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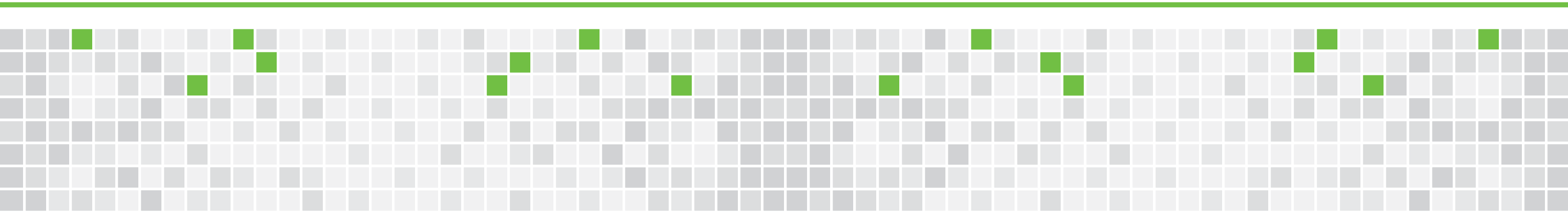
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MC-6099 6/13

FUZION™



Build better. Build more. Spend less.



Maximize Competitive Advantage

FUZION™

Build Better. Build More. Spend Less.

A contemporary model for profitability

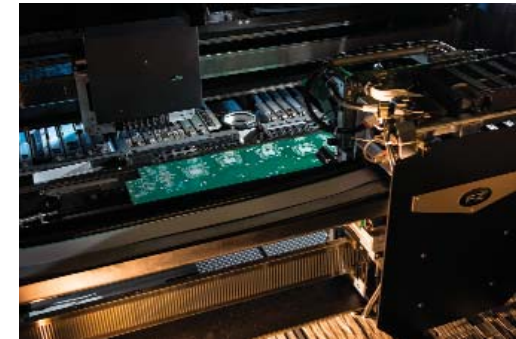
A Changing Market

The electronics landscape is continuously evolving to meet the demands of a dynamic market. Products that were once exclusive have undergone mass global adoption, driving extreme diversity and complexity, shortened product lifecycles, and the expectation for higher performance at the lowest cost.

New Expectations

Today's requirements present electronics manufacturers in all production environments with a significant challenge to reduce costs and time-to-market in a contracted market window – all while delivering the best in features, flexibility and performance in the products they build.

Whether prototyping or sustaining high-volume production, manufacturers must leverage efficient, adaptable, cost-effective solutions to meet these objectives and ensure profitability in a highly competitive market.



Fuzion™ enables manufacturers to accommodate the most diverse revenue stream and produce a full range of products in a lean environment – build any product at any time, accelerate new product introduction and ramp to volume, maximize utilization, quality, and yield. Fuzion enables operational excellence to deliver considerable cost savings, increased productivity and ultimate profitability.

Maximize utilization and Overall Equipment

Effectiveness (OEE)

- High-mix agility
- Sustained high-volume productivity

Optimize performance for any product mix

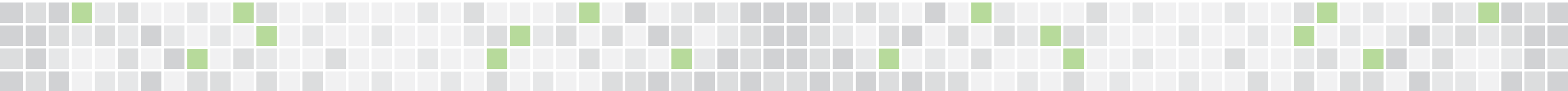
- Build any product at any time
- Solutions for any environment

