



ASM



SIPLACE CA & SIPLACE TX

Maurice Liao March 2017

Together  
**#1**

Agenda

SIPLACE TX

Together  
**#1**

## SIPLACE TX Targets



### Target market

- Very high volume lines for mobile and module applications
- General high volume part of a line in automotive applications

### Meet target customer price/performance requirement on smallest possible floor space as exact as possible

### Main focus topics

- Improvement of floor space / performance
- Improve width of machine especially in combination with tray solution
- Improve real performance
- Smaller sized block
- Better accuracy
- Keep as much flexibility regarding PCB sizes and component range as possible
- Improved Usability

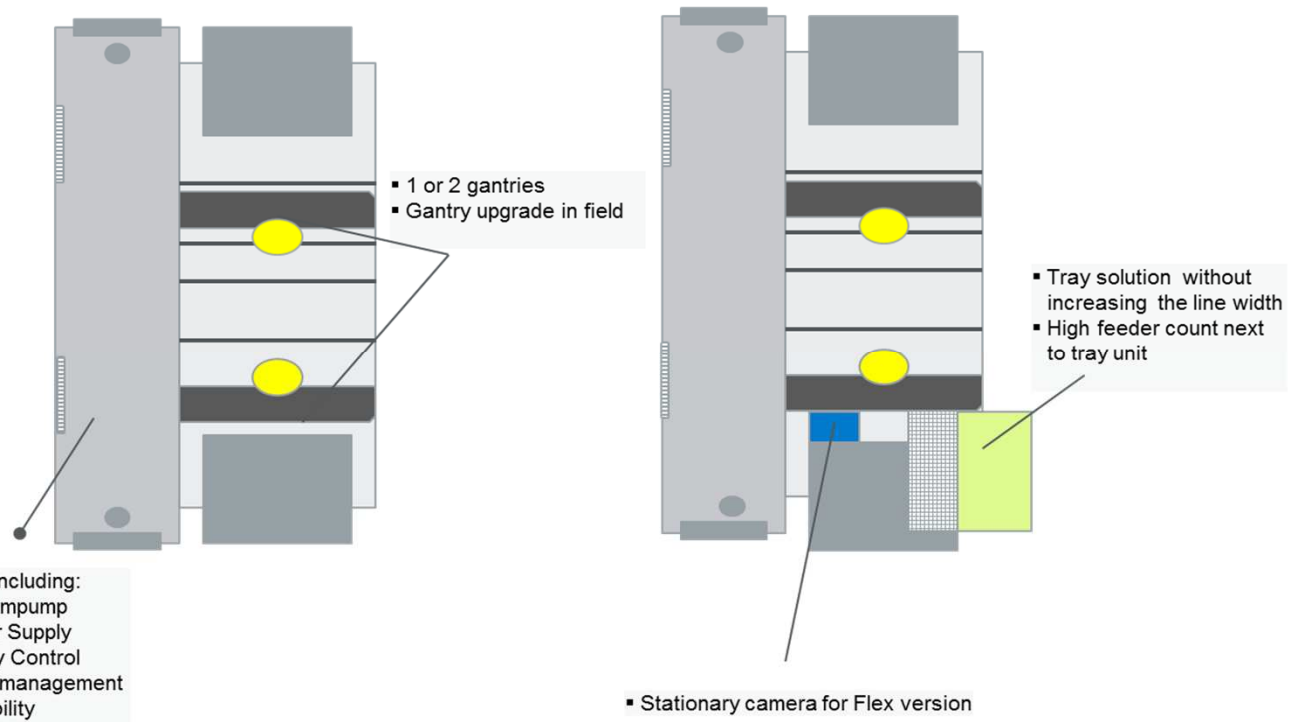
# SIPLACE TX

## Basic Concept

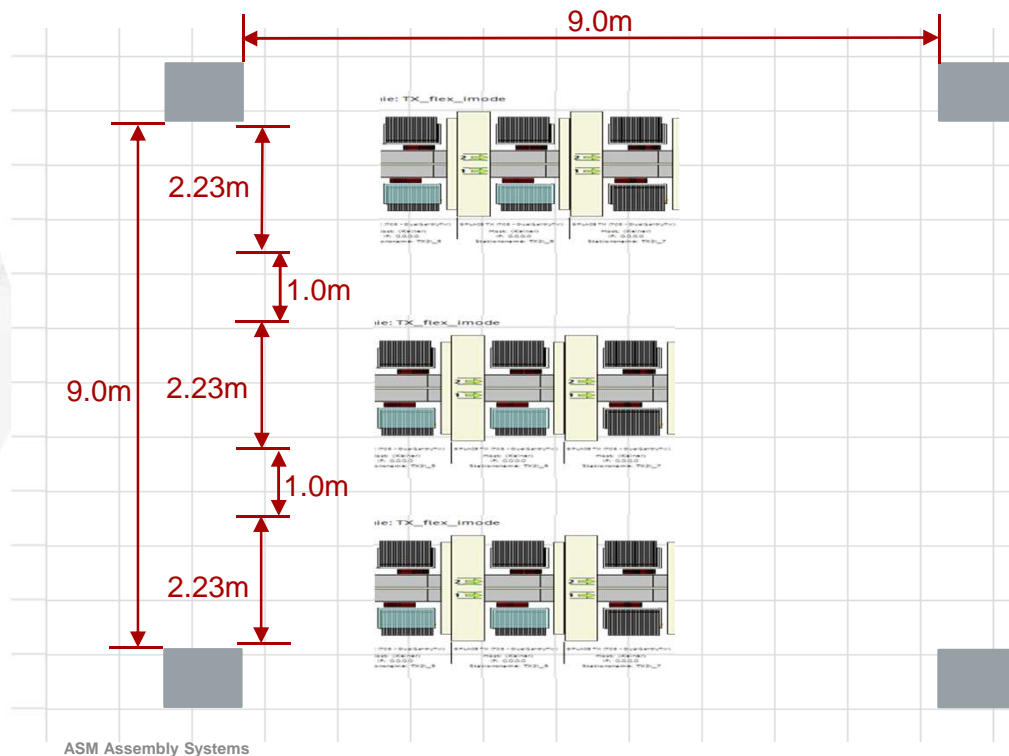


<b>Operation</b>	Dual Sided Machine		
<b>Machine Configuration</b>	One or Two Gantries		
<b>Placement heads</b>	SpeedStar (CP20)	MultiStar (CPP)	TwinStar (TH)
