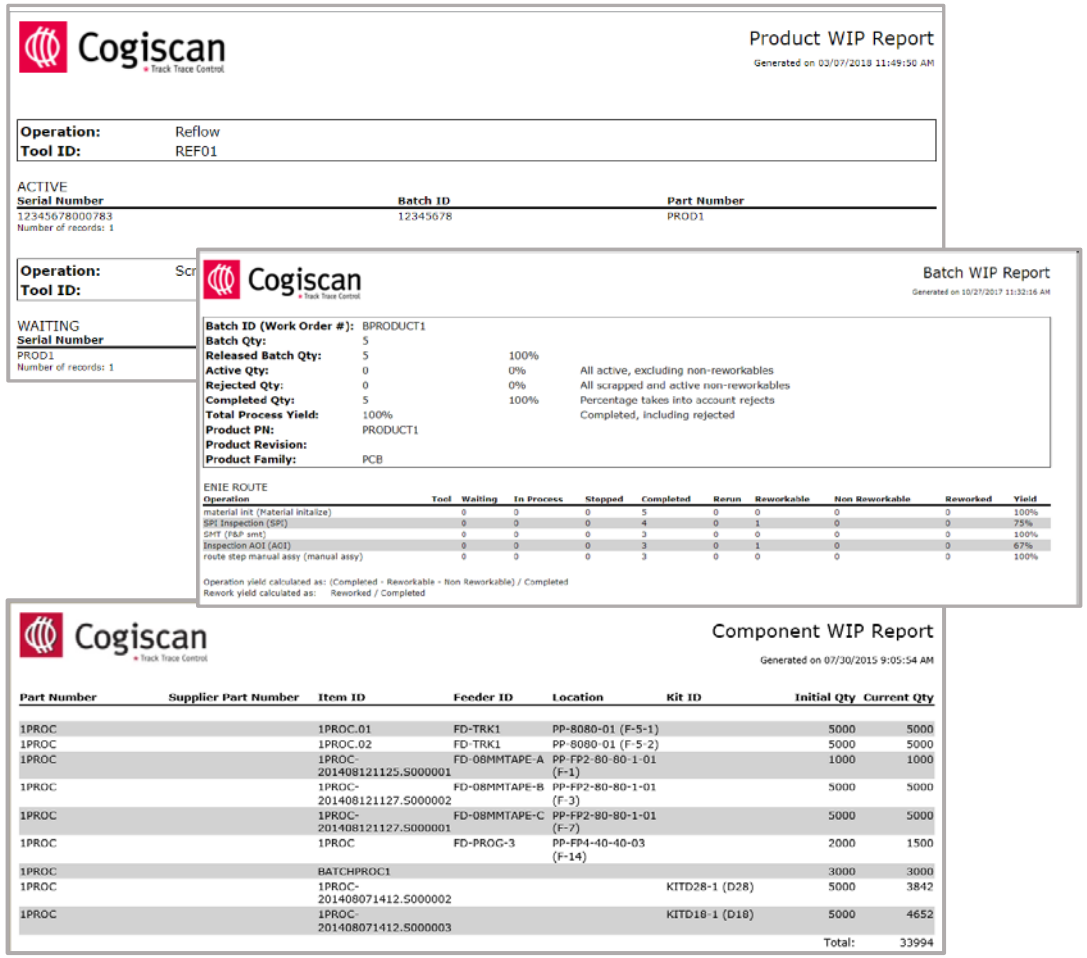




WIP Tracking

Gain visibility into which products and materials are currently in WIP

- Track in real time which products are currently active or waiting on the production line
- Track which components are currently being used in WIP
- Display WIP quantities for a given batch (work order)
- Export data to Excel or CSV



Cogiscan
Track Trace Control

Product WIP Report
Generated on 03/07/2018 11:49:50 AM

Operation: Reflow
Tool ID: REF01

ACTIVE

Serial Number	Batch ID	Part Number
12345678000783	12345678	PROD1

Number of records: 1

Operation:
Tool ID:

WAITING

Serial Number
PROD1

Number of records: 1

Cogiscan
Track Trace Control

Batch WIP Report
Generated on 10/27/2017 11:32:16 AM

Batch ID (Work Order #):	BPRODUCT1		
Batch Qty:	5		
Released Batch Qty:	5	100%	
Active Qty:	0	0%	All active, excluding non-reworkables
Rejected Qty:	0	0%	All scrapped and active non-reworkables
Completed Qty:	5	100%	Percentage takes into account rejects
Total Process Yield:	100%		Completed, including rejected
Product PN:	PRODUCT1		
Product Revision:			
Product Family:	PCB		

ENIE ROUTE

Operation	Tool	Waiting	In Process	Stopped	Completed	Rerun	Reworkable	Non Reworkable	Reworked	Yield
material init (Material initalize)		0	0	0	5	0	0	0	0	100%
SPI Inspection (SPI)		0	0	0	4	0	1	0	0	75%
SMT (P&P smt)		0	0	0	3	0	0	0	0	100%
Inspection AOI (AOI)		0	0	0	3	0	1	0	0	67%
route step manual assy (manual assy)		0	0	0	3	0	0	0	0	100%

Operation yield calculated as: (Completed - Reworkable - Non Reworkable) / Completed
Rework yield calculated as: Reworked / Completed

Cogiscan
Track Trace Control

Component WIP Report
Generated on 07/30/2015 9:05:54 AM

Part Number	Supplier Part Number	Item ID	Feeder ID	Location	Kit ID	Initial Qty	Current Qty
1PROC		1PROC.01	FD-TRK1	PP-8080-01 (F-5-1)		5000	5000
1PROC		1PROC.02	FD-TRK1	PP-8080-01 (F-5-2)		5000	5000
1PROC		1PROC-201408121125.S000001	FD-08MMTAPE-A	PP-FP2-80-80-1-01 (F-1)		1000	1000
1PROC		1PROC-201408121127.S000002	FD-08MMTAPE-B	PP-FP2-80-80-1-01 (F-3)		5000	5000
1PROC		1PROC-201408121127.S000001	FD-08MMTAPE-C	PP-FP2-80-80-1-01 (F-2)		5000	5000
1PROC		1PROC	FD-PROG-3	PP-FP4-40-40-03 (F-14)		2000	1500
1PROC		BATCHPROC1				3000	3000
1PROC		1PROC-201408071412.S000002			KITD28-1 (D28)	5000	3842
1PROC		1PROC-201408071412.S000003			KITD18-1 (D18)	5000	4652
						Total:	33994

TRACEABILITY

Offers **complete and accurate reporting** of the entire production process. Includes:

- **product**, **material**, and **process** traceability for **all manufactured units**

Both **fast and reliable**, our traceability reporting is a go-to resource tool for **electronics manufacturers worldwide**.

Traceability: Benefits

- **Guarantees compliance** with regulatory requirements
- **Enables immediate action** to identify the source and scope of a quality issue
- **Improves process compliance** in order to simplify client audits
- **Simplifies corrective action** reporting and recall management requirements
- **Improves customer satisfaction** through accurate and reliable traceability reporting

> **"The most important benefit is that every time we want to create a traceability report for a customer, we save a lot of time in retrieving the information and we are really confident that the data is very accurate."**

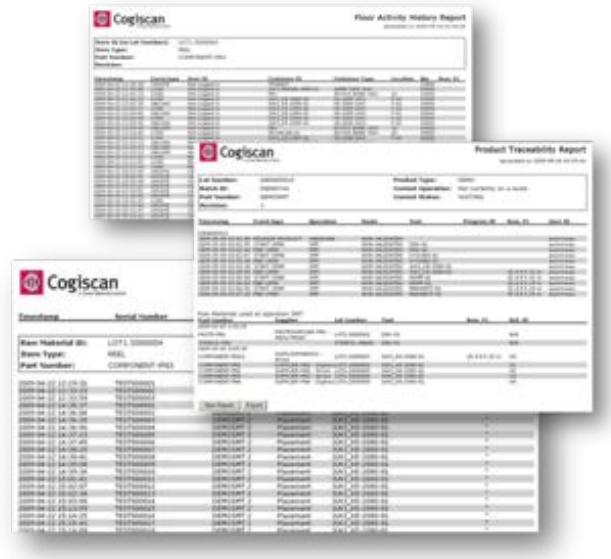
Lin Lin TI, IT Manager Flash Electronics

Product Traceability

Records all product-level information for manufactured units

Includes:

- Product & Work Order Information
- Each Operation's Start & End Date/Time
- Line / Machine / Workstation ID
- Operator Name/ID



1 2 3 4

Product Traceability: Reporting

Product Serial Number

Time Stamp

Start / End

Route Step

Operator ID

Machine Name

Cogiscan
Track Trace Control

Product Traceability Report

Generated on 11/23/2016 10:31:38 AM

Lot Number: PCBA-1
Batch ID: BPCBA
Part Number: PCBA

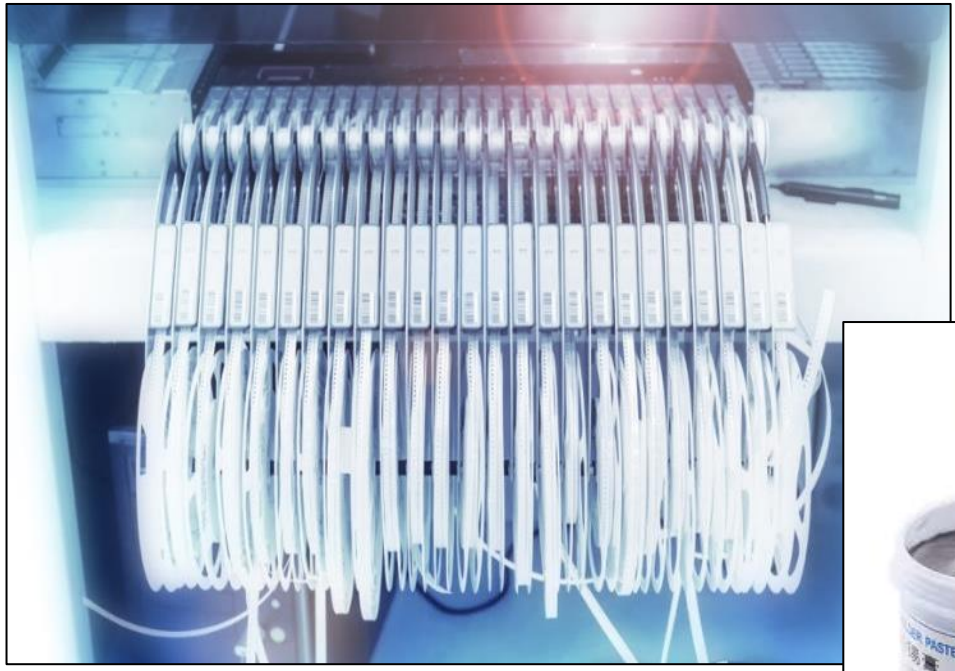
Product Type: PCB
Current Operation: Not in WIP

Timestamp	Event Type	Operation	Route	Tool	Program ID	Rem. FL	User ID
PCBA-1							
11/23/2016 9:30:33 AM	RELEASE PRODUCT	inspection receiving (rcv inspection)	RCV/MARK/P&P/INSP/OVEN/AOI				Not Logged in
11/23/2016 10:23:08 AM	START OPER	inspection receiving (rcv in	RCV/MARK/P&P/INSP/OVEN/AOI	RCV INSP (SH)			JSmith
11/23/2016 10:23:16 AM		in re inspection)	/P&P/INSP/OVEN/AOI	RCV INSP (SH)			JSmith
11/23/2016 10:27:10 AM	START OPER	Marking (Marking)	RCV/MARK/P&P/INSP/OVEN/AOI	MARKING (SH)	pcbamarkprog		JSmith
11/23/2016 10:27:10 AM	END OPER	Marking (Marking)	RCV/MARK/P&P/INSP/OVEN/AO	MARKING (SH)			JSmith
11/23/2016 10:27:26 AM	START OPER	Route step SMT (smt placement)	RCV/MARK/P&P/INSP/OVEN/AOI	P&P (SH)			JSmith
11/23/2016 10:27:30 AM	END OPER	Route step SMT (smt placement)	RCV/MARK/P&P/INSP/OVEN				JSmith
11/23/2016 10:28:02 AM	START OPER	Inspection (post smt insp)	RCV/MARK/P&P/INSP/OVEN/AOI	INSP TABLE (SH)			JSmith
11/23/2016 10:28:37 AM	END OPER	Inspection (post smt insp)	RCV/MARK/P&P/INSP/OVEN/AOI	INSP TABLE (SH)			JDoe

Material Traceability

Trace information related to all raw materials used during production

- Includes components, consumables, and tooling
- Available for each product's serial number:
  - Unique ID
  - Part Number
  - Supplier
  - Lot & Date Codes
  - MSD Information
- Trace from material info (e.g., lot code, reel ID) to find units produced



Material Traceability: Reporting

Cogiscan
Track Trace Control

Product Tracea

Generated

Lot Number:	20190531-PCB02-000000	**Product Type:**	PCB
Batch ID:	20190531-PCB02	**Current Operation:**	Not in WIP
Part Number:	PCB02		