Accelerate NPI and achieve 100% first-pass yield

- Comprehensive prototyping solutions
- Seamless transition to volume

Enjoy lowest cost of operation and ownership

- Lower CapEx investment
- Reduced operating costs



Peak Efficiency

Increase utilization by up to 50% and maximize OEE

High-mix agility

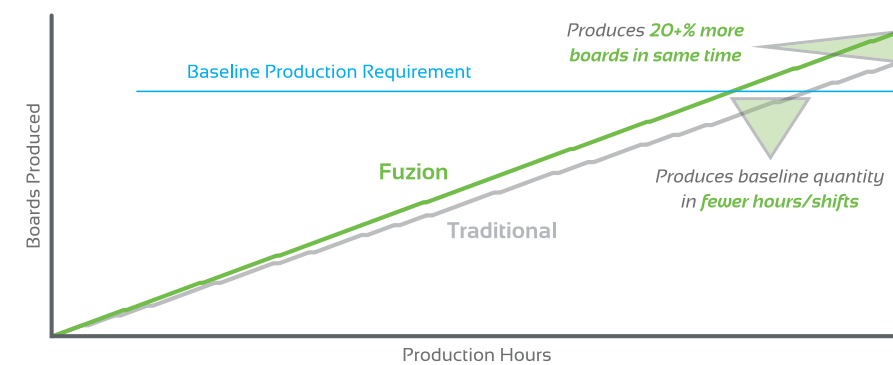
- Reduce or eliminate setups with multiple, fixed family or flexible schemes, thereby increasing output or eliminating production shifts
- Streamline changeover with off-line/auto-online setup validation and rapid bank change
- Promote a lean environment with smaller lot sizes, reduced WIP and increased turns

Sustained high-volume productivity

- Continuous production flow enabled by splicing, duplicate/alternate feeder replenishment, feeder-low warnings, and feeder hot swap
- Minimize replenishment times with easy-loading ion™ feeders
- PCB staging and component pre-pick for < 30 second pulse rates



Fuzion efficiency = greater output



- Eliminate setups and reduce setup time for up to 50% utilization improvement
- Eliminate head changes and machine reconfigurations for new products
- 20+% more boards in same time frame or eliminate production shifts and achieve the same output



Ultimate Flexibility

Optimize performance for any product mix

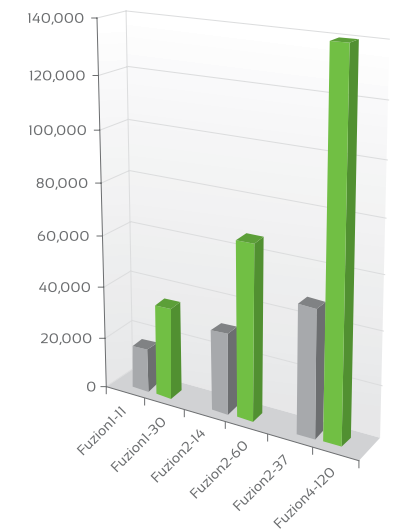
Build any product at any time with unmatched flexibility

- Handle the broadest range of components, package types, board sizes
- Address odd-form requirements with 5kg placement force, automated gripper nozzle change, and advanced feature recognition
- Support advanced process requirements with high-end accuracy and technologies

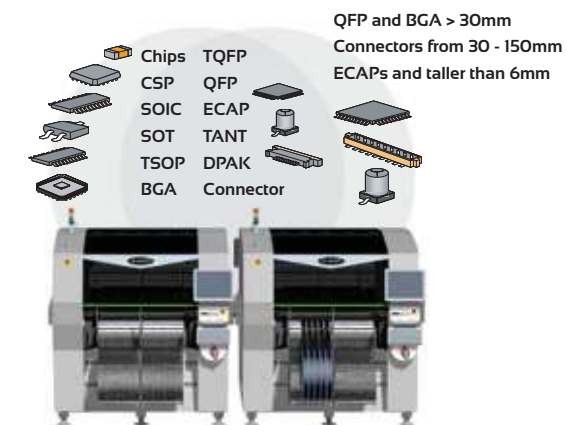
Solutions for any environment

- Comprehensive portfolio and scalable configurations (from LVHM to high-volume)
- Complete assembly line solutions from high-speed chip to extreme odd-form due to the widest overlapping component range between placement heads
- Flexibility to meet new market challenges throughout the product lifecycle

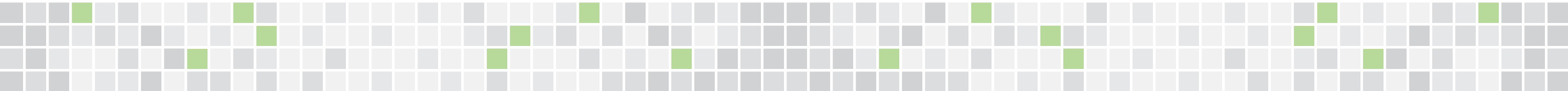
Scalable Throughput



Change the program, not the line



Fuzion Line Output Across Random Product Mix



Streamlined Introduction

Value Designed In

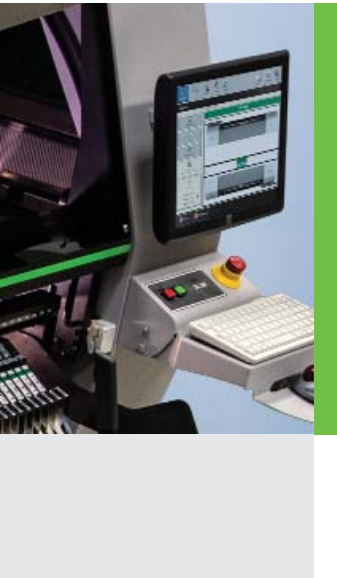
Accelerate NPI and achieve 100% first-pass yield