<b>Benchmark</b>	up to <b>78.000 cph</b> with SpeedStar		
<b>Component range [LxWxH]</b>	min. <b>0201 metric</b>	max. 45mm x 55mm x 25mm	
<b>Accuracy</b>	<b>25µm* @ 3 σ with SpeedStar</b>		
<b>Transport</b>	Flexible dual conveyor		
<b>Board size</b>	Dual conveyor: 45 x 45 mm to 375 x 260 mm Dual as single: 45 x 45 mm to 375 x 460 mm		
<b>Machine size [LxWxH]</b>	<b>1,00m x 2,35m x 1,45m</b>		
<b>Component Supply</b>	up to 80 x 8 mm tapes JEDEC tray, Bulk Feeder		
<b>Power Consumption</b>	Typical: 1,9 kW including vacuum pump		

# SIPLACE TX Basic Concept



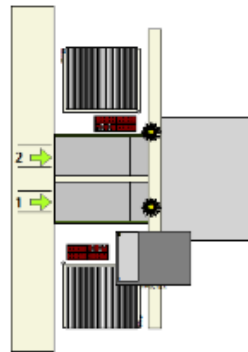
# SIPLACE TX Typical Floor plan



ASM Assembly Systems

- For the whole line layout, the columns, people, material flow etc. have to be considered on site
- Proposal line layout for reference based on new TX2i and TX2 plus tray feeding solution JTF-ML
- The TX changeover table requires >650mm space of maneuvering radius between two lines