Raw Materials used at operation SMT

Part Number	Supplier	Lot Number	Tool	Rem. FL	LCR Test	Part Ref. ID
05/31/2019 1:01:26 PM						
COMP1	-	COMP1.A	PP2_1			R11, R12, R13, R14, R15
COMP2	-	COMP2.B	PP2_1			R21, R22, R23, R24, R25
COMP3	-	COMP3.B	PP2_1			R31, R32, R33, R34, R35
COMP4	-	COMP4.B	PP2_1			R41, R42, R43, R44, R45
COMP5	-	COMP5.B	PP2_1			R51, R52, R53, R54, R55
COMP6	-	COMP6.B	PP2_1			R61, R62, R63, R64, R65
COMP7	-	COMP7.B	PP2_1			R71, R72, R73, R74, R75
COMP8	-	COMP8.B	PP2_1			R81, R82, R83, R84, R85
05/31/2019 1:02:11 PM						
COMP1	-	COMP1.B	PP2_2			R11, R12, R13, R14, R15
COMP2	-	COMP2.A	PP2_2			R21, R22, R23, R24, R25
COMP3	-	COMP3.A	PP2_2			R31, R32, R33, R34, R35
COMP4	-	COMP4.A	PP2_2			R41, R42, R43, R44, R45
COMP5	-	COMP5.A	PP2_2			R51, R52, R53, R54, R55

View raw material details for each component placed on the PCBA:

- Part number
- Supplier
- Lot number
- Machine/Tool
- Reference Designator

Material Traceability: Reporting

Cogiscan
Track Trace Control

Product Traceability Report

Generated on 08/05/2019 5:59:35 PM

Lot Number:	20190531-PCB02-000000	**Product Type:**	PCB
Batch ID:	20190531-PCB02	**Current Operation:**	Not in WIP
Part Number:	PCB02		

Raw Materials used at operation SMT

Part Number	Supplier	Lot Number	Tool
05/31/2019 1:01:26 PM			
COMP1	-	COMP1.A	PP2_1
COMP2	-	COMP2.B	PP2_1
COMP3	-	COMP3.B	PP2_1
COMP4	-	COMP4.B	PP2_1
COMP5	-	COMP5.B	PP2_1
COMP6	-	COMP6.B	PP2_1
COMP7	-	COMP7.B	PP2_1
COMP8	-	COMP8.B	PP2_1
05/31/2019 1:02:11 PM			
COMP1	-	COMP1.B	PP2_2
COMP2	-	COMP2.A	PP2_2
COMP3	-	COMP3.A	PP2_2
COMP4	-	COMP4.A	PP2_2
COMP5	-	COMP5.A	PP2_2

Cogiscan
Track Trace Control

Raw Materials Usage History Report

Generated on 08/05/2019 6:36:38 PM

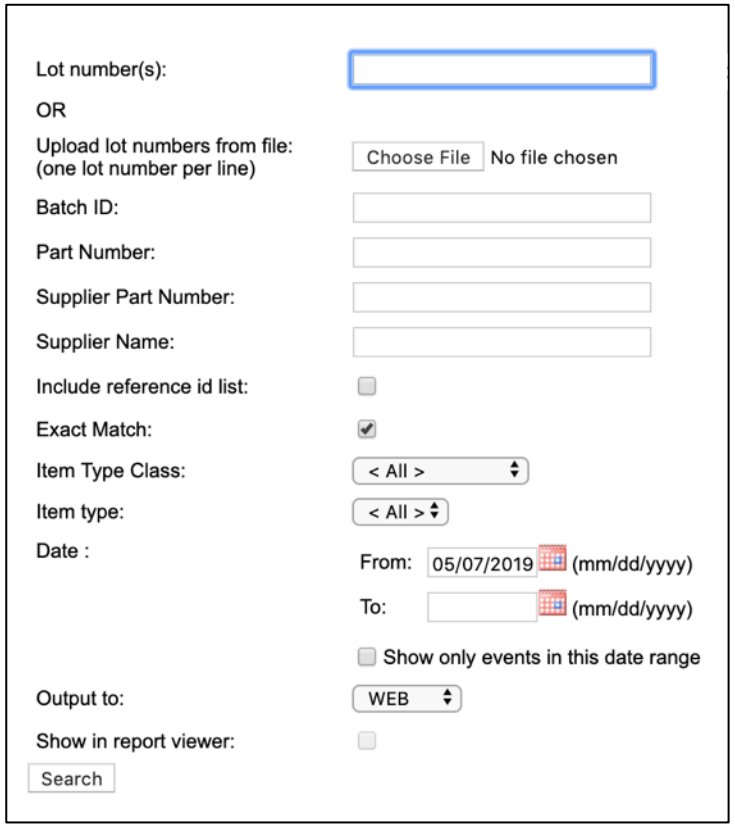
Raw Material ID:	COMP6.B					
Item type:	REEL					
Part Number:	COMP6			**Supplier:**		-

Timestamp	Serial Number	Batch ID	Part Number	Operation	Tool ID	Rem. FL
2019-05-16 13:48:56	20190516-PCB2-L2-000001	20190516-PCB2-L2	PCB02	SMT	PP2_1	
2019-05-16 13:49:17	20190516-PCB2-L2-000002	20190516-PCB2-L2	PCB02	SMT	PP2_1	
2019-05-16 13:49:42	20190516-PCB2-L2-000003	20190516-PCB2-L2	PCB02	SMT	PP2_1	
2019-05-16 13:50:23	20190516-PCB2-L2-000004	20190516-PCB2-L2	PCB02	SMT	PP2_1	
2019-05-16 13:51:03	20190516-PCB2-L2-000005	20190516-PCB2-L2	PCB02	SMT	PP2_1	
2019-05-16 13:51:44	20190516-PCB2-L2-000006	20190516-PCB2-L2	PCB02	SMT	PP2_1	
2019-05-16 13:52:25	20190516-PCB2-L2-000007	20190516-PCB2-L2	PCB02	SMT	PP2_1	
2019-05-16 13:53:06	20190516-PCB2-L2-000008	20190516-PCB2-L2	PCB02	SMT	PP2_1	
2019-05-16 13:53:47	20190516-PCB2-L2-000009	20190516-PCB2-L2	PCB02	SMT	PP2_1	
2019-05-16 13:54:27	20190516-PCB2-L2-000010	20190516-PCB2-L2	PCB02	SMT	PP2_1	
				SMT	PP2_1	
				SMT	PP2_1	
				SMT	PP2_1	
				SMT	PP2_1	
				SMT	PP2_1	
				SMT	PP2_1	

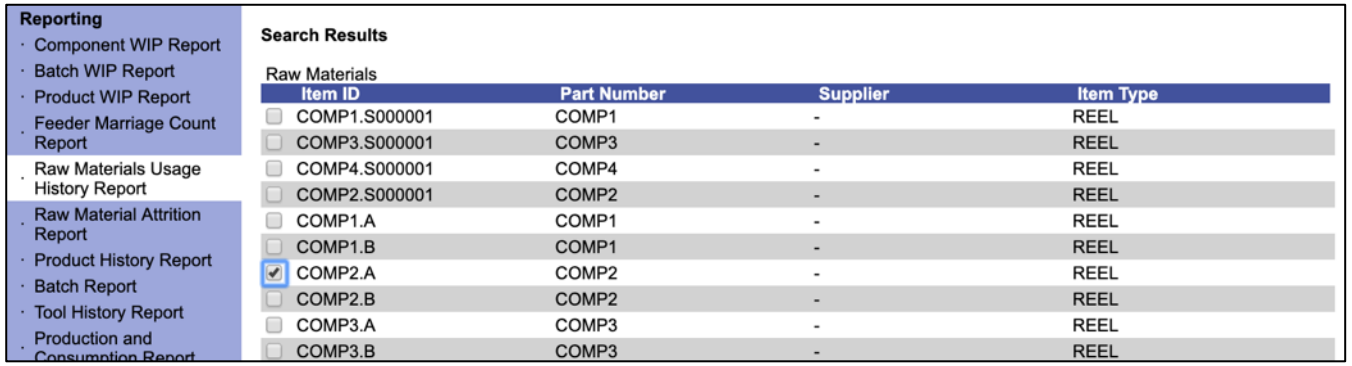
In order to find all products produced with a specific component, users can double-click on "Lot Number" to access the Raw Materials Usage History Report.

Material Traceability: Reporting

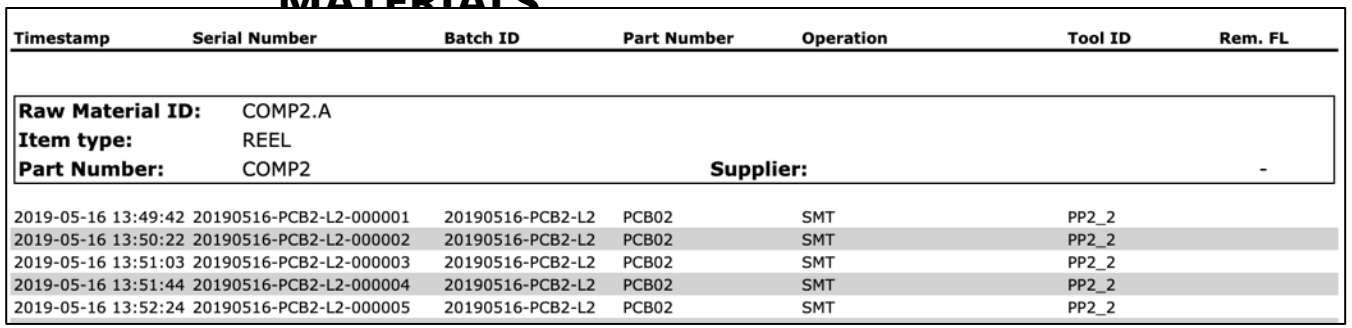
SEARCH FOR MATERIALS



SELECT MATERIALS



FIND UNITS BUILT WITH THOSE MATERIALS



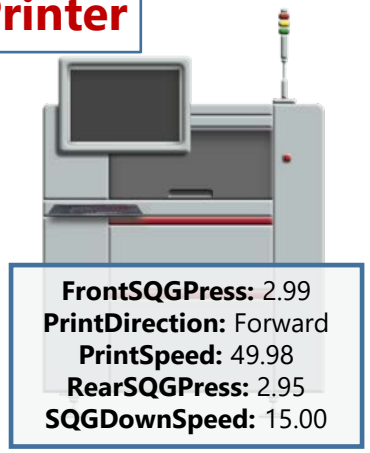
Process Traceability

Trace all process-related settings, parameters and measurements

Includes:

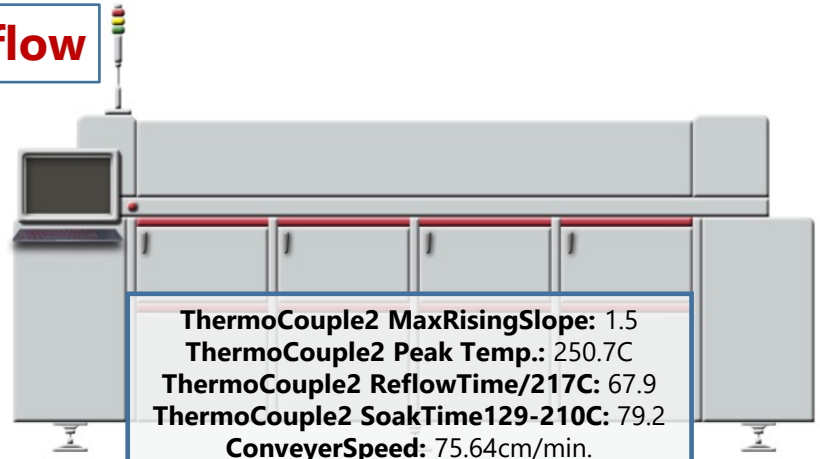
- Program / Recipe Name
- Temperature Settings / Actual Temperatures
- Test & Inspection Pass / Fail
  - With Defect Codes
- Measured Values for Electrical Test

Printer



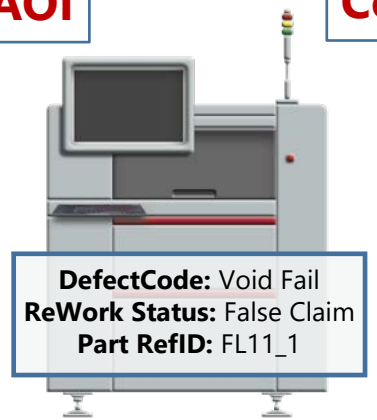
FrontSQGPress: 2.99
PrintDirection: Forward
PrintSpeed: 49.98
RearSQGPress: 2.95
SQGDownSpeed: 15.00

Reflow



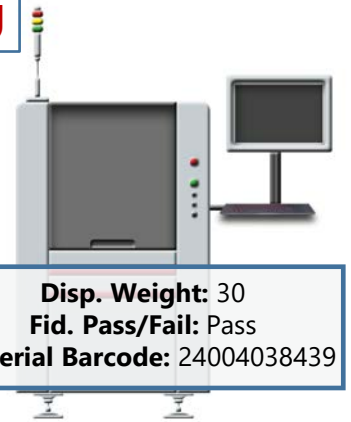
ThermoCouple2 MaxRisingSlope: 1.5
ThermoCouple2 Peak Temp.: 250.7C
ThermoCouple2 ReflowTime/217C: 67.9
ThermoCouple2 SoakTime129-210C: 79.2
ConveyerSpeed: 75.64cm/min.