Comprehensive prototyping solutions

- Prototype on a single platform
- Eliminate production validation time using off-line board and component teach and verification
- Ensure fast and precise NPI with direct data import, on-the-fly production editing, auto board/feeder/component teach, and post-placement inspection
- Support NPI with tape, tube, strip, or tray feeding capability and a large on-line nozzle inventory

Seamlessly transfer from NPI to production volume

- Common platform supports common program, feeders
- No secondary process validation required



Seamlessly transfer from NPI to volume production

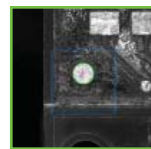


Fastest time to market, highest yields

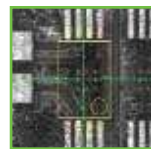
- Sequential process for complete board build
- Quickly generate and optimize fiducial, feeder, placement, and component information
- Full editing capability for all aspects of programming in pre-production NPI mode, and dynamic on-the-fly editing in full production mode eliminate need for machine stoppages and reduce scrap and repair costs
- Semi-automated solder paste and post-placement inspection



Feeder Inspection



Fiducial Inspection



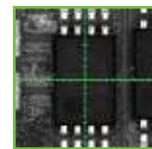
Pre-Placement Inspection



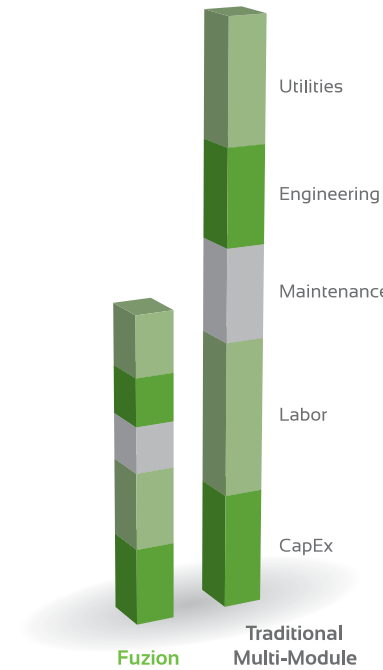
Component Teach



Component Inspection



Post-Placement Inspection



Enjoy lowest cost of operation and ownership

Lower CapEx investment

- Purchase fewer modules versus alternative solutions
- Leverage existing installed base of feeders, nozzles, spares, training, etc.
- Utilize more feeders at the lowest capital cost per input
- Benefit from investment protection with future-proof technologies and the highest residual value

Reduced operating costs

- Decrease production costs with fewer operators, less maintenance/consumables, power/air consumption, programming and labor/repair costs
- Consume less shop floor space with fewer modules and tighter line spacing
- Minimize scrap, waste and rework through closed-loop yield features
- Lowest cost per placement and superior yields for high-volume applications

Lowest cost per input. Most inputs per floor space.

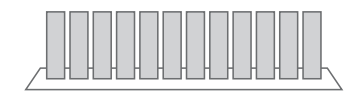
2x FuzionXC Platform line

536 feeder inputs
lowest CapEx



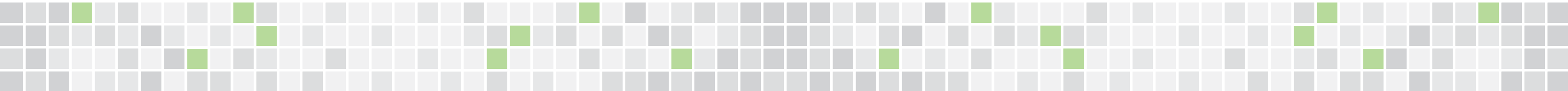
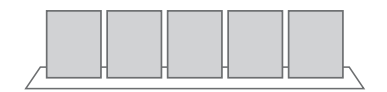
12x mini module line