# SIPLACE TX JTF ML Tray Feeder



## Tray feeder Unit

- In combination with CPP and TH
- Magazine for 14 and 18 trays available
- Connection to machine from the side
- 28 feeder slots left next to tray unit
- Tray unit
- Output extension conveyor will be offered
  - Length 600 mm

## Benefit

- Impact on line width minimized
- High line utilization as only few feeder slots occupied

## SIPLACE TX Best-in-class energy efficiency



### Switched Mode Power Supply inspired by E-Car Technology

- Kinetic energy recovery with energy harvesting
- Minimized peak consumption and maximized robustness regarding supplying power net work
- Diagnostic system of power levels & fusing

### Load management via frequency adaption

- Optimized DPM-rate based on vacuum / leakage monitoring of CP20 P head
- Adaption of generated vacuum via load management based on application demand
- Up to 15% reduced energy consumption for machines based on CP20 P with vacuum pump
- Best-in-class energy efficiency



## SIPLACE TX

### Improvements in regards to usability



**No keyboard**

- All required tasks possible without keyboard

**Accessibility**

- Wide Opening of cover for good accessibility
- Head interface more easy to access for easier head exchange

**Cover Lock**

- The cover can only be opened after pressing stop button
- Reduced undefined emergency stoppages

**Infrastructure**

- Ideal access to machine infrastructure e.g. vacuum pump, power supply, ...



**Machine height**

- Machine height only 1,45 m at transport height 900 mm

**Interior Illumination**

- Available also while machine is powered off

**Serviceability**

- Condition monitoring of subsystems
- Supervision of fans, fuses and all power levels
- GUI for predictive, preventive maintenance & head verification

**New Changeover table**

- 4 movable wheels for table exchange in narrow space for line spacing down to 1m
- Larger waste bin to reduce work for operator

## SIPLACE TX

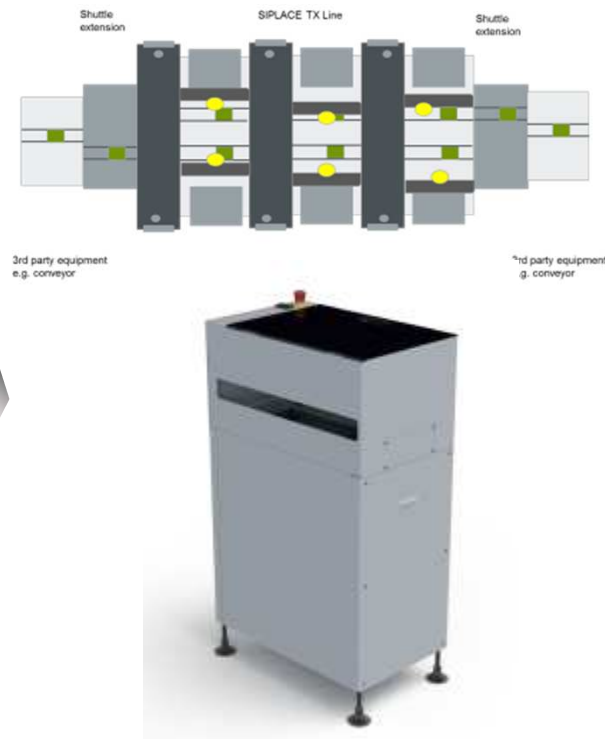
### Improvements in regards to usability & serviceability



#### Easier Maintenance and better monitoring

- Wide Opening of cover for good accessibility
- Head interface more easy to access for easier head exchange
- Interior illumination available while machine is powered off
- Power supply, MGCU, Vacuum pump can be accessed easily
- Condition monitoring of bearing systems and fan supervision
- GUI for predictive, preventive maintenance & head verification

