FRITSCH

Competence in SMT

placeALL® 510

Basic machine

Range of applications
Dispensing and picking and placing of low volume SMT and small series, up to 4.000 components per hour (cph).

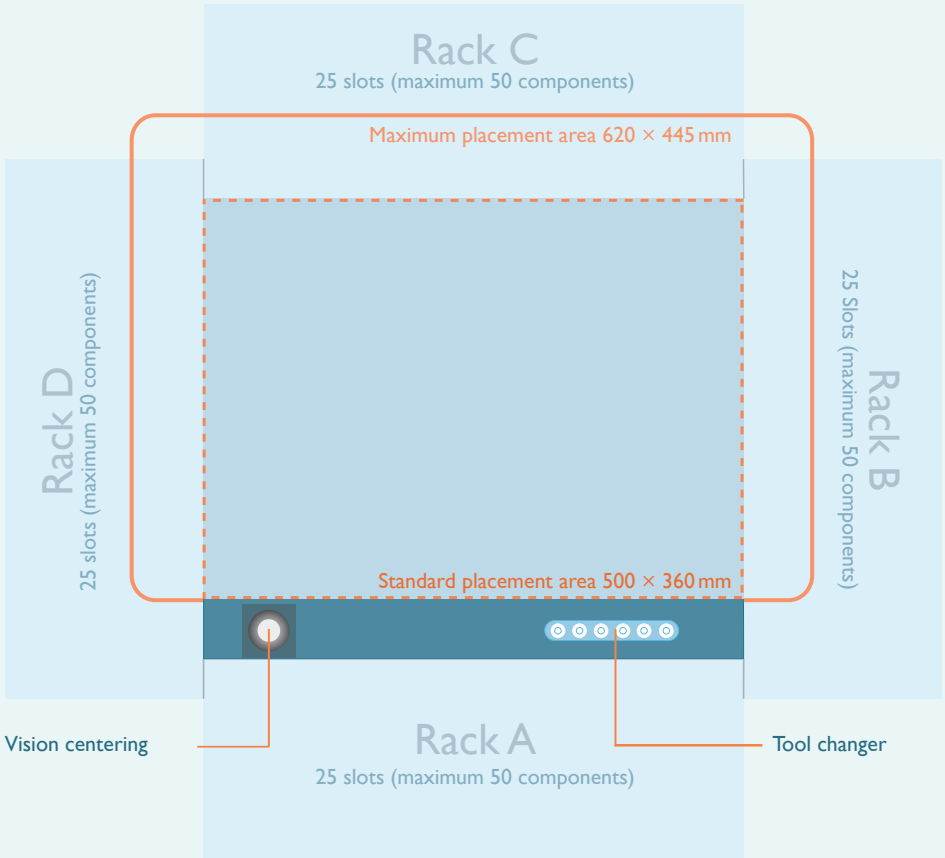
Component capability
Chips 0402 up to 45 × 45 mm (optional 70 × 70 mm) and pitch 0.4 mm, BGAs, CSPs, µBGAs and custom parts (connectors, wired LEDs, etc.)

Assembly
Distortion free, welded machine frame

Axis drive and control
X-Y Axis
Direct-current motors with contactless linear encoders, resolution 0.5 micron
Z-Axis
Direct-current motor with encoder, resolution 8 microns

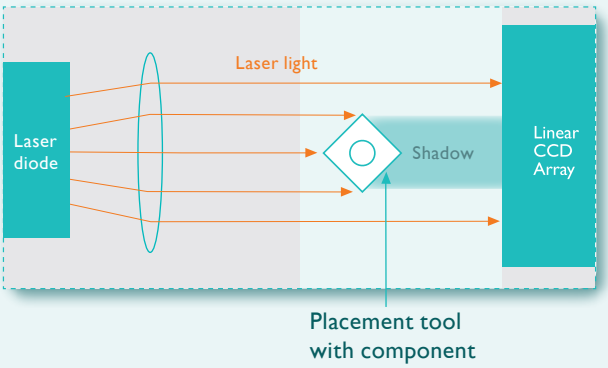
Economics
Modular system, fast changeover times, intelligent feeders, user friendly software

Placement area placeALL® 510



Accurate component centering

On the placeALL® 510 machine, all components are measured by a precise non-contact laser or optical centering mechanism.