500 feeder inputs
2.1x CapEx



5x traditional platform line

500 feeder inputs
1.6x CapEx



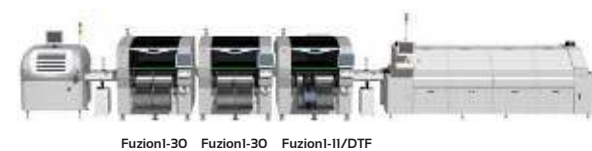
Solutions for any Market

NPI / All-in-One

Single-machine solution from
prototyping to LVHM



Scalable NPI – volume, smaller/low-volume OEM/EMS, higher-complexity markets
20-25k line cph real throughput
Advanced NPI software, Auto component teach and edit on-the-fly for immediate first article
270+ 8mm inputs, 58 random access tray inputs, strip tape and track feeder support
Large PCB size range: up to 610 x 1300mm (24" x 51")
Large component range: 01005 - 150mm, micro BGA, + PoP, odd-form
Off-line component teach and program validation
Direct CAD/Gerber import with BOM merge
Leverage component range and single-machine process capabilities



Medium-Volume OEM, White Goods, Military, Medical
30k - 45k line cph real throughput
Rapid changeover with full feeder bank exchange, family setups
User-friendly offline setup and validation with self-ID feeders
390+ 8mm inputs, 40 random access tray inputs, track feeder support
Large PCB size range: up to 508 x 635mm (20" x 25")
Large component range: 01005 - 150mm
Extensive component range overlap across all modules for easy balancing
Leverage zero setup time with front/back changeover schemes



Complex assemblies, EMS/ODM manufacturers, Server/Data Storage, Internet Infrastructure, LED Signage and Displays
40-50k line cph real throughput
Advanced NPI software, edit on-the-fly for immediate first article
540+ 8mm inputs, 58 random access tray inputs, strip tape and track feeder support
Largest PCB size range: up to 610 x 1300mm (24" x 51")
Large component range: 01005 - 150mm connectors, micro BGA
PoP, odd-form capable
Leverage feeder capacity and flexible (Feeder Anywhere) setup capabilities

Higher-Volume, Medium-Mix

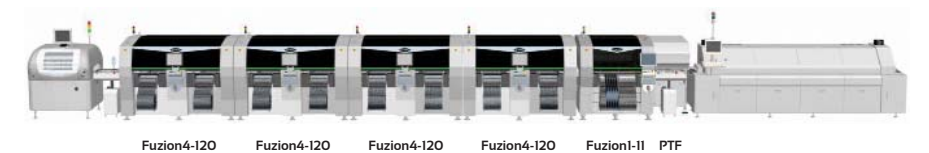
Efficiency and no compromises for
constantly changing environments



Industrial, Telecom, Computer, TV, SetTop Box, Gaming, Tablet
60k - 80k line cph real throughput
Rapid changeover with full feeder bank exchange, family setups
User-friendly offline setup and validation with self-ID feeders
480+ 8mm inputs, 40 random access tray inputs, track feeder support
Large PCB size range: up to 508 x 635mm (20" x 25")
Increased multifunction and odd-form capacity (25mm tall, 5kg force capable)
Extensive component range overlap across all modules for easy balancing
Leverage zero setup time with front/back or left/right changeover schemes



Consumer, Automotive, Hard Drive, LED Lighting
100k - 150k line cph real throughput
Fully spliceable, hot swap, alternate, or duplicate feeder replenishment
Throughputs not reliant on gang-picking/duplication of feeders
Auto tray replenishment
400+ 8mm inputs (large reel capable), 58 random access tray inputs
01005 - 150mm, micro BGA, package-on-package (PoP), odd form shields, connectors
<25dpmo (real) enabled by FZ30 head technologies, ion feeders, closed-loop monitoring
Line Manager utilization tools for sustained output, LineChart to monitor factory performance



Mobile Phone
280k - 320k line cph real throughput
Fully spliceable, hot swap, alternate, or duplicate feeder replenishment
Throughputs not reliant on gang-picking/duplication of feeders
PCB staging and component pre-pick for < 30 second pulse rates
-700 8mm inputs (large reel capable), 58 random access tray inputs, auto tray replenishment
Industry standard for 01005 – package-on-package (PoP), odd form shields, connectors
<25dpmo (real) enabled by FZ30 head technologies, ion feeders, closed-loop monitoring
Fastest placement head in the industry provides high throughput and low cost per placement
Line Manager utilization tools for sustained output, LineChart to monitor factory performance