AOI



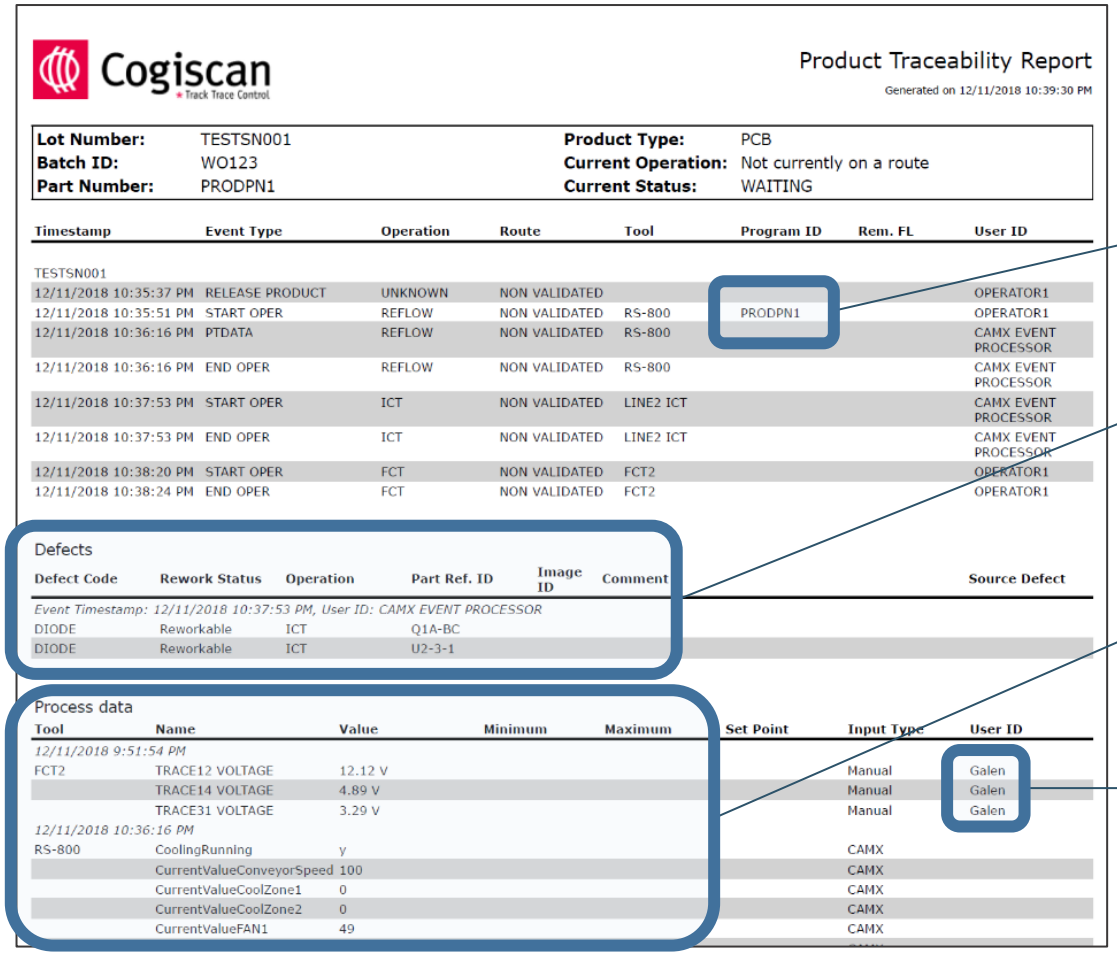
DefectCode: Void Fail
ReWork Status: False Claim
Part RefID: FL11_1

Coating



Disp. Weight: 30
Fid. Pass/Fail: Pass
Material Barcode: 24004038439

Process Traceability: Reporting



Cogiscan
Track Trace Control

Product Traceability Report

Generated on 12/11/2018 10:39:30 PM

Lot Number:	TESTSN001	**Product Type:**	PCB
Batch ID:	WO123	**Current Operation:**	Not currently on a route
Part Number:	PRODPN1	**Current Status:**	WAITING

Timestamp	Event Type	Operation	Route	Tool	Program ID	Rem. FL	User ID
TESTSN001							
12/11/2018 10:35:37 PM	RELEASE PRODUCT	UNKNOWN	NON VALIDATED				OPERATOR1
12/11/2018 10:35:51 PM	START OPER	REFLOW	NON VALIDATED	RS-800	PRODPN1		OPERATOR1
12/11/2018 10:36:16 PM	PTDATA	REFLOW	NON VALIDATED	RS-800			CAMX EVENT PROCESSOR
12/11/2018 10:36:16 PM	END OPER	REFLOW	NON VALIDATED	RS-800			CAMX EVENT PROCESSOR
12/11/2018 10:37:53 PM	START OPER	ICT	NON VALIDATED	LINE2 ICT			CAMX EVENT PROCESSOR
12/11/2018 10:37:53 PM	END OPER	ICT	NON VALIDATED	LINE2 ICT			CAMX EVENT PROCESSOR
12/11/2018 10:38:20 PM	START OPER	FCT	NON VALIDATED	FCT2			OPERATOR1
12/11/2018 10:38:24 PM	END OPER	FCT	NON VALIDATED	FCT2			OPERATOR1

Defects

Defect Code	Rework Status	Operation	Part Ref. ID	Image ID	Comment	Source Defect
Event Timestamp: 12/11/2018 10:37:53 PM, User ID: CAMX EVENT PROCESSOR						
DIODE	Reworkable	ICT	Q1A-BC			
DIODE	Reworkable	ICT	U2-3-1			

Process data

Tool	Name	Value	Minimum	Maximum	Set Point	Input Type	User ID
12/11/2018 9:51:54 PM							
FCT2	TRACE12 VOLTAGE	12.12 V				Manual	Galen
	TRACE14 VOLTAGE	4.89 V				Manual	Galen
	TRACE31 VOLTAGE	3.29 V				Manual	Galen
12/11/2018 10:36:16 PM							
RS-800	CoolingRunning	y				CAMX	
	CurrentValueConveyorSpeed	100				CAMX	
	CurrentValueCoolZone1	0				CAMX	
	CurrentValueCoolZone2	0				CAMX	
	CurrentValueFAN1	49				CAMX	

Program / Recipe Name

Defects logged against PCBA during inspection/test

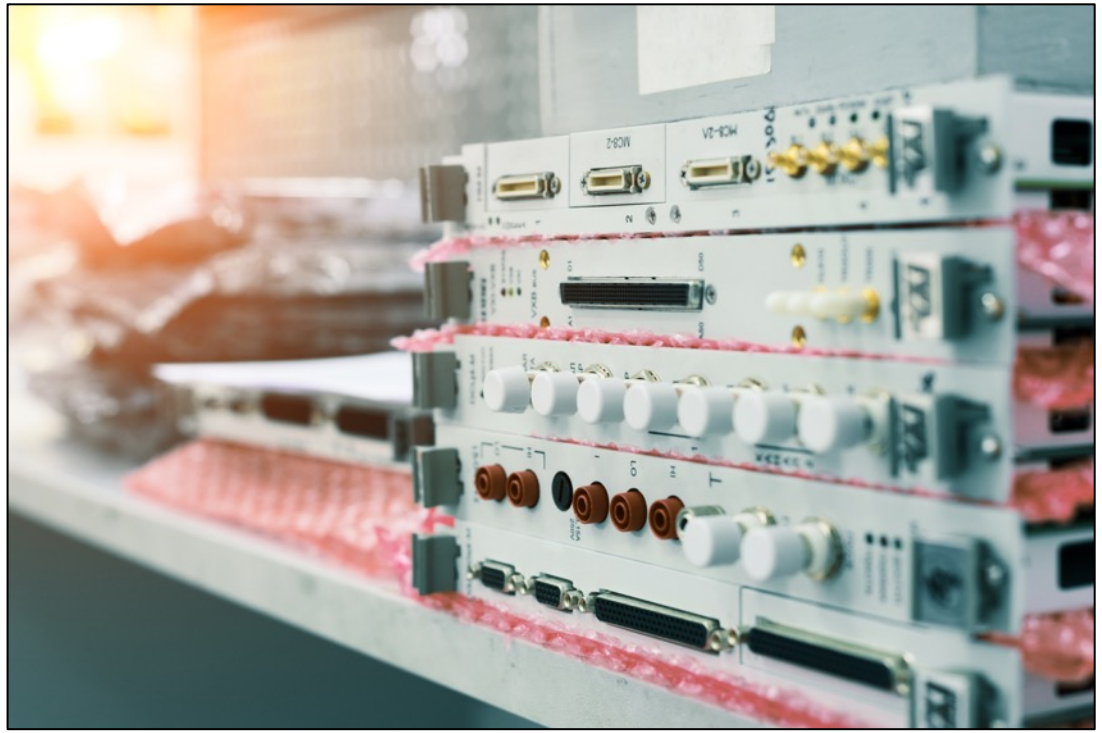
Process Parameters / Measured Values for each machine or step

User ID recorded for each station where logged in

Traceability: Genealogy

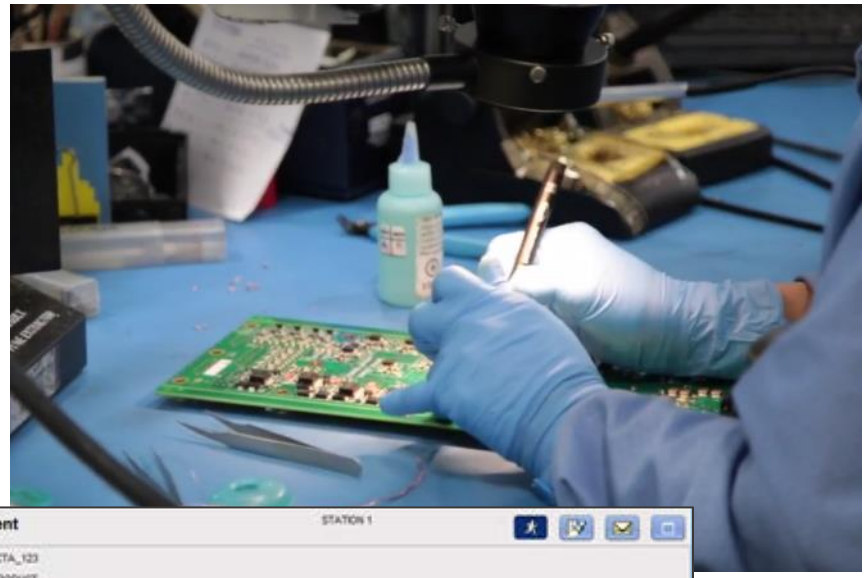
Accurately link all sub-assemblies to the final box build assembly

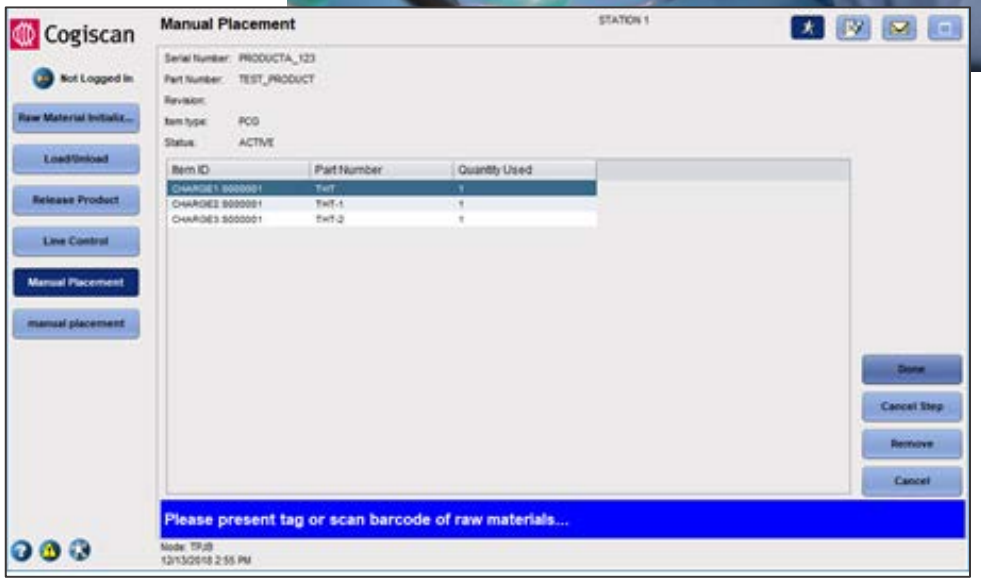
- Captures & records the identity of each individual PCBA as well as serialized components
- Supports multi-level BoM's in order to link all BoM level items to the final product's serial number
  - Trace up from the sub-assembly level
  - OR… Trace down from the final assembly level
- Validates that the correct sub-assembly part numbers are used in box build / final assembly



Manual Placement

- Record hand-placed components to work order or PCB
- Import product BOM to identify parts to be manually placed at each operation
- Require setup validation of material containers and tools to log material info
- Provide setup instructions to the operator to eliminate human error
- Link with Route Control module to validate routing