## SIPLACE TX Shuttle extension

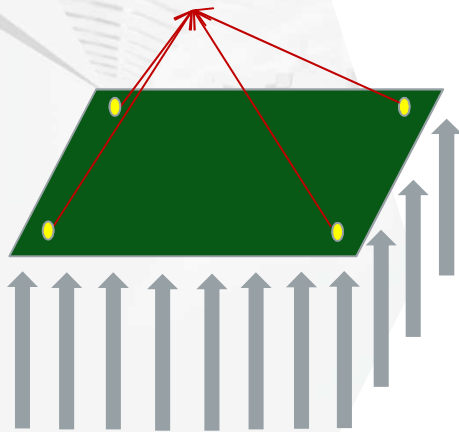


### Shuttle Extension

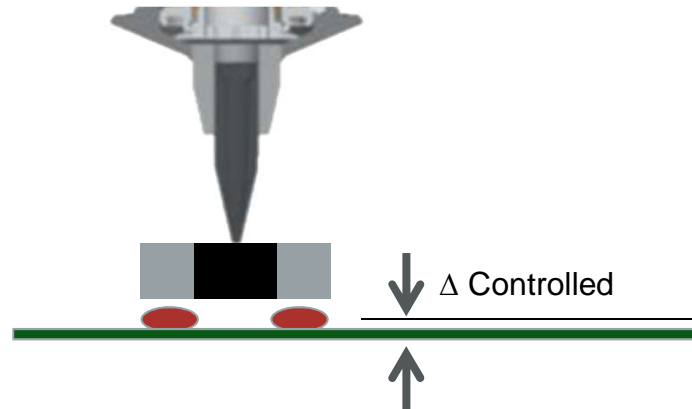
- Transfer PCBs easily into SIPLACE TX and sort back to peripheral equipment
- Programming in SIPLACE PRO
  - Automated width adjustment
  - End positions
  - Sorting modes
  - Support of convoy mode
- Control panel implemented in station software
- Power supply from SIPLACE TX
- Fixed to machine frame
- Possible to mount PCB barcode reader
- Length only 400 mm
- Ideal fit to JTF-ML solution

## Touchless Placement Process

**2** Height measurement for PCB leveling prior to placement



**1** Vacuum tooling to make sure PCB is flat positioned and supported



**3** Place component with accurate Z axis height control based on PCB leveling

### Zero Placement force

- Application for very fragile component
- Accurate process control of placement into the flux/solder etc.

## SIPLACE Linear Dipping Module (LDU)



- Reliable flux thickness control for up to 25 mm die size
- Flux thickness depending on cavity depth: 20  $\mu\text{m}$  to 400  $\mu\text{m}$
- Clean & constant fluxing thickness
- Constant flux thickness independent of flux velocity
- Fluxing velocity adjustable according to process requirements
- Simple adjustment, handling and cleaning
- Optional automated refill
- Mounted on the SIPLACE Wafer System or feeder changeover table