High-Volume, Lower-Mix

Little derate and the highest utilization
for competitive cost advantages

Ultra High-Volume

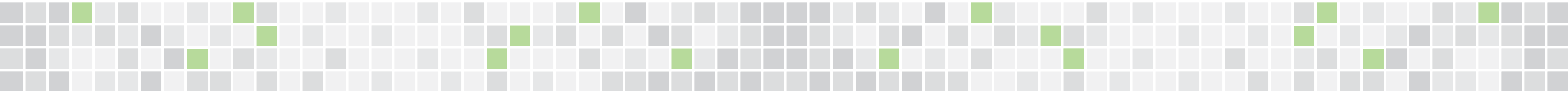
Complete solution for high-volume
mobile phone production

Medium-Volume, Medium-Mix

Highest flexibility (front/back setups)

Medium-Volume, High-Mix

Quote any job and turn it quickly



Technologies for Performance, Flexibility & Yield

FZ Placement Heads



Base Frame

- Robust and stable foundation for accurate and repeatable performance
- Precision machined to within 1µm from corner to corner for extreme accuracy



VRM Linear Motor Positioning System

- High-accuracy (1µm resolution), closed-loop positioning control supports current, converging and emerging technologies
- High acceleration – up to 2.5G
- Dual-drive control is self correcting and reduces settle times
- Thermally stable, non-magnetic
- Fewer moving parts for minimal maintenance and no adjustments
- 20-year lineage – thousands of proven VRM platforms in the field today
- Direct drive technology stands the test of time to maintain its accuracy indefinitely



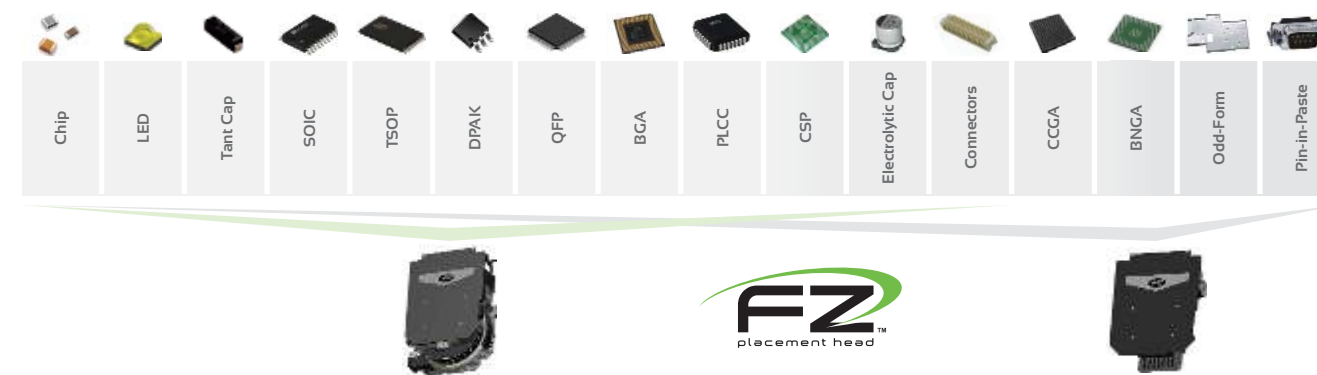
Magellan Digital Upward-Looking Camera

- Exceptional flexibility for NPI through high-volume, high-throughput applications
- High resolution of 1024 x 1024 to facilitate small part feature recognition
- Large 55mm field-of-view improves throughput for applications that typically require multiple FOVs
- Complete feature-based recognition: full-lead/all-bump, missing-ball, orientation check, odd-form features
- Provides substantial throughput improvements for applications that require multiple scans
- Front, side, and on-axis lighting that can be used individually or in combination
- Lighting intensity is consistent across viewable area for faster, more accurate alignment and inspection



FZ™ Placement Heads

- Extensive component ranges that significantly overlap between heads, delivering superior line balancing and the ability to simply change the program, and not the line or heads, when changing products
- Robust design, low maintenance, industry-leading accuracy and performance



FZ30™ Placement Head

The FZ30 is the industry's fastest, most accurate and most flexible high-speed placement head.