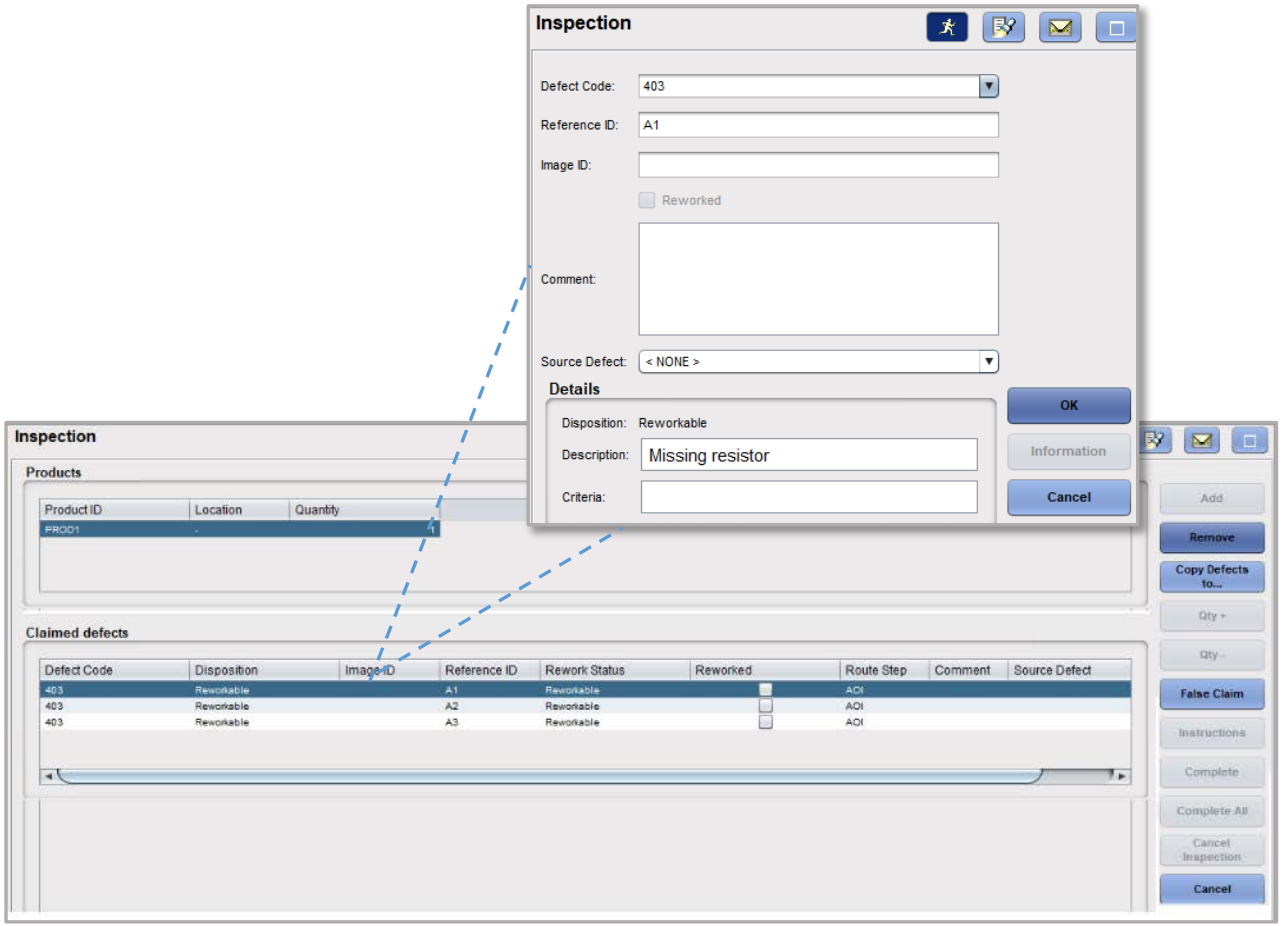


Defect & Repair Management

- Record defect codes for each PCBA
- Define and enforce rework route, including re-entry operation
- Block defective units from proceeding to subsequent steps until all defects are repaired
- Manage rework / repair process
- Record replaced material in unit history for traceability
- Automatically collect data from AOI, SPI & test equipment

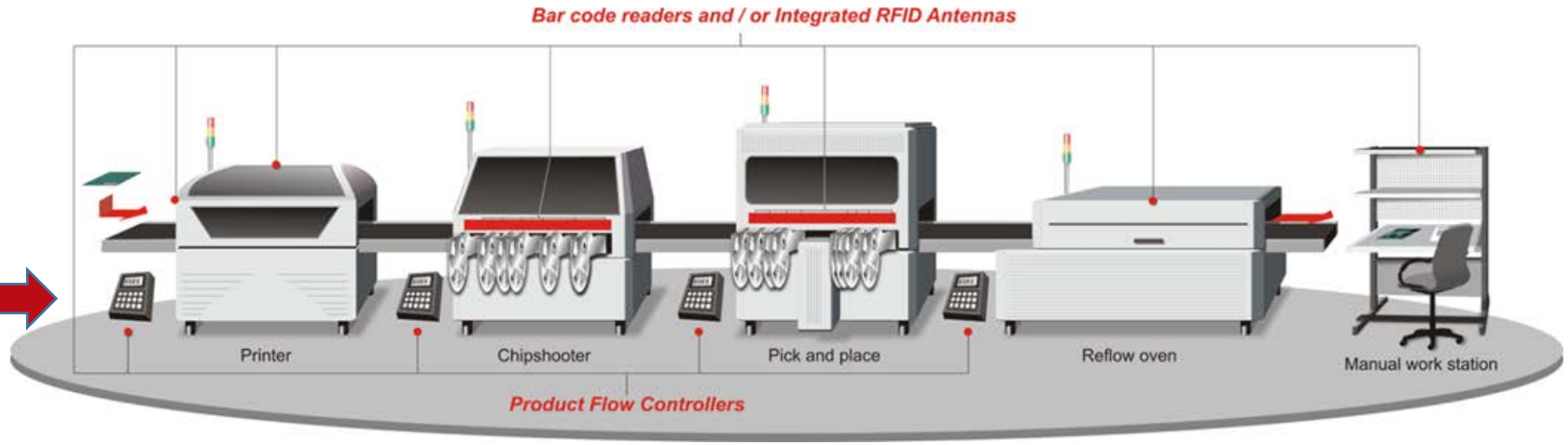
Manual Inspection

- Claim defects for each unit from a catalog of defect codes, and include details such as reference ID, image, comments, criteria, and source defect
- Copy defects between products for cases where multiple products contain the same defects
- Flag false claims from previous test / inspection steps
- Link to instructions for identifying specific defects



Product Flow Controller (PFC+)

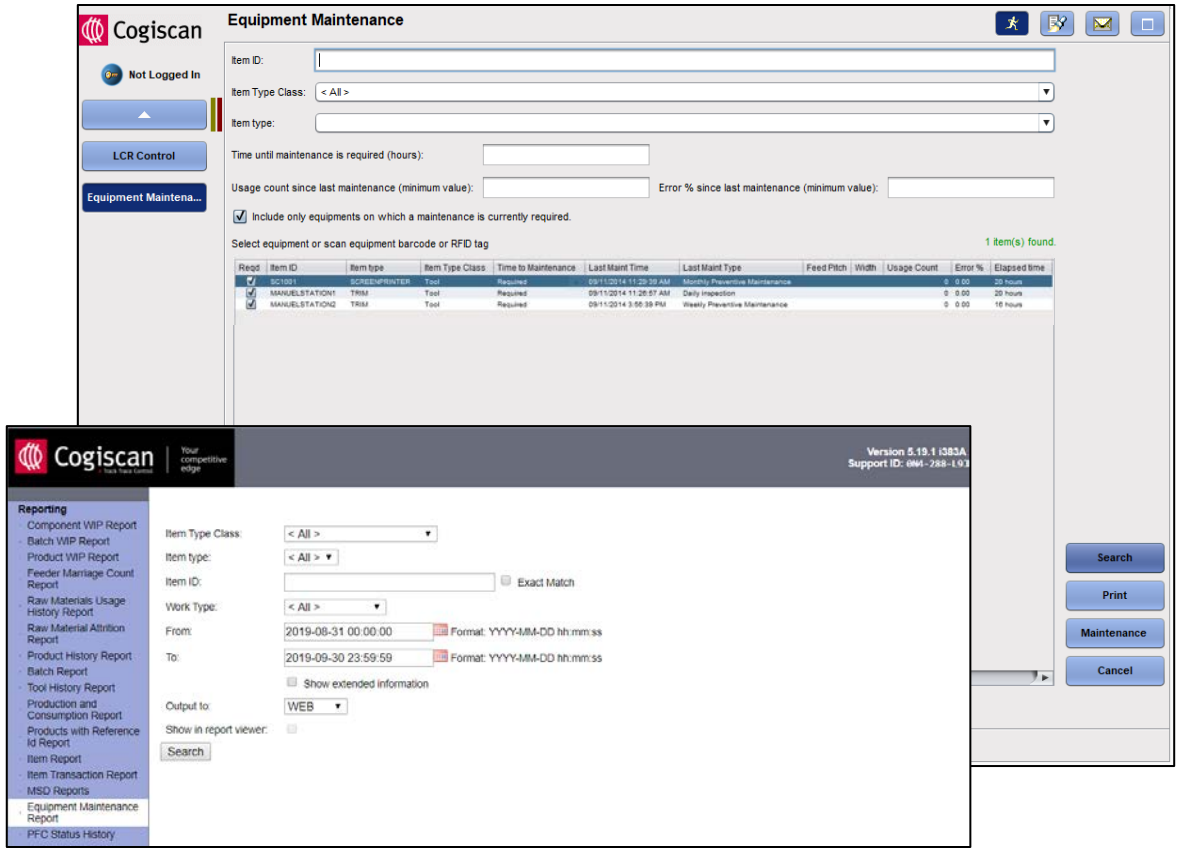
- Controls SMEMA to stop production (interlock) when there's a critical issue (e.g., invalid setup, route control error)
- Ensure 100% read rate of PCB bar codes
- Supports up to 2 Scanners per PFC to enable both top and bottom side scanning



Maintenance Control Module

Save money by preventing unforeseen machine downtime

- Effectively tracks and manages schedules for both preventative and corrective maintenance
- Allows users to set rules using:
  - Machine requirements
  - Operator input
  - Machine performance
    - Includes feeder pick counts and mispick ratio
- Warning alarms trigger maintenance
- Includes detailed maintenance history reporting



MEASURE.
REACT.
TAKE THE LEAD.

AES VIETNAM

Cogiscan
Track Trace Control

Factory Intelligence (FI)

You cannot improve what you do not measure!

Factory Intelligence is the perfect web-based tool to get a holistic view of the entire manufacturing operation.

Available in two versions:

1. **Real-Time:** live production monitoring
2. **Analytics:** historical reporting and analysis

FI: User Benefits

- **Increase productivity** through better management of specific machines, individual lines, and overall factory performance.
- **React faster** to the most immediate areas of concern and send the appropriate resources to solve problems quickly.
- **Enhance continuous improvement** efforts with improved visibility into actual factory performance.
- **Improve manufacturing efficiency** with better understanding of factory performance.
- **Lower production costs** by avoiding unnecessary downtime.

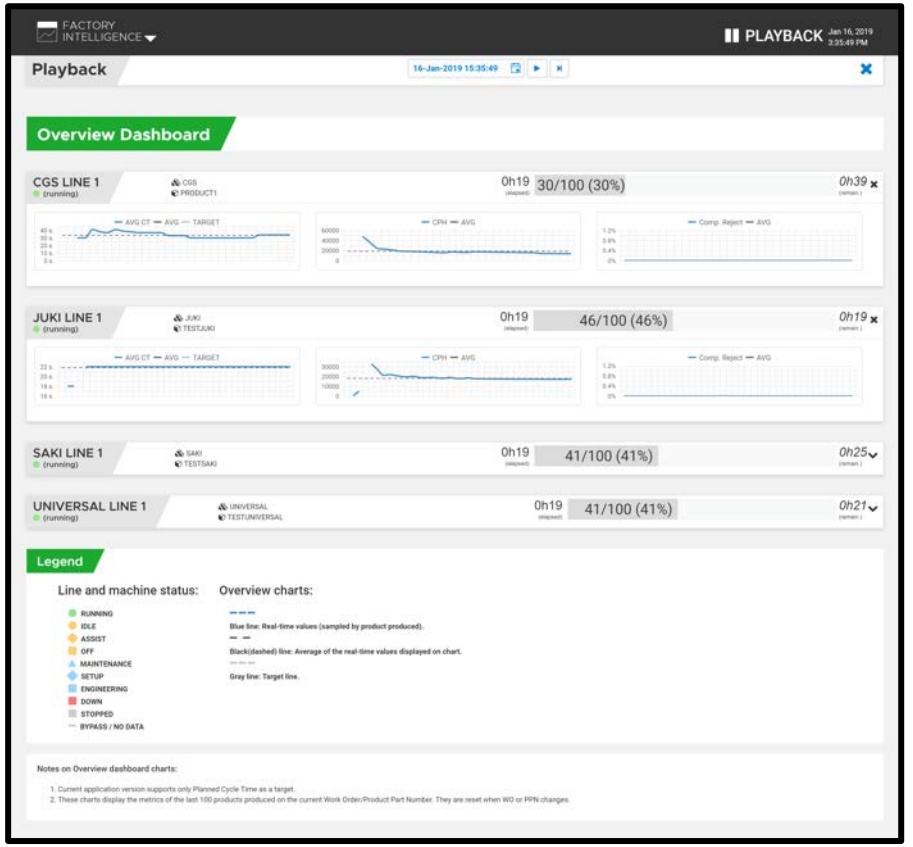
"Additionally, we have Cogiscan's Factory Intelligence tracking the performance of our 6 SMT Lines. Displayed on TV screens at the beginning of each line, Factory Intelligence offers a quick, visual illustration of critical key performance indicators to our production team."