# SIPLACE Linear Dipping Module (LDU) Software control



Dipping Mode **Dipping Vision** Dwell time  ms

Inspect flux after dipping

Process material

Cavity depth   $\mu\text{m}$

Standard force

Creeping  Use custom creep distance  
Creep distance  mm

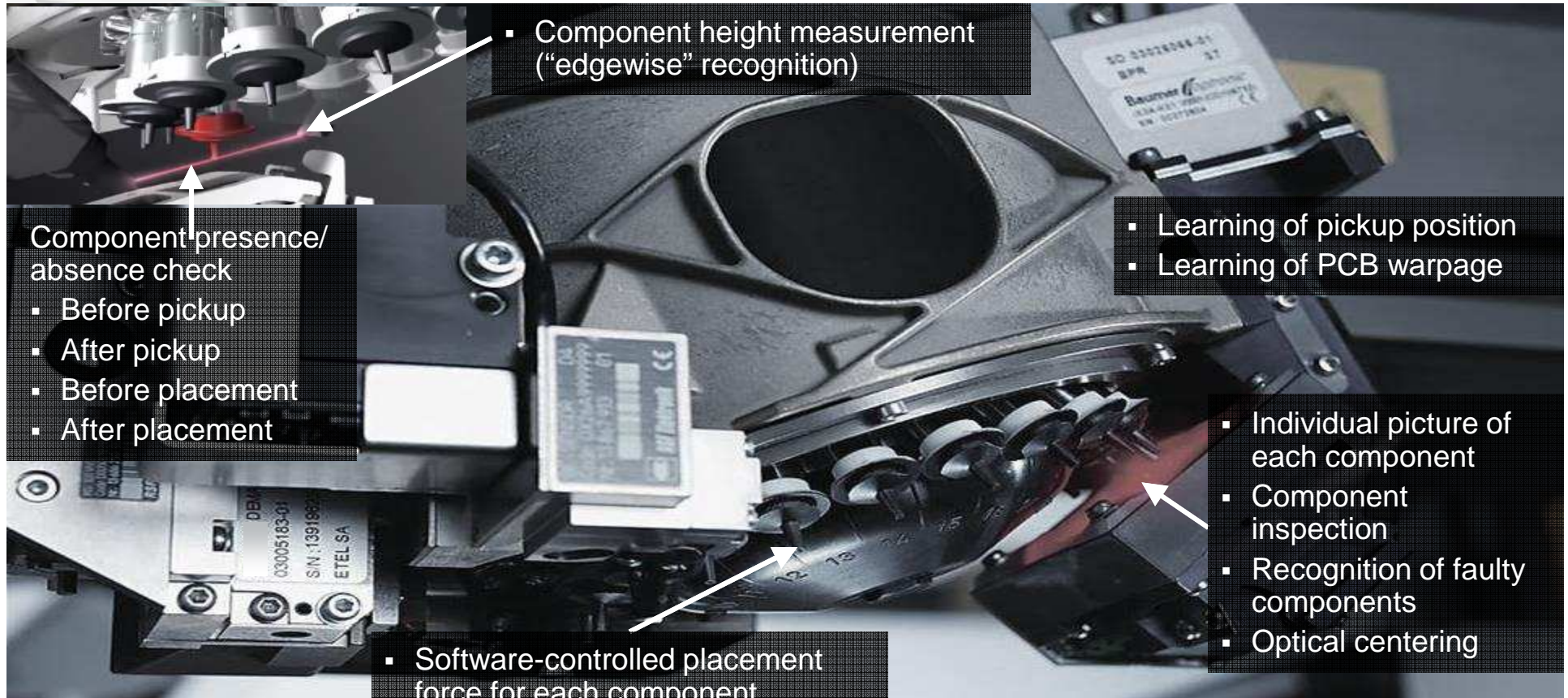
Speed down end  %

Speed up start  %

→ Dipping Modes:

- No dipping
- Dipping/Vision
- Vision/Dipping
- Vision/Dipping
- Vision/Dipping/Vision

## SIPLACE Placement Heads



Component presence/  
absence check

- Before pickup
- After pickup
- Before placement
- After placement

▪ Component height measurement  
("edgewise" recognition)

- Learning of pickup position
- Learning of PCB warpage

- Individual picture of each component
- Component inspection
- Recognition of faulty components
- Optical centering

▪ Software-controlled placement  
force for each component

## SIPLACE Placement Heads Standards for Best Placement Quality

### Pickup of component

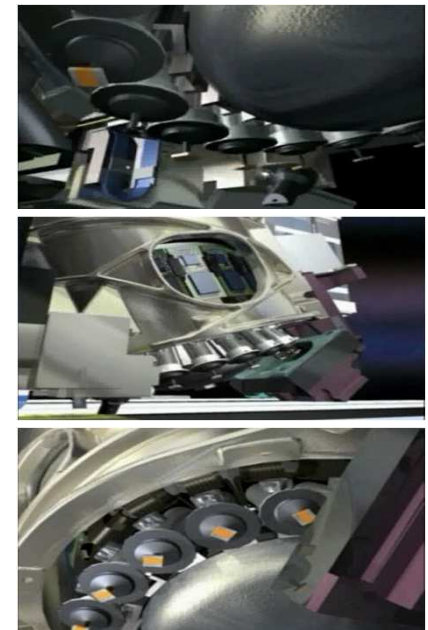
- Learning of pickup position
- Touchless pickup / standard pickup
- Individual presence control after pickup