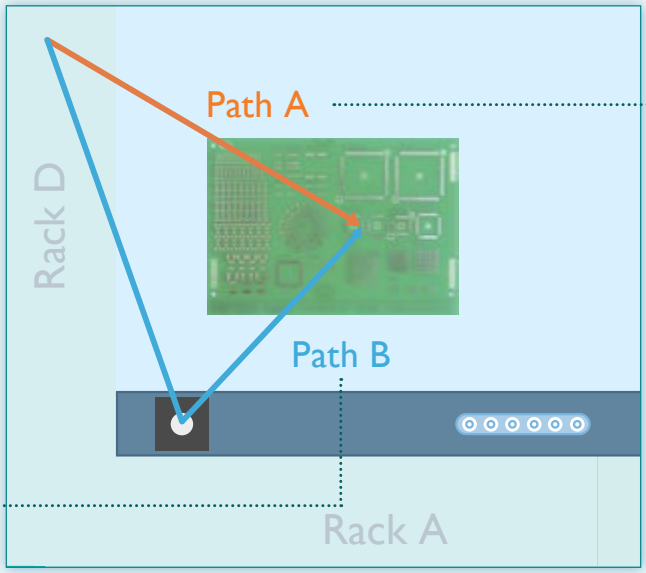


Laser centering

The laser centering system is mounted directly to the assembly head. It projects a laser beam onto the component using a laser diode. The component is measured by rotating it and analyzing its shadow length.
While the head is moving towards the placement position, the measurement of the angle and position takes place. This centering method results in a high placement speed compared to an optical centering system.

For components:

- Chips ≥ 0402 up to 32×32 mm and pitch ≥ 0.6 mm



Path A: Traverse path using laser centering

Path B: Traverse path using optical centering

Optical centering / Vision system

The Vision system captures a picture of the component with a stationary camera. The image recognition software then measures each pin or the outer borders of the component and computes the corresponding correction factor.
Applicable components include:

- BGA, CSP, FP up to 45 × 45 mm (opt. 70 × 70 mm) and pitch 0.4 mm
- Custom components (connectors, wired LEDs, etc.)

Feeders

Tape feeder

General

- From 8 mm to 72 mm
- Intelligent
- Securely fixed to the machine
- Precision feeders for 0402 and 0201
- For plastic and paper tapes
- Easy and quick setup

Application areas

Setup of flexible and project-specific kits at the Pick & Place machine.

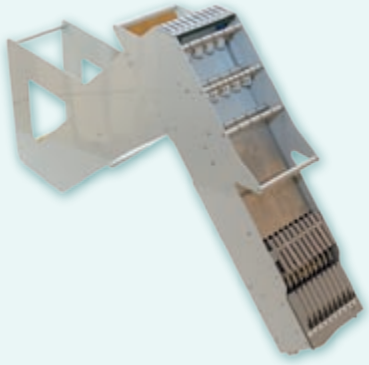
Block feeder

General

- One block feeder with 10 slots occupies the same space as 5 single feeders
- Intelligent
- For 8 mm strips
- Maximum of 200 components can be accommodated on the placeALL 510®

Application areas

By using block feeders, space is saved, constant machine re-kitting is avoided. Only some project-specific components need to be used in each program.



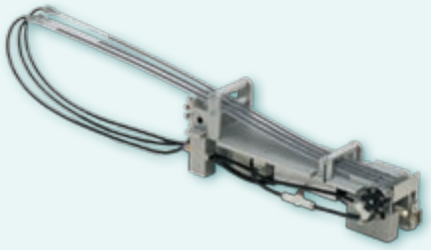
Stick feeder

General

- Driven by compressed-air; large and small components can be placed side by side
- For all pole widths

Operation details

Stick feeders are operated by compressed air, and can securely carry different large and small sized components side by side. During feeding, a pneumatic-driven cover holds the parts to ensure safe delivery of different component types.