Jason Sciberras, VP of Manufacturing Saline Lectronics

FI: Real-Time

Live snapshot of production performance

- **User Friendly:** Mobile-friendly web interface that allows for quick identification of any areas of concern
- **Comprehensive**: Clear display of objective Key Performance Indicators (KPIs) per machine and per line
- **Flexible:** Customizable metrics with drill-down views at various levels – from factory, to line, to machine
- **Adaptable:** Playback feature for users to review past production events
- **Configurable:** Collected data can be integrated into a third-party tool using a WebSocket connection or Restful API.



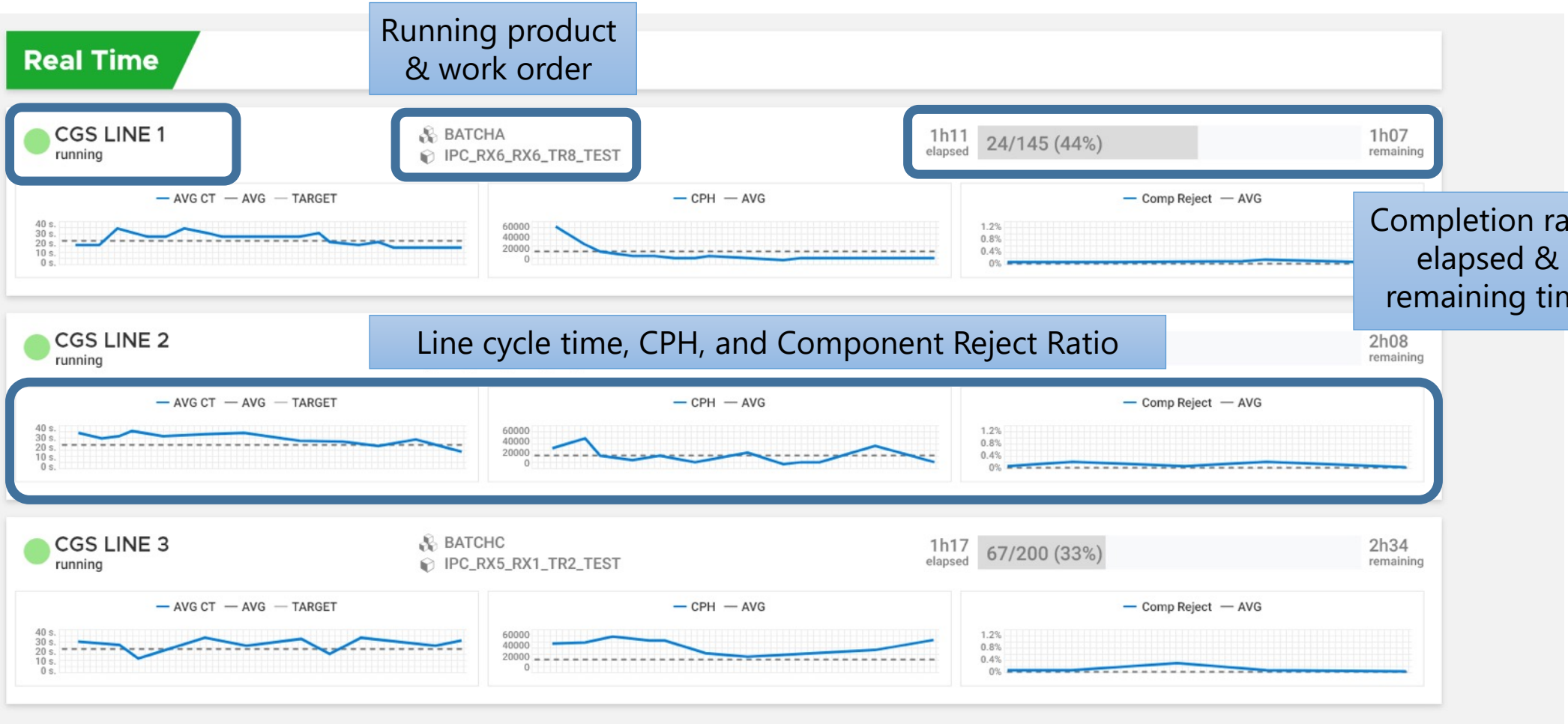
FI Real-Time: Factory Overview

Line Status

Running product & work order

Completion rate, elapsed & remaining time

Line cycle time, CPH, and Component Reject Ratio



FI Real-Time: Line Overview

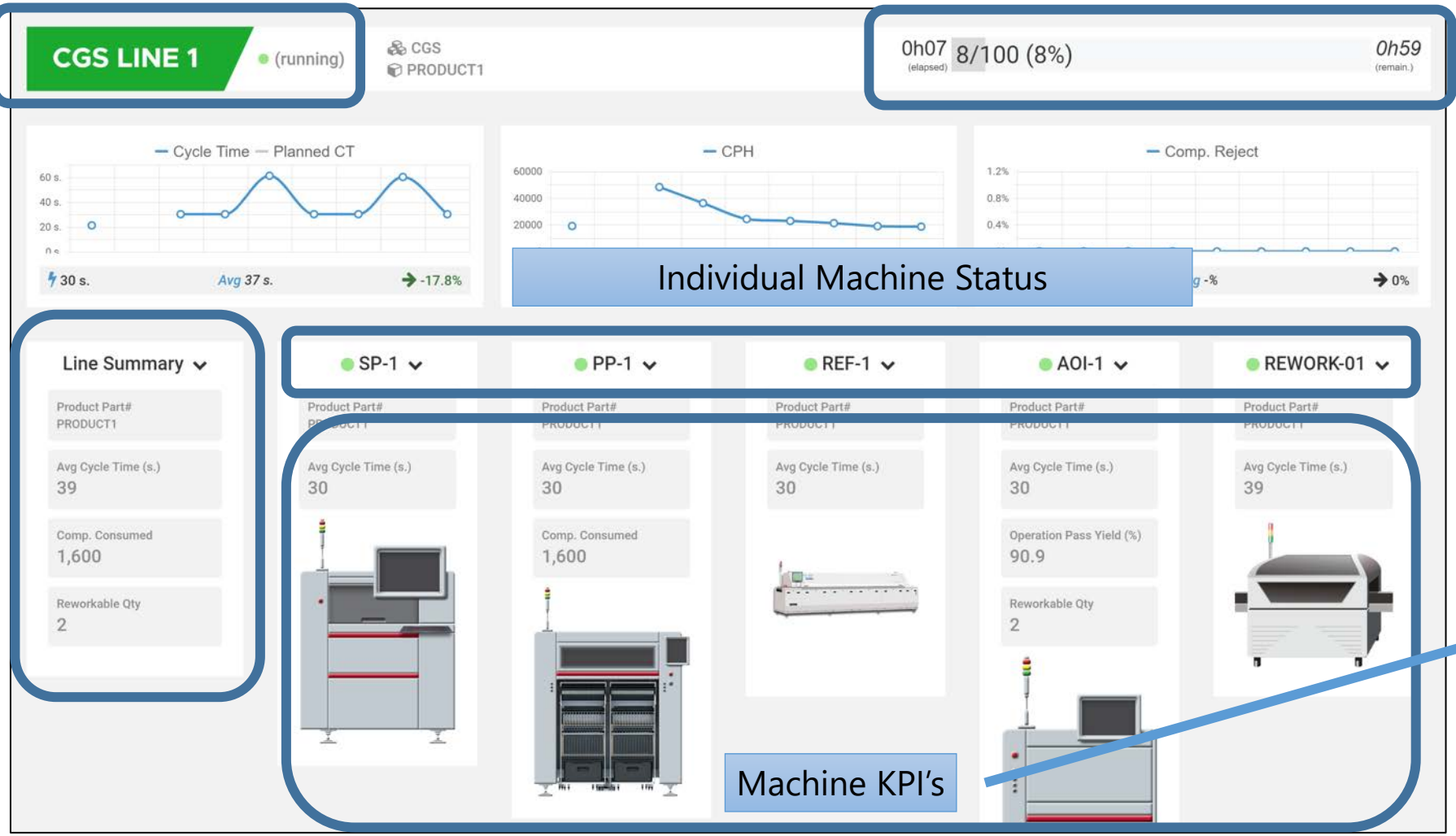
Line Status

Completion rate, elapsed time, & remaining time

Line KPI's

Individual Machine Status

Machine KPI's



Factory Intelligence: Analytics

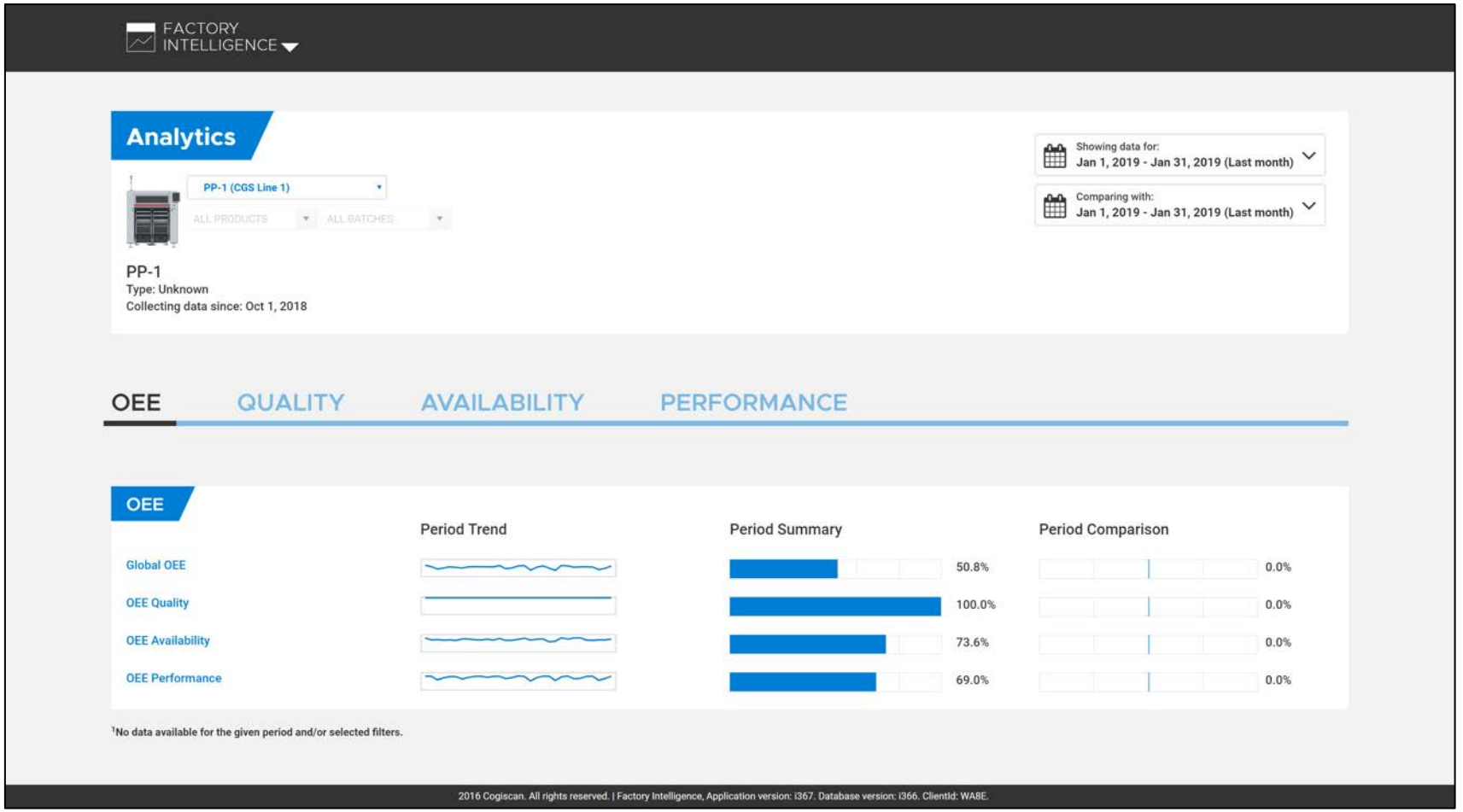
Displays analyzed metrics of machine utilization with customizable dashboards based on the Overall Equipment Effectiveness (OEE) method.