### Processing of component

- Individual self-rotating segments
- Single measurement per component
- Individual component alignment

### Placement of component

- Presence control before/after placement
- Learning of placement height
- Placement force control cycle

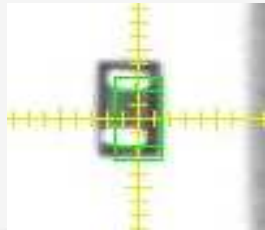
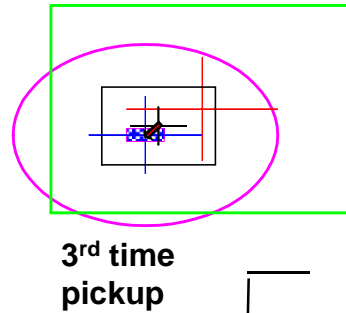
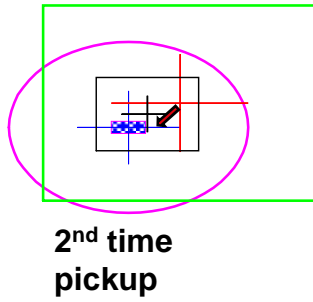
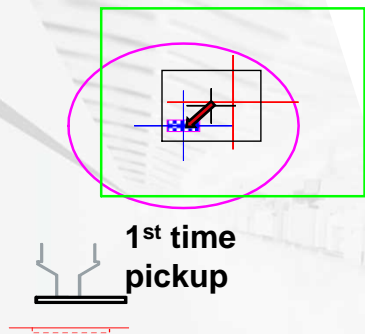


**SIPLACE offers all these features as standard to ensure top placement quality**

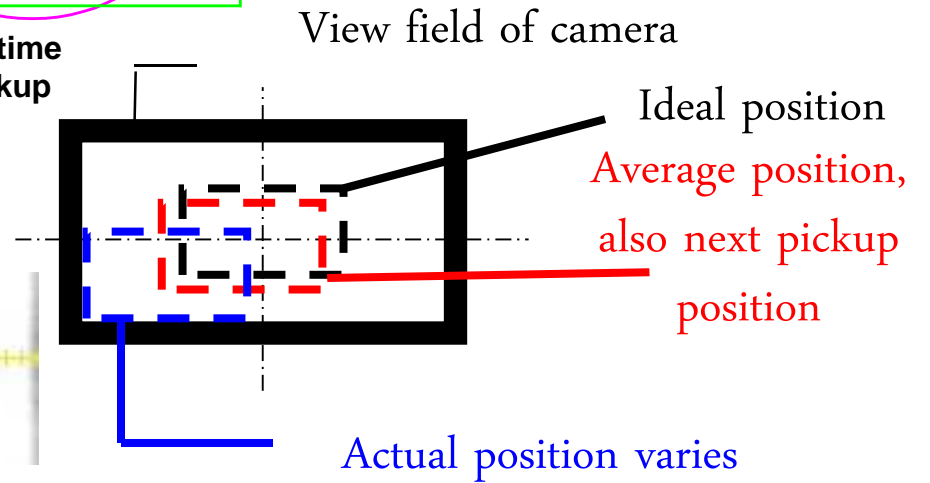


## Auto Pickup Correction

### Pickup position auto learning



Pickup position auto learning  
(0201 component)