Feeder type	Order number	Slots	Tape width	Tape depth	Rack position	Notes
Tape feeder	908.121.008	1	8 mm		A/B/C/D	Half-step for 0402/0201
Tape feeder	908.120.008	1	8 mm	6 mm	A/B/C/D	
Tape feeder	908.120.012	1	12 mm	6 mm	A/B/C/D	
Tape feeder	908.120.016	2	16 mm	13 mm	A/B/C/D	
Tape feeder	908.120.024	2	24 mm	13 mm	A/B/C/D	
Tape feeder	908.120.032	3	32 mm	13 mm	A/B/C/D	
Tape feeder	908.120.044	3	44 mm	13 mm	A/B/C/D	
Tape feeder	908.120.056	4	56 mm	13 mm	A/B/C/D	
Tape feeder	908.120.072	4	72 mm	13 mm	A/B/C/D	
Block feeder	908.160.008	5	8 mm	3 mm	A/B/C/D	For 10×8 mm tape
Stick feeder	908.120.002	7			A/B/C/D	For 10×SO8

Feeders

Tape-strip feeder

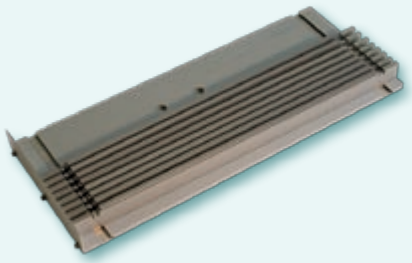
When assembling prototype runs, tape-strips are often used. With this feeder, up to ten 8 mm strips (or less, but wider strips) can be fed simultaneously.

Custom-/LED-Feeder

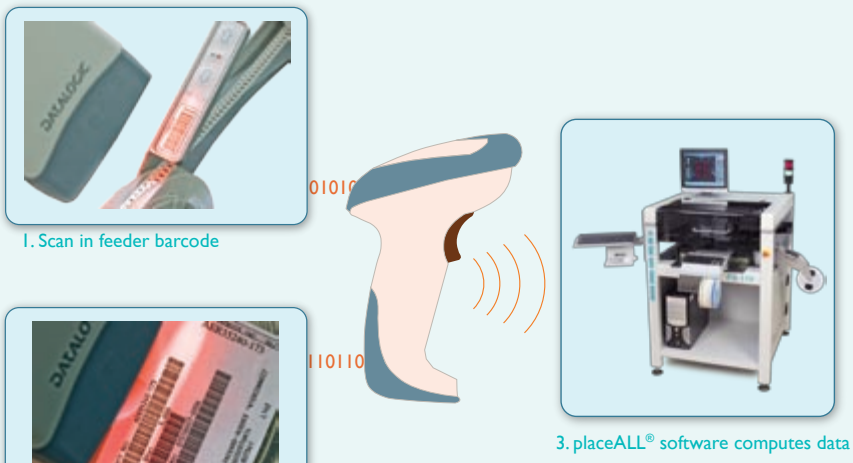
For custom projects a number of different feeder types are available. Examples would be the feeding, cutting and placing of wired LEDs or the bending of components to a specific form. We can provide other custom solutions, please ask for details.

Tray feeder

Multiple tray feeders can be used inside the placement area. Thus the placement area of the Pick & Place machine can be adapted easily to different projects and tasks.



Intelligent feeder kitting



1. Scan in feeder barcode

2.Scan in tape barcode

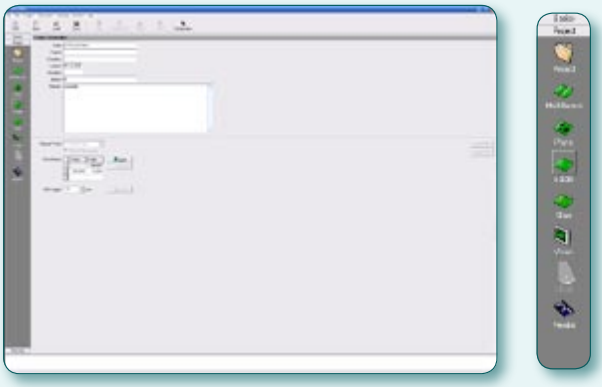
3. placeALL® software computes data

Our intelligent feeders can be kitted at the machine using a barcode reader. To do this, the barcode is scanned in from the feeder and the component package. The feeder is then plugged into the machine in any slot.
The Pick & Place recognizes the feeder and the components delivered from it automatically.
This concept keeps the re-kitting times between projects at a minimum.
Follow-up projects can even be kitted while the machine is still placing parts from the current project.