- **User Friendly:** Intuitive and mobile-friendly web interface that allows for quick assessment of quality, performance, and availability data per machine
- **Comprehensive:** 40+ predefined Key Performance Indicators (KPIs) to choose from
- **Flexible:** Interface to access data using external tools (Excel) to create customizable, offline reports
- **Open:** Quickly connect compatible machines with large interface library for most electronic assembly equipment types

FI Analytics: KPIs

Overall Equipment Effectiveness (OEE) method:

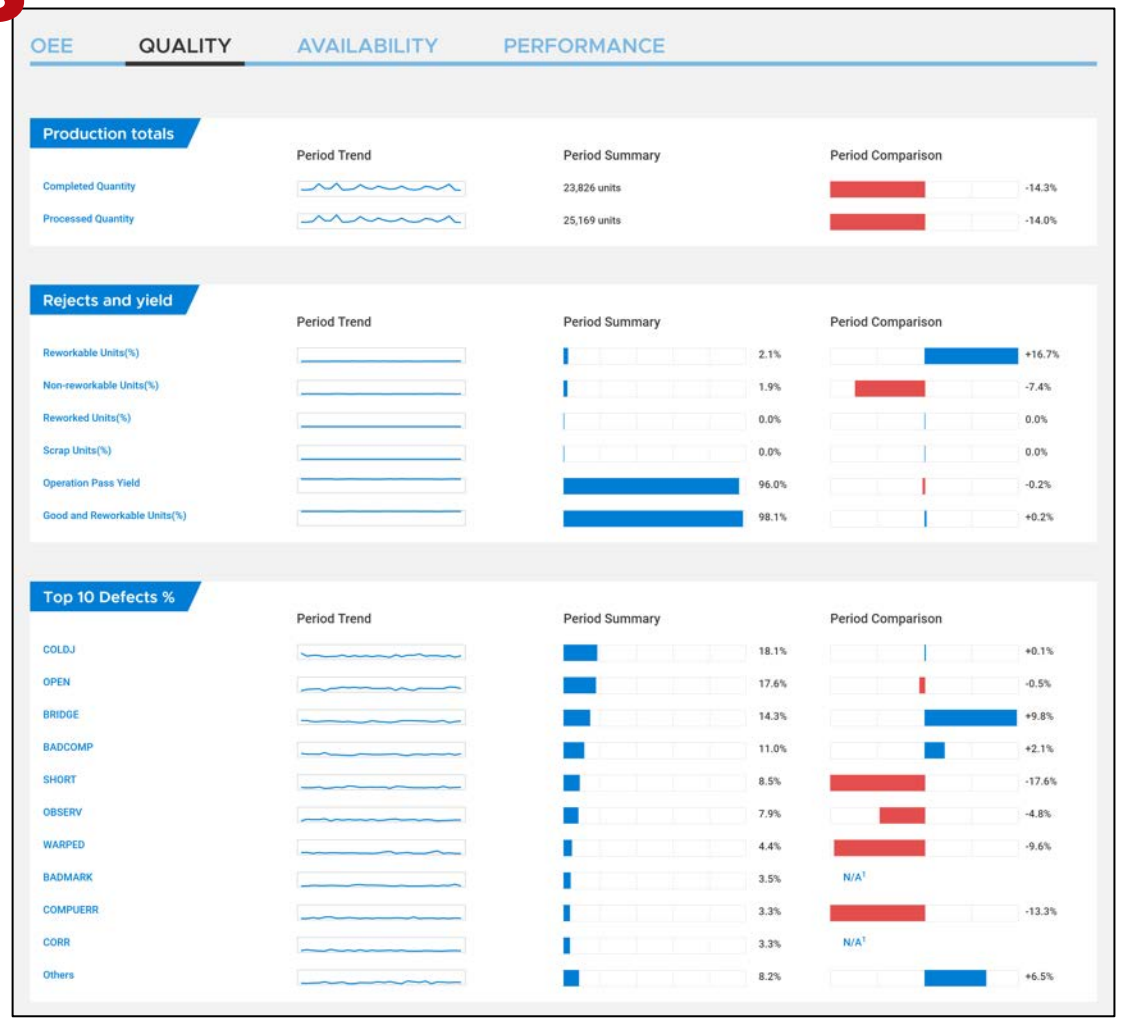
- Global OEE
- OEE Quality
- OEE Availability
- OEE Performance



FI Analytics: KPIs

OEE Quality

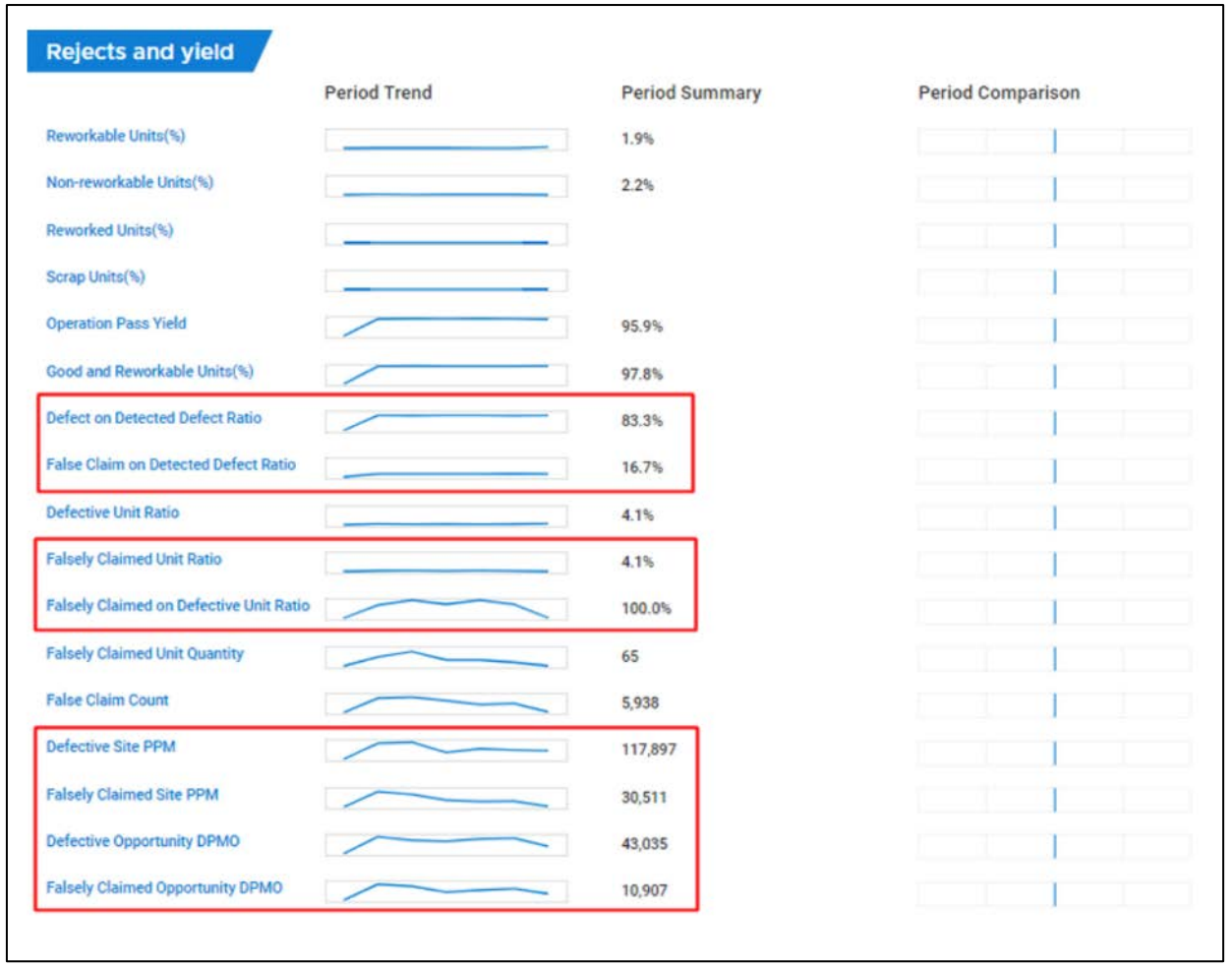
- Production Totals
  - Completed & Processed Quantities
- Rejects & Yield (%)
  - Reworkable & Non-Reworkable units
  - Reworked & Scrap Units
  - Operational Pass Yield
  - Good & Reworkable Units
- Top 10 Defects (%)
  - By defect type
  - Varies by machine type



FI Analytics: New KPIs

OEE Quality

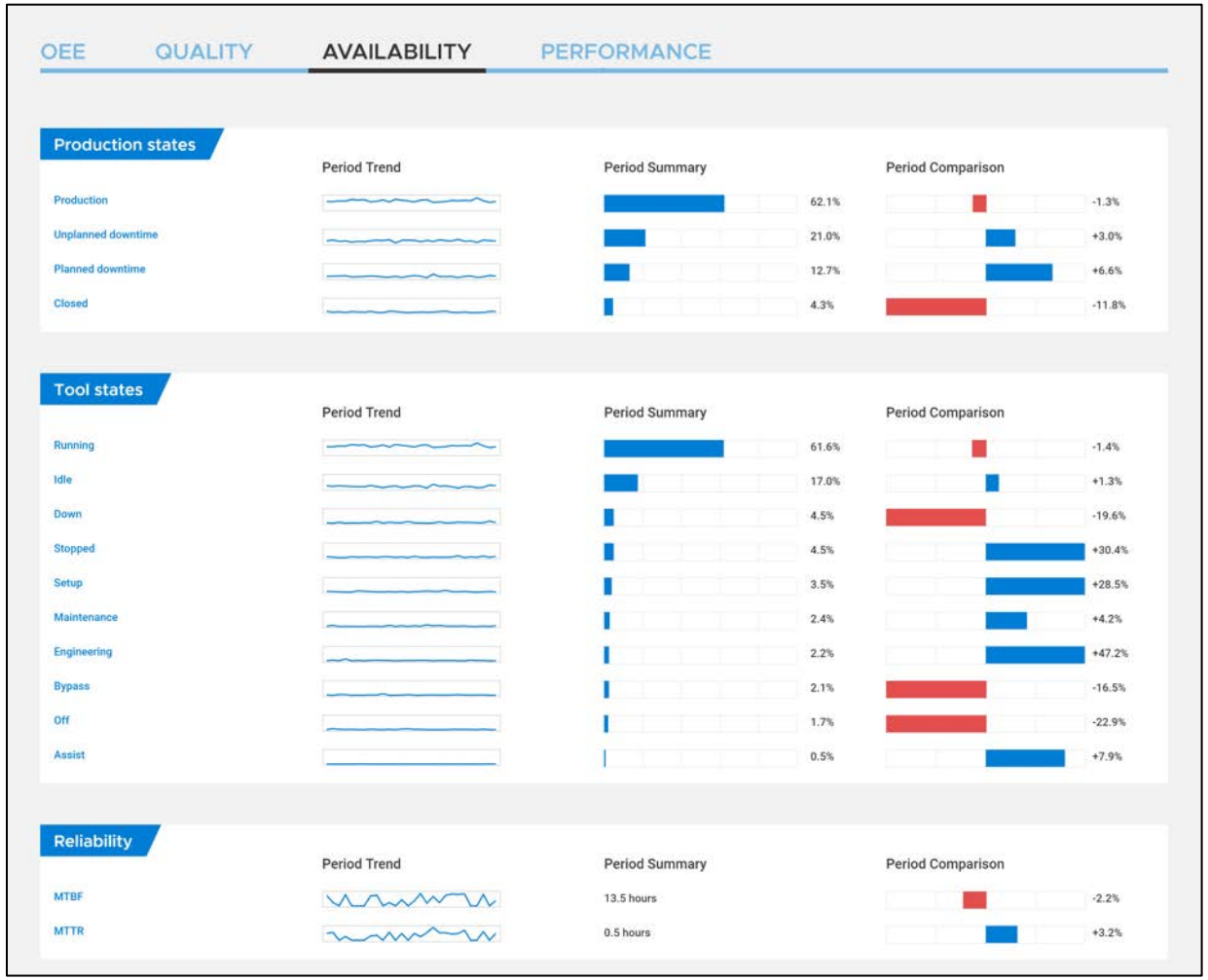
- New KPI's added September 2019 for Inspection Machines
- Rejects & Yield (%)
  - Defect on Detected Defect Ratio
  - False Claim on Detected Defect Ratio
  - Falsely Claimed Unit Ratio
  - Falsely Claimed on Defective Unit Ratio
  - Defective Site PPM
  - Falsely Claimed Site PPM
  - Defective Opportunity (DPMO)
  - Falsely Claimed Opportunity (DPMO)



