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
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-pitch for < 30 second pulse rates

Fuzion efficiency = greater output

Fuzion

Baseline Production Requirement

Traditional

Production Hours

Baseline baseline quantity in fewer hours/shifts

Products 20x% more boards in same time

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 Shg 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
• Realize machine/time balance and achieve predictable output regardless of complexity due to the widest overlapping component range between placement heads
• Flexibility to meet new market challenges throughout the product lifecycle

Change the program, not the line

Fuzion Line Output Averse Random Product Mix

Throughput [fpds]

0 5 10 15 20 25 30 35 40 45 50

Number of Placements

OFP and BGA > 30mm
Connections from 30 - 65mm
ECOs and taller than 6mm
Connectors from 30 - 150mm
ECOs and taller than 6mm

Ultimate Flexibility
Streamlined Introduction

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

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

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 eliminates rework for machine stoppages and reduce scrap and repair costs
- Semi-automated solder paste and post-placement inspection

Lowest cost per input. Most inputs per floor space.

Semi-automated solder paste and post-placement inspection

2x FusionXC 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

Seamlessly transfer from NPI to volume production
Solutions for any Market

**NPI / All-in-One**
Single-machine solution from prototyping to LVHM

**Medium-Volume, Medium-Mix**
Highest flexibility (front/back setups)

**Medium-Volume, High-Mix**
Quote any job and turn it quickly

**Complex assemblies, EMS/ODM manufacturers, Server/Data Storage, Internet**

- Advanced NPI software, edit on-the-fly for immediate first article
- Large component range: DH05 - 150mm, micro BGA, PoP, odd-form
- Off-line component teach and program validation
- Leverage component range and single-machine process capabilities

**High-Volume, Medium-Mix**
Efficiency and no compromises for constantly changing environments

- Fully spliceable, hot swap, alternate, or duplicate feeder replenishment
- Auto tray replenishment
- ~700 8mm inputs (large reel capable), 58 random access tray inputs, auto tray replenishment
- <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

**Higher-Volume, Medium-Mix**
Little derate and the highest utilization for competitive cost advantages

- Industrials, Telecom, Computer, TV, SetTop Box, Gaming, Tablet
- Fully spliceable, hot swap, alternate, or duplicate feeder replenishment
- Throughputs not reliant on gang-picking/duplication of feeders
- Auto tray replenishment
- 480+ 8mm inputs, 40 random access tray inputs, track feeder support
- 01005 - 150mm, poP, odd form shields, connectors
- 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

- Industrial, Telecom, Computer, TV, SetTop Box, Gaming, Tablet
- Fully spliceable, hot swap, alternate, or duplicate feeder replenishment
- Throughputs not reliant on gang-picking/duplication of feeders
- Auto tray replenishment
- 480+ 8mm inputs, 40 random access tray inputs, track feeder support
- 01005 - 150mm, poP, odd form shields, connectors
- Line Manager utilization tools for sustained output, LineChart to monitor factory performance

**Ultra High-Volume**
Complete solution for high volume mobile phone production

- Mobile Phone
- 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
- ~500 8mm inputs (large reel capable), 58 random access tray inputs, auto tray replenishment
- Industry standard for DH05s - package-on-package (PoP), odd form shields, connectors
- 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

**FuzionXC2-37**
- 2D-25k line cph real throughput
- Advanced NPI software, Auto component teach and edit on-the-fly for immediate first article
- Large PCB size range: up to 508 x 635mm (20" x 25")
- Large component range: DH05 - 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
Technologies for Performance, Flexibility & Yield

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

VBM Linear Motor Positioning System
- High-accuracy (1 μm 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 VBM 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 FDVs
- Complete feature-based recognition: full lead/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

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 (34 μm)

Uncompromising Flexibility
- Largest component range for a high-speed head (D025–30mm square): leadless, 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 pitch 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