Maximized Performance

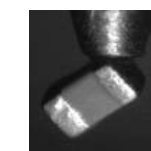
- Industry's fastest tact time (55ms), 35,000 cph per head
- Industry's most accurate high-speed placement head (34µm)
- Little derate, not reliant on gang picking, predictable throughputs on any mix

Uncompromising Flexibility

- Largest component range for a high-speed head (01005–30mm square): lead-less, leaded, bumped, odd-form with little need to skip spindles
- Full-lead/all-bump inspection, missing-ball inspection/orientation check

Highest Quality and Yields

- Vertical Part Sensor (VPS) validates part presence, orientation, and thickness; inspects nozzles and enables on-the-fly exchange of suspect nozzles
- Auto Pocket Teach and touchdown sense at both pick and place improves pick ppm, guarantees ideal placement force, and reduces nozzle wear
- Single pick point eliminates gang picking (multiple pick point) concerns
- Auto nozzle centering/contamination check/bypass assure sustained yields

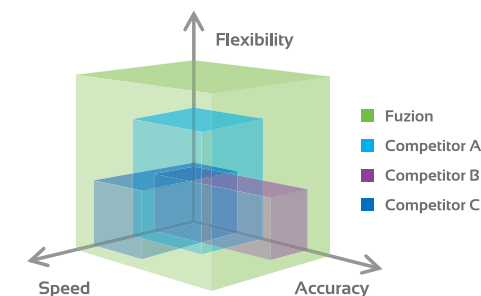


FZ7™ Placement Head

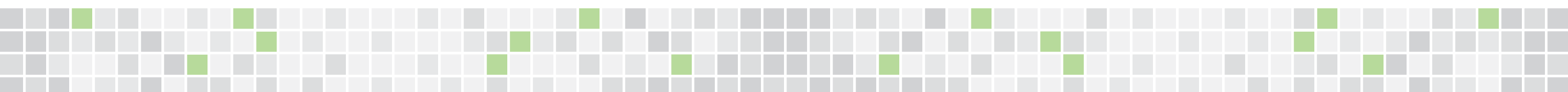
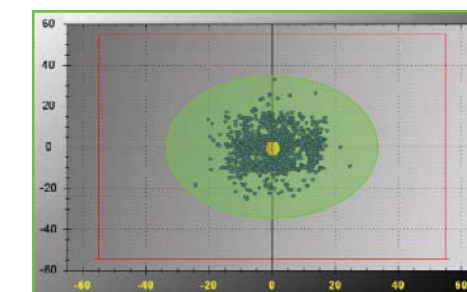
The FZ7 head quickly and accurately places components as small as 0201 up to 55mm square with single field-of-view inspection and up to 25mm tall.

- Precision accuracy (27µm @ Cpk>1)
- Advanced odd-form capability and insertion forces up to 5kg
- Components up to 150mm with multiple fields of view
- Standard Package-on-Package functionality

FZ30 - Unmatched flexibility and performance



FZ30 - Best-in-class accuracy of 34µm



Fuzion Portfolio

Single-Beam Models

Fuzion1-11



Versatile IC placement platform perfect for special processes such as Pin-in-Paste, Flip Chip and OFA

Single-beam, dual-drive overhead gantry system

One 7-spindle FZ7 and one 4-spindle FZ4 placement head

Upward-looking vision system

Fuzion1-30



Superb for high-mix NPI environments and large board applications. Also a high-volume line booster.

Single-beam, dual-drive overhead gantry system

One 30-spindle rotary FZ30 placement head

Dual on-the-head optics

Dual-Beam Models

Fuzion2-14



Best-in-class multi-function machine with fast placement of a wide component range for applications where flexibility and performance per line length are important

Dual-beam, dual-drive overhead gantry system

Two 7-spindle FZ7 placement heads

Upward-looking vision system

Fuzion2-37



A true multi-purpose platform. A versatile stand-alone prototyping solution, a flexible line balancer, or a high-performance multi-function solution.

Dual-beam, dual-drive overhead gantry system

One 30-spindle rotary FZ30 and one 7-spindle FZ7 placement head

Dual on-the-head optics and upward-looking vision system

Fuzion2-60



Flexible, high-speed productivity for medium-volume environments. A powerful line booster solution or high-performance small part placer.

Dual-beam, dual-drive overhead gantry system

Two 30-spindle rotary FZ30 placement heads

Dual on-the-head optics

Dual-Beam High-Capacity Models

FuzionXC2-37



High-capacity NPI, all-in-one, line balancer, or multifunction solution with a full component range

Dual-beam, dual-drive overhead gantry system

One 30-spindle rotary FZ30 and one 7-spindle FZ7 placement head

Dual on-the-head optics and upward-looking vision system

FuzionXC2-60



Cost-efficient, high-performance turret replacement or high-input chip placer

Dual-beam, dual-drive overhead gantry system

Two 30-spindle rotary FZ30 placement heads

Dual on-the-head optics

Quad-Beam Models

Fuzion4-120



Powerful performance for high-volume production environments: Consumer, Mobile, Notebook, Auto