FI Analytics: KPIs

OEE Availability

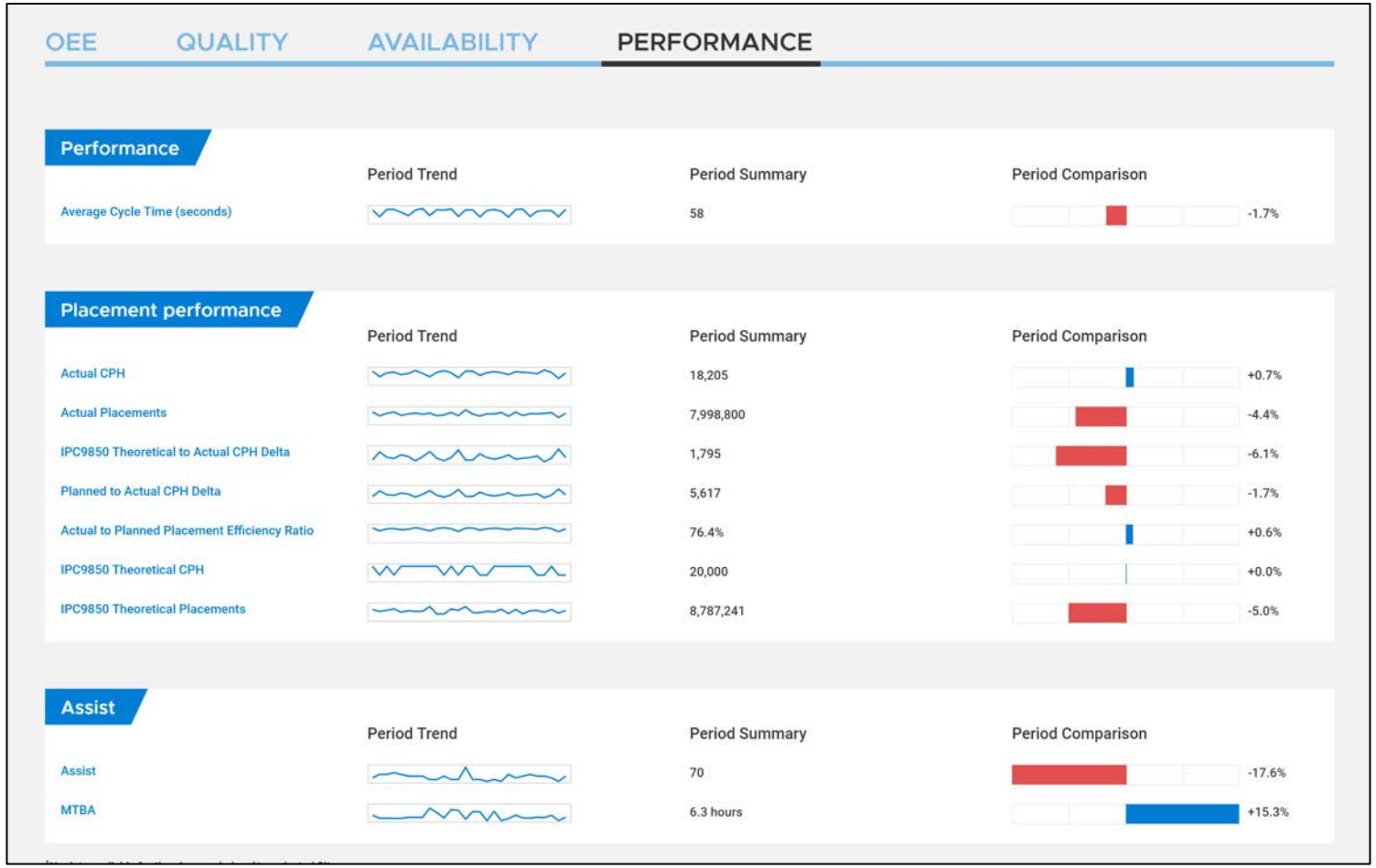
- Production States
  - Production
  - Unplanned & Planned Downtime
  - Closed
- Tool States
  - Running, Idle, Down, Stopped
  - Set-Up, Maintenance, Engineering
  - Bypass, Off, Assist
- Reliability
  - MTBF
  - MTTR



FI Analytics: KPIs

OEE Performance

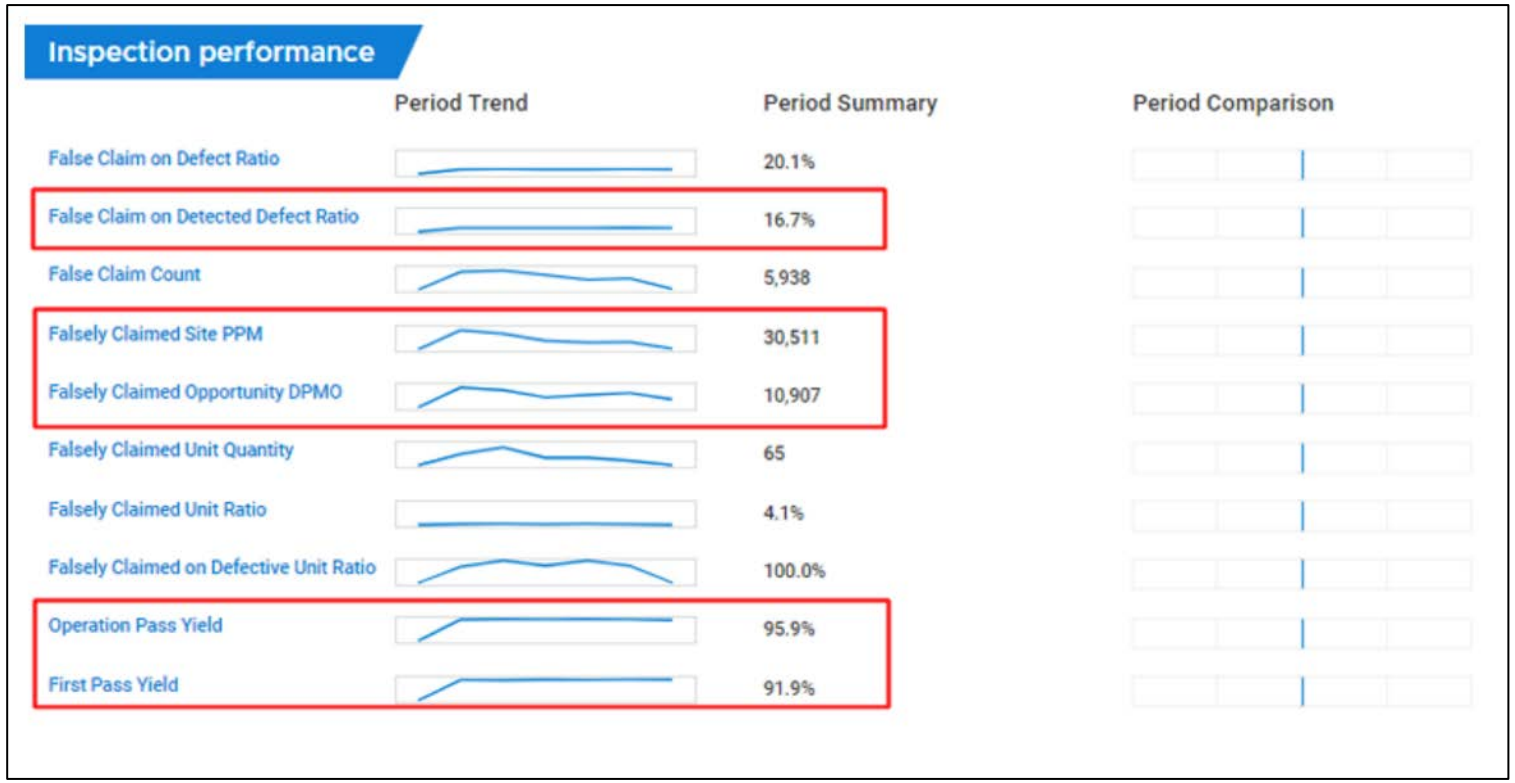
- Performance
  - Average Cycle Time (seconds)
- Placement performance
  - Actual CPH, Actual Placements
  - IPC9850 Theoretical to Actual CPH
  - Planned to Actual CPH
  - Actual to Planned Placement Ratio
  - IPC9850 Theoretical CPH & Theoretical Placements
- Assist
  - MTBA



FI Analytics: New KPIs

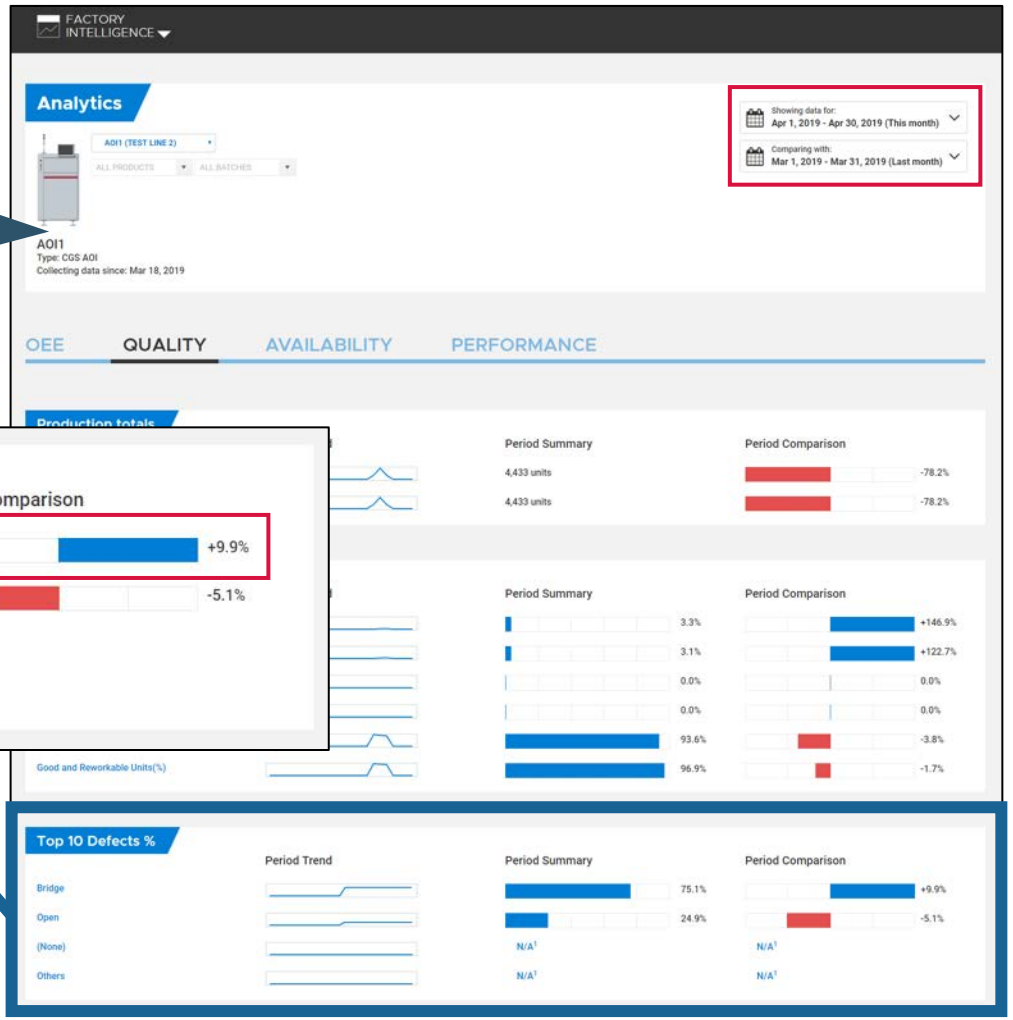
OEE Performance

- New KPI's added September 2019 for Inspection Machines
- Inspection Performance
  - False Claim on Detected Defect Ratio
  - Falsely Claimed Site PPM
  - Falsely Claimed DPMO
  - Operation Pass Yield
  - First Pass Yield



FI Analytics: In Action

Compare AOI Defects for a specific assembly from month to month.



Soldering Bridging Defect increased 9.9% from March to April for same assembly. ***What went wrong?***

Technician to investigate!
Was the solder paste changed?
Verify stencil condition?
Verify Machine alignment?

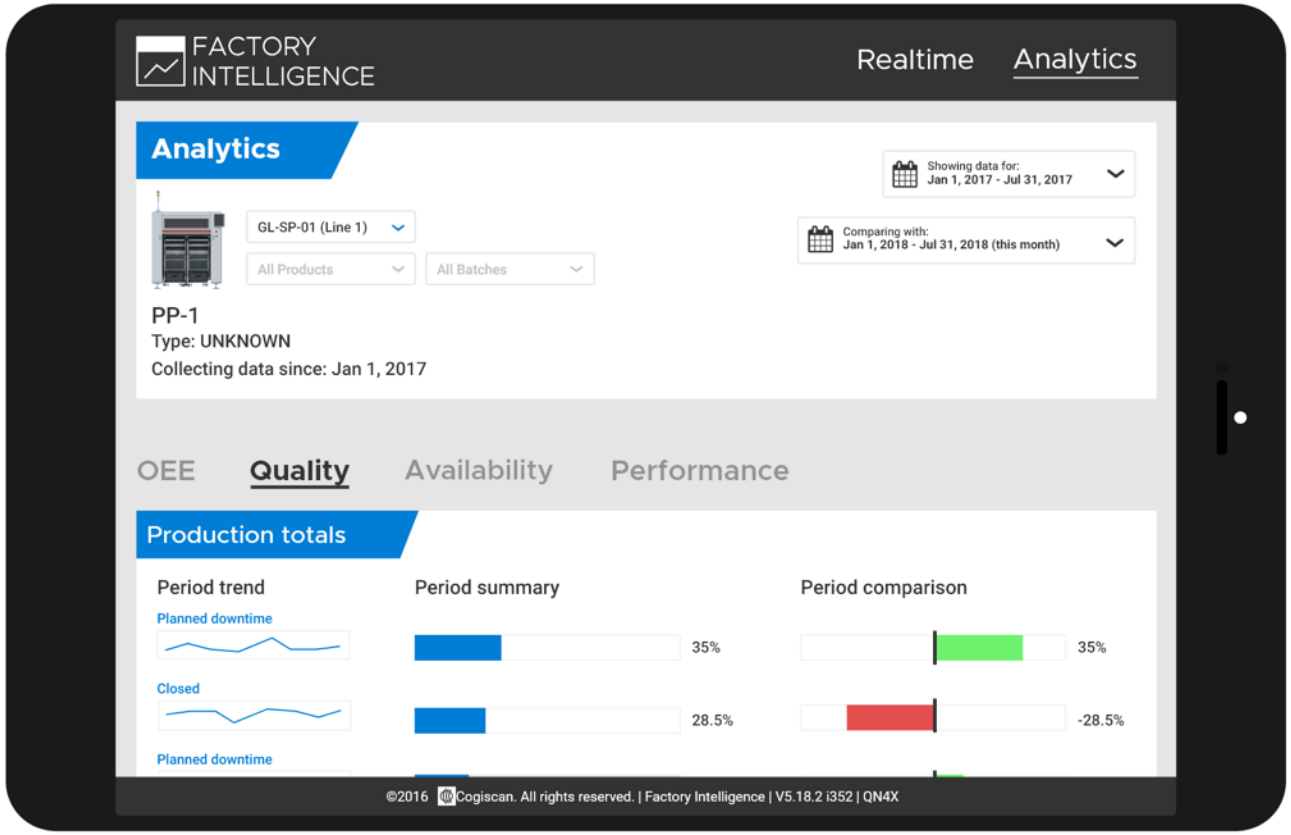
FI Analytics: Customized Reports

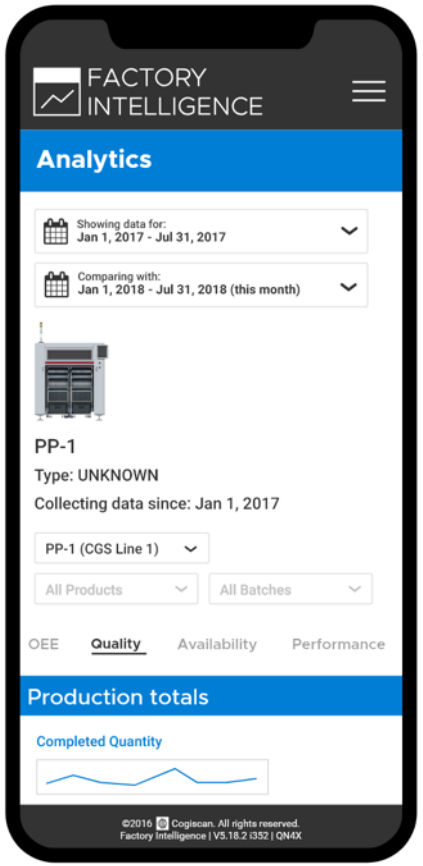
Take control – develop your own customized reports and dashboards!