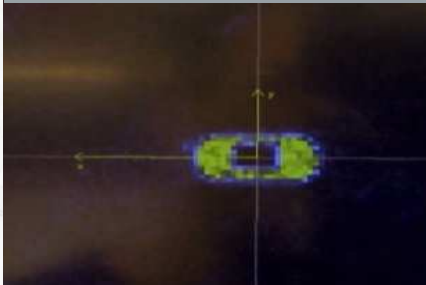


## Design and Functions of a SIPLACE Pick & Place System for Component Placement (1)

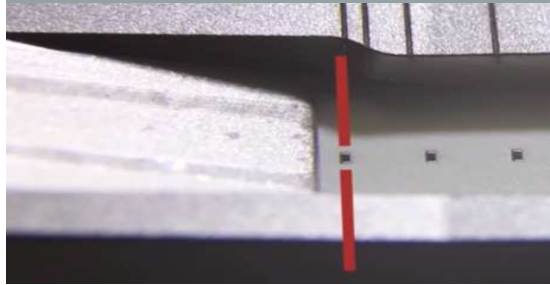
Optimized nozzle shape



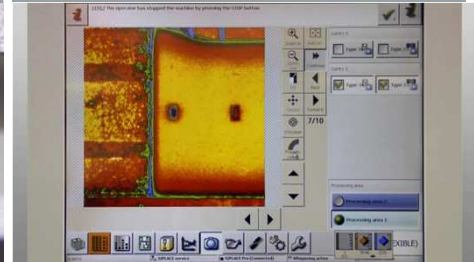
Check nozzles for contamination and wear



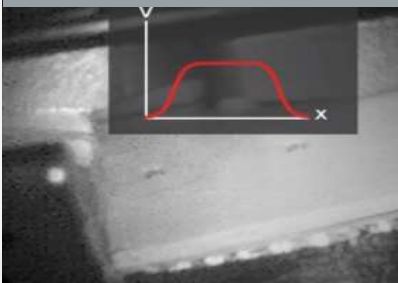
Components must stop always exactly in the same pickup position



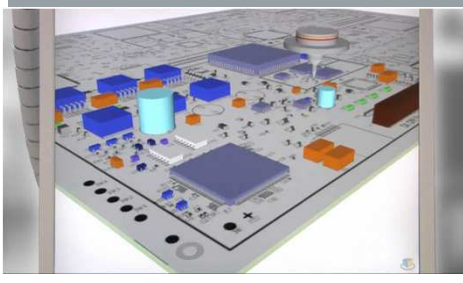
Check and scan position of tape pockets



Feeder Speed precisely controlled



Optimized Placement Sequence

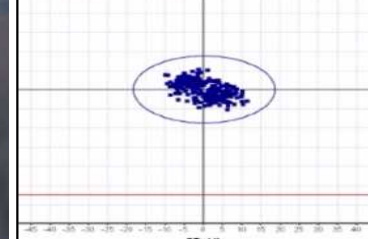


Solid PCB-Clamping and bottom side Support



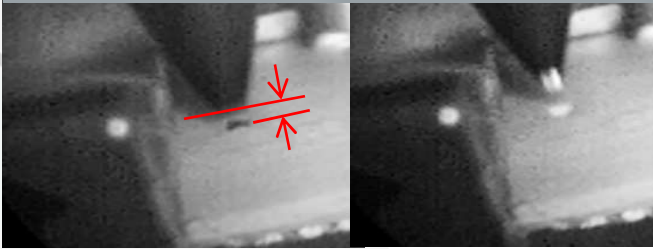
X/Y Chart

Precisely controlled X- and Y- drives



## Design and Functions of a SIPLACE Pick & Place System for Component Placement (2)

Touchless Pickup:  
The nozzle stops above the component and sucks up the component



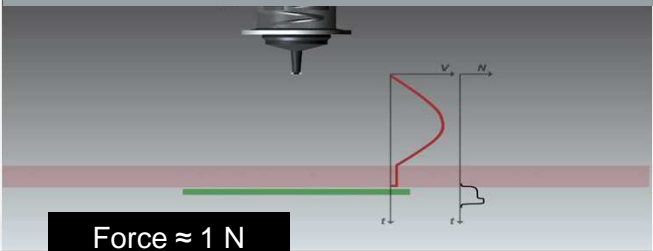
Check that the component is at the nozzle