FZ30 - Unmatched flexibility and performance

FZ27™ Placement Head
The FZ27 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 (27 μm @ 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 - Best-in-class accuracy of 34 μm
**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

- **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**
  - 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 Models**

- **FuzionXC2-37**
  - High-capacity NPI, all-in-one, line balancer, or multi-function 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 turn 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

- **FuzionXC2-37**
  - High-capacity NPI, all-in-one, line balancer, or multi-function 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 turn 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

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### Model Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Throughput (cph)</th>
<th>Accuracy (μm)</th>
<th>Max Board Size</th>
<th>Max Feeder Inputs (8mm)</th>
<th>Component Range (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fuzion1-11</strong></td>
<td>16,500</td>
<td>±38 (Chips)</td>
<td>508 x 813mm</td>
<td>12 (2 ULC)</td>
<td>±38 (Chips)</td>
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<tr>
<td><strong>Fuzion1-30</strong></td>
<td>11,400 (1-Bd IPC Chips)</td>
<td>±27 (ICs)</td>
<td>20 x 32&quot;</td>
<td>136 (30 x 6 ULC)</td>
<td>±27 (ICs)</td>
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<tr>
<td><strong>Fuzion2-14</strong></td>
<td>30,000</td>
<td>±38 (Chips)</td>
<td>508 x 813mm</td>
<td>120 (2 ULC)</td>
<td>±38 (Chips)</td>
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<tr>
<td><strong>Fuzion2-37</strong></td>
<td>22,600 (1-Bd IPC Chips)</td>
<td>±34 (ICs)</td>
<td>20 x 40&quot;</td>
<td>136 (30 x 6 ULC)</td>
<td>±34 (ICs)</td>
</tr>
<tr>
<td><strong>Fuzion2-60</strong></td>
<td>48,000</td>
<td>±36 (Chips)</td>
<td>508 x 1016mm</td>
<td>128 (1 ULC)</td>
<td>±36 (Chips)</td>
</tr>
<tr>
<td><strong>Fuzion3-60</strong></td>
<td>16,500</td>
<td>±36 (Chips)</td>
<td>508 x 1016mm</td>
<td>136 (30 x 6 ULC)</td>
<td>±36 (Chips)</td>
</tr>
<tr>
<td><strong>FuzionXC3-37</strong></td>
<td>43,000</td>
<td>±36 (Chips)</td>
<td>610 x 130mm</td>
<td>272 (150 square and up to 25 tall)</td>
<td>±36 (Chips)</td>
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<tr>
<td><strong>FuzionXC2-37</strong></td>
<td>20,500</td>
<td>±34 (ICs)</td>
<td>24 x 52.2&quot;</td>
<td>264 (30 x 6 ULC)</td>
<td>±34 (ICs)</td>
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<tr>
<td><strong>FuzionXC2-60</strong></td>
<td>65,500</td>
<td>±36 (Chips)</td>
<td>610 x 130mm</td>
<td>264 (30 x 6 ULC)</td>
<td>±36 (Chips)</td>
</tr>
<tr>
<td><strong>Fuzion4-120</strong></td>
<td>30,000 (1-Bd IPC Chips)</td>
<td>±34 (ICs)</td>
<td>19.7 x 27.6&quot;</td>
<td>44 (30 x 6 ULC)</td>
<td>±34 (ICs)</td>
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<tr>
<td><strong>Fuzion4-120</strong></td>
<td>140,000</td>
<td>±36 (Chips)</td>
<td>500 x 700mm</td>
<td>144 (30 x 6 ULC)</td>
<td>±36 (Chips)</td>
</tr>
</tbody>
</table>

- (0201) .25 x .5 x .15 (Min)
- (01005) .18 x .38 x .10 (Min)
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.

Fusion 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.

Versatile Feeding Solutions

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)

Stationary Matrix Tray Feeder

- Single tray, single part number tray feeder
- Adjustable tray height
- SMT 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-rule
  - Odd-Form / Automation Feeders
  - Stow, GPX, and other feeding solutions