- **Gain access to FI Analytics' underlying data sources using an OLAP Layer or RESTful API to…**
  - Build custom, live dashboards and reports using Microsoft Excel
  - Share data with a 3rd party Business Intelligence tool (e.g., Tableau)

Mobile-Friendly Display

Responsive display automatically adjusts to the proper screen size





Factory Intelligence: In Action

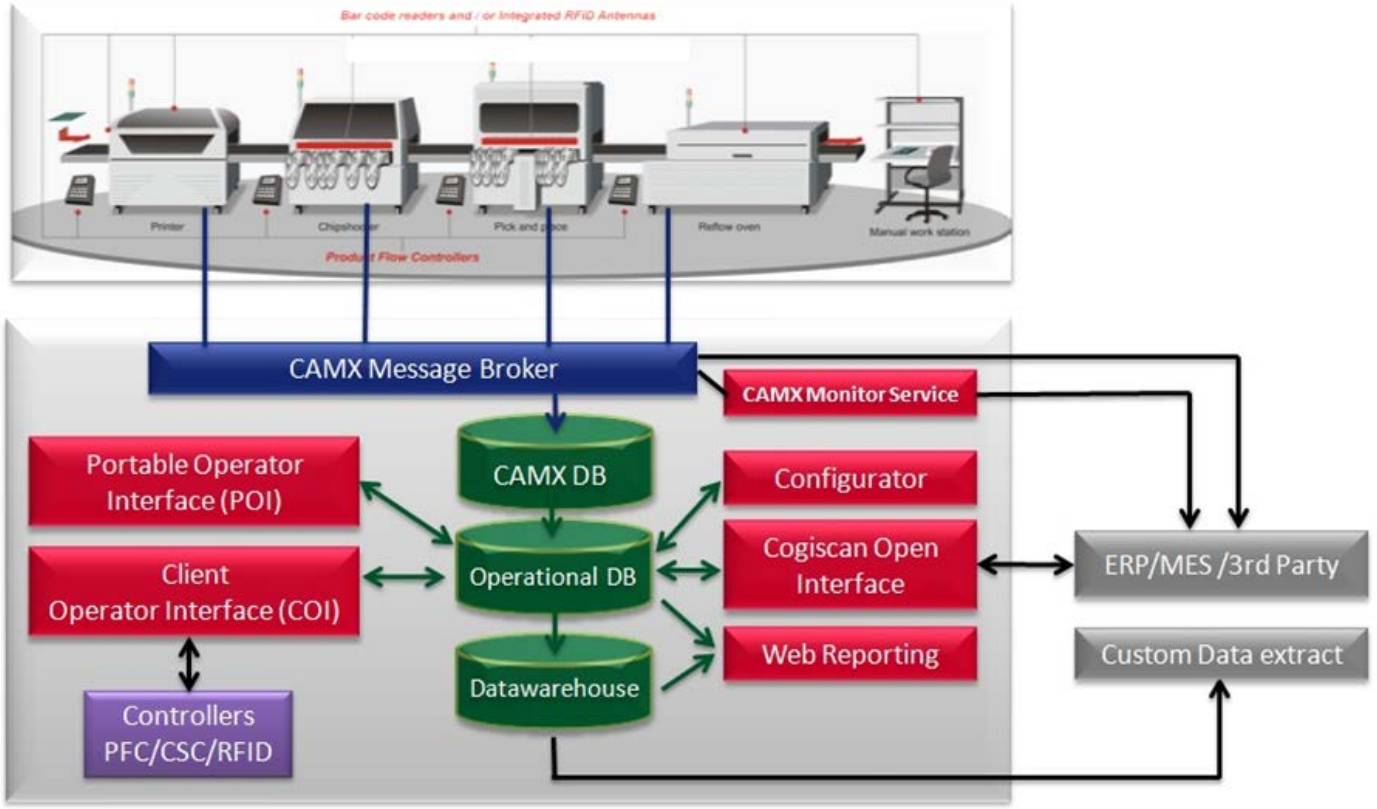
> "Factory Intelligence aligns with our Smart Factory goals… this software puts information in the right place at the perfect time. This faster flow of information is critical to our production planning."

Jason Sciberras,
VP of Manufacturing
Saline Lectronics

Enterprise Integration

Seamless integration with ERP, MES, in-house and 3rd-party SW systems

- Exchange order, product, material info with enterprise systems
- RPC web-service interface for synchronous communication with external systems
- Comprehensive Data Warehouse for custom reporting, data harvesting, or ETL to other database systems
- Specialized interfaces for commercial MES solutions (e.g., Dassault DELMIA Apriso, iTAC, iBASET Solumina)



New Product: TTC GO!

New Portable Operator Interface

- **A faster, more efficient, and error-proof application**
- Operators require simple and intuitive tools to run production!
- Completely redesigned application to take full advantage of Android 7+ supported mobile devices
  - **Recommend:** Honeywell CT60, Android 7.1.1; & Zebra TC 51, Android 7.0
- Cogiscan users can download & upgrade for **FREE**

*** with valid service contract**

TTC GO! Benefits

Modern, Intuitive & Simple

- **Simplify production tasks** with a modern and user-friendly handheld interface with intuitive navigation features
- **Leverage flexibility** by downloading the **free** app on any Android supported device
- **Upgrade outdated technology** that will no longer be supported by PDA vendors
- **Save hardware costs** by utilizing modern, reliable, and less expensive devices that can be easily upgraded

TTC GO! Supported Hardware

Honeywell (Android 7+)

- **CT 60**
- CT40
- EDA50
- EDA51
- EDA60K
- EDA70

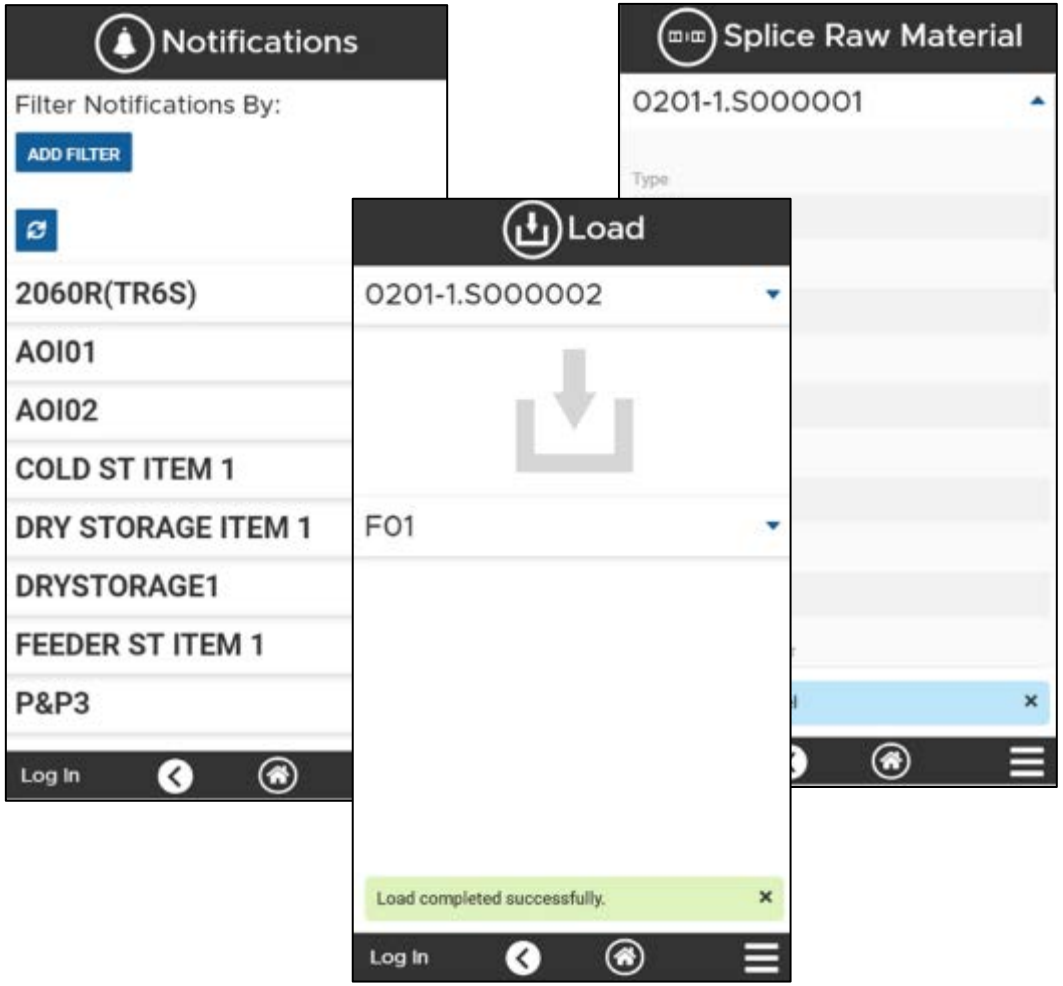
Zebra (Android 7+)

- **TC 51**
- MC33
- PC20
- TC20
- TC25
- TC52
- TC56
- TC57
- TC70x
- TC72
- TC75x
- TC77
- VC80x
- WT6000

TTC GO! Features

Intelligent and contextualized performance

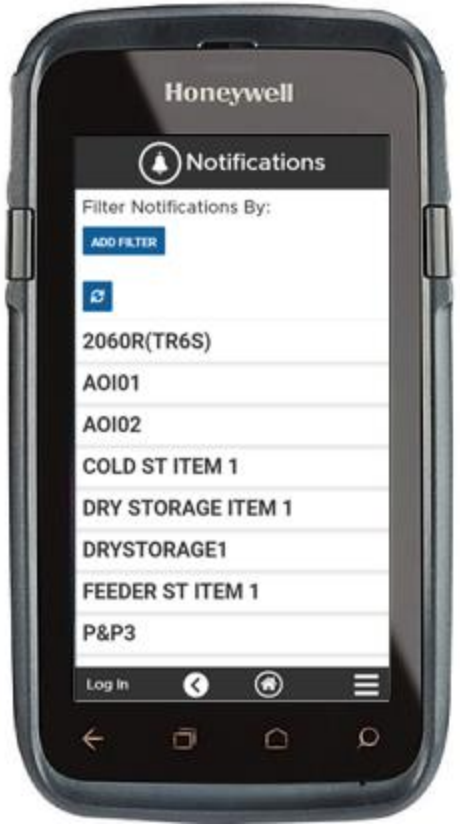
- **Context driven functionality**:
  - Intuitive guidance for Operators when they scan within the app they will be presented with contextually appropriate screens
  - **Saves Operators time!** No need to scroll through to find the required task button



TTC GO! Functionality

Critical production tasks performed intuitively, quickly & efficiently

- **Initial Release:**
  - PCB Scan
  - Material Initialization
  - Loading/Unloading
  - Reel Splicing
  - Factory Notifications



- **Phase II - Coming Soon:**
  - Low-level Warning
  - Quantity Editing
  - Raw Material Splitting
  - Line state
  - Kitting

Typical Sales Process

Phase	Description
General introduction of company and product	Identify specific interests and needs
Specific product presentations	Confirm specific interests and needs
Budgetary estimate	Confirm budget
Site visit with apps engineer	Detailed analysis of process and equipment
Statement of Work (SOW)	Define solution, pre-requisites, special requirements, implementation plan
Final quotation	Incl. sw licenses, hardware, services, support and special requirements
Purchase	Development of special requirements, implementation, training

Thank you!

For more information

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