Quad-beam, dual-drive overhead gantry system

Four 30-spindle rotary FZ30 placement heads

Dual on-the-head optics

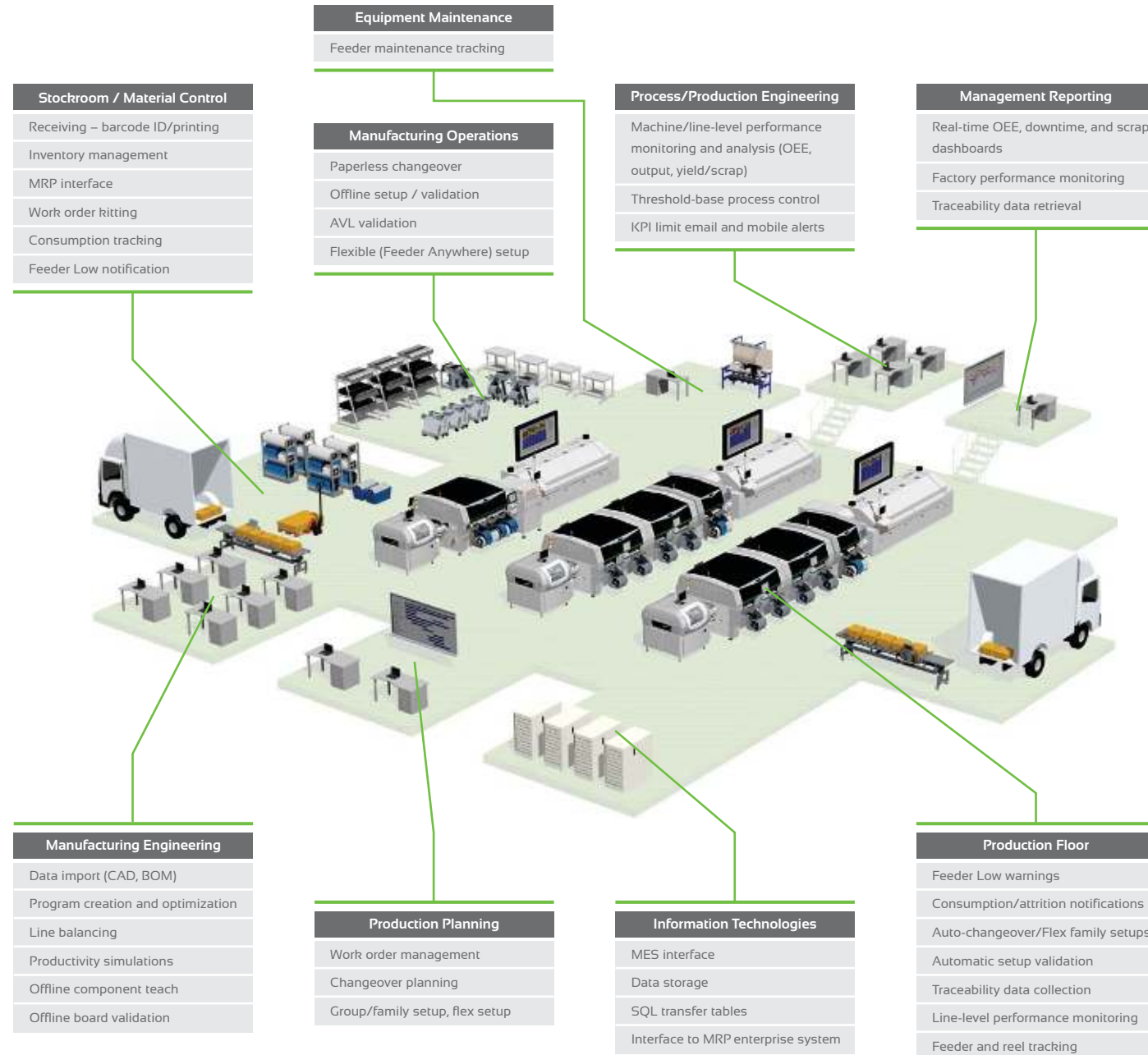
Model	Throughput (cph)	Accuracy ($\mu\text{m}@ \geq 1.00 \text{ Cph}$)	Max Board Size	Max Feeder Inputs (8mm)	Component Range (mm)
Fuzion1-11	16,500 (Max) 11,400 (I-Bd IPC Chips)	± 38 (Chips) ± 27 (ICs)	508 x 813mm 20 x 32"	120 (2 ULC)	(0201) .25 x .5 x .15 (Min) 150 square and up to 25 tall
Fuzion1-30	35,000 (Max) 22,600 (I-Bd IPC Chips)	± 34 (Chips) ± 34 (ICs)	508 x 1016mm 20 x 40"	136	(01005) .18 x .38 x .10 (Min) 30 x 30 x 6 (Max)
Fuzion2-14	30,750 (Max) 21,750 (I-Bd IPC Chips)	± 38 (Chips) ± 27 (ICs)	508 x 813mm 20 x 32"	120 (2 ULC)	(0201) .25 x .5 x .15 (Min) 150 square and up to 25 tall
Fuzion2-37	48,000 (Max) 27,500 (I-Bd IPC Chips)	± 34 (Chips) ± 27 (ICs)	508 x 1016mm 20 x 40"	128 (1 ULC)	(01005) .18 x .38 x .10 (Min) 150 square and up to 25 tall
Fuzion2-60	66,500 (Max) 40,500 (I-Bd IPC Chips)	± 34 (Chips) ± 34 (ICs)	508 x 1016mm 20 x 40"	136	(01005) .18 x .38 x .10 (Min) 30 x 30 x 6 (Max)
FuzionXC2-37	43,000 (Max) 20,500 (I-Bd IPC Chips)	± 34 (Chips) ± 27 (ICs)	610 x 1300mm 24 x 51.2"	272	(01005) .18 x .38 x .10 (Min) 150 square and up to 25 tall
FuzionXC2-60	65,500 (Max) 30,000 (I-Bd IPC Chips)	± 34 (Chips) ± 34 (ICs)	610 x 1300mm 24 x 51.2"	264	(01005) .18 x .38 x .10 (Min) 30 x 30 x 6 (Max)
Fuzion4-120	140,000 (Max) 81,000 (I-Bd IPC Chips)	± 34 (Chips) ± 34 (ICs)	500 x 700mm 19.7 x 27.6"	144	(01005) .18 x .38 x .10 (Min) 30 x 30 x 6 (Max)