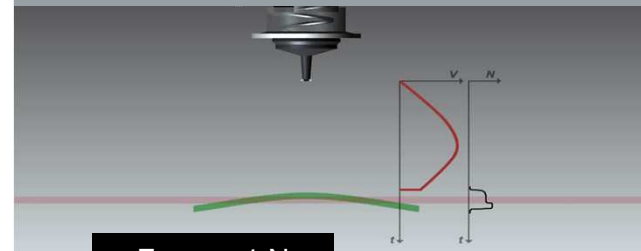
Check that components are in the right position and calculate the exact offset



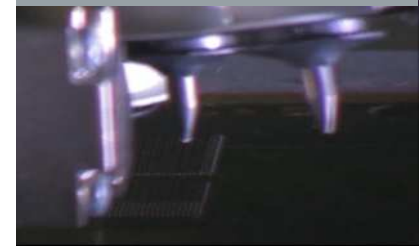
Check and apply low forces for touch down of the component to avoid any damage

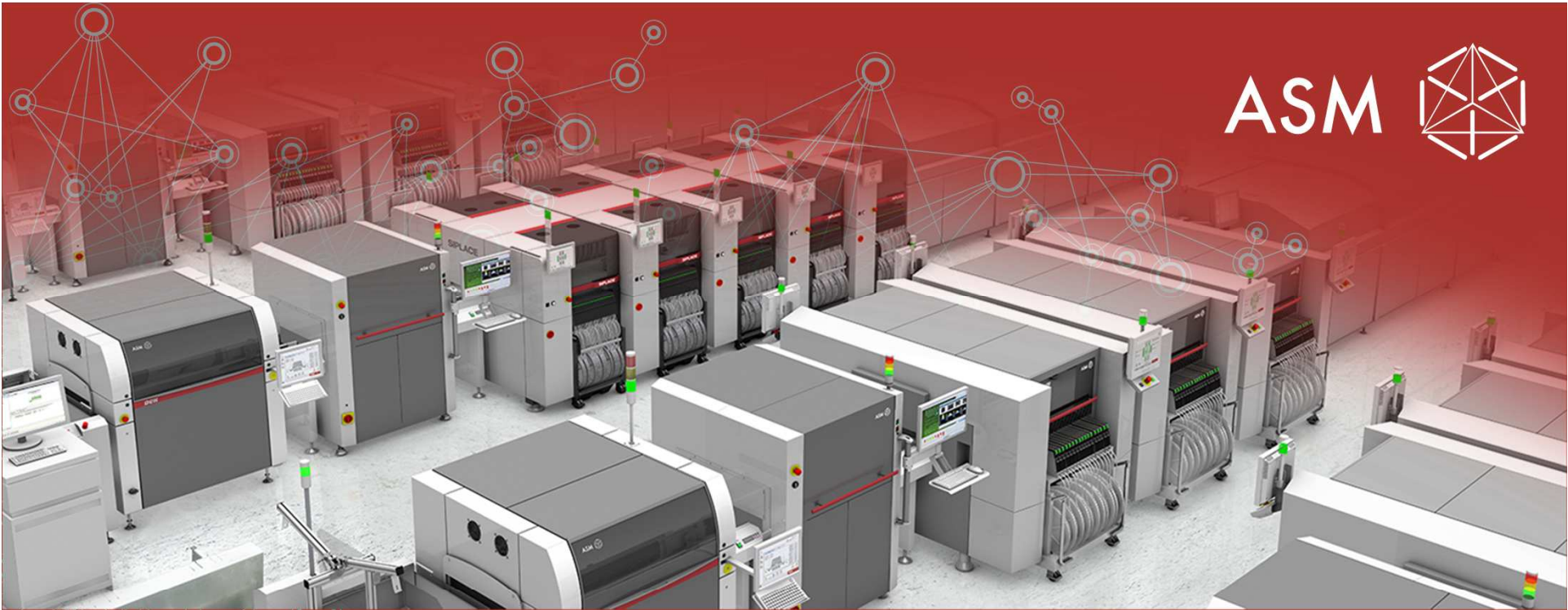


Even when the PCB is warped



Check for PCB vibrations during placement





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Thank You

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