Manufacturing Execution Software



Connect. Streamline. Control.

The Dimensions software suite features powerful NPI solutions and changeover tools to accelerate product introductions, as well as turnkey shop floor control tools that provide real-time visibility and analysis to maximize utilization and track and trace materials during production.



Versatile Feeding Solutions

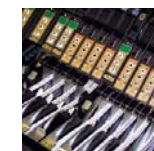
Fuzion Platforms support the widest variety of input types in the industry; from strip tape NPI and tube feeders to high-volume continuous-splice tape feeders, random access matrix tray feeding, and odd-form feeders to support any automated assembly challenge.

High-Performance Tape Feeders



ion Feeders

- Fast/easy loading
- Load-in-place on feeder bank reduces handling time
- Operator-friendly ergonomics (size, weight, latching)
- Flexible reel management (baskets or optional reel holders)
- Strip tape-friendly
- 8mm dual-lane and 12/16mm single-lane occupy single slot
- Standard high-performance O1005 capability
- Multi-pitch (SL/DL), independent pitch and index speed (DL)
- Latch sensor enables safe hot swapping
- High-utilization continuous-splice capability with splice detection



Gold Plus Feeders

- 8 - 88mm tape widths, multi-pitch
- Integrated reel holders
- Dual-lane and single-lane options
- Continuous-splice capability
- Reel detection sensor



NPI Strip Tape Feeders

- Single lane/single slot strip tape feeders
- Multi-lane, multi-slot, matrix tray-style

Random Access Tray Feeders



Direct Tray Feeder (DTF)

- Components picked directly from tray (supports odd-form)
- JEDEC or non-standard vacuum formed matrix trays
- Operates in 3 modes: Exchange (no downtime for replenishment), Concurrent (combined for maximum capacity), and Job Changeover (zero setup time)



Platform Tray Feeder (PTF)

- No base machine feeder capacity consumed
- Up to 58 different part numbers
- Parts are pre-oriented allowing for gang pick
- Stackable functionality accommodates higher-volume parts
- Automatic empty tray removal



Stationary Matrix Tray Feeder

- Single tray, single part number tray feeder
- Adjustable tray height

SMA Stackable Matrix Tray Feeder

- Stackable alternative for higher volumes of one part number

Specialty Feeders



Tube Feeders

- Adjustable track, multi-input track, single-input multi-tube

Odd-Form / Automation Feeders

- Bowl, GPAX and other feeding solutions