User-friendly software

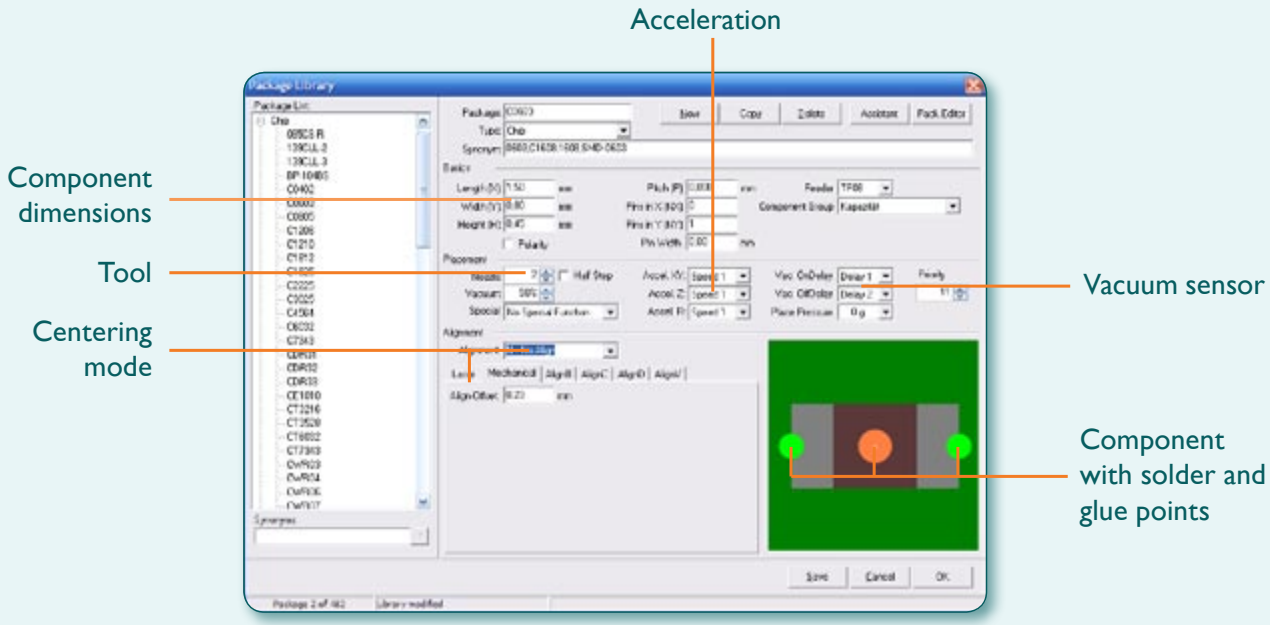
Usability and programming

The clearly laid out interface guides the user step by step towards his aim. To setup a new project or alter an existing one, the parameters can be simply chosen with a mouse click. There is also a detailed help menu for each function.
The smartASSISTANT monitors all user activities, gives hints and tips and shows every error source in plain text, so it is generally not necessary to consult the user manual.



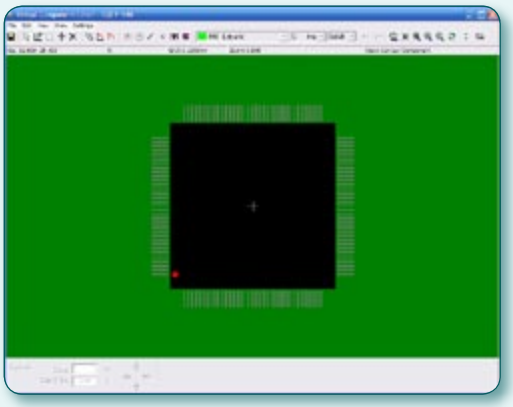
Component library

The component library contains over 300 component models. This represents one of the biggest libraries on the market today. All content items can be edited or new ones can quickly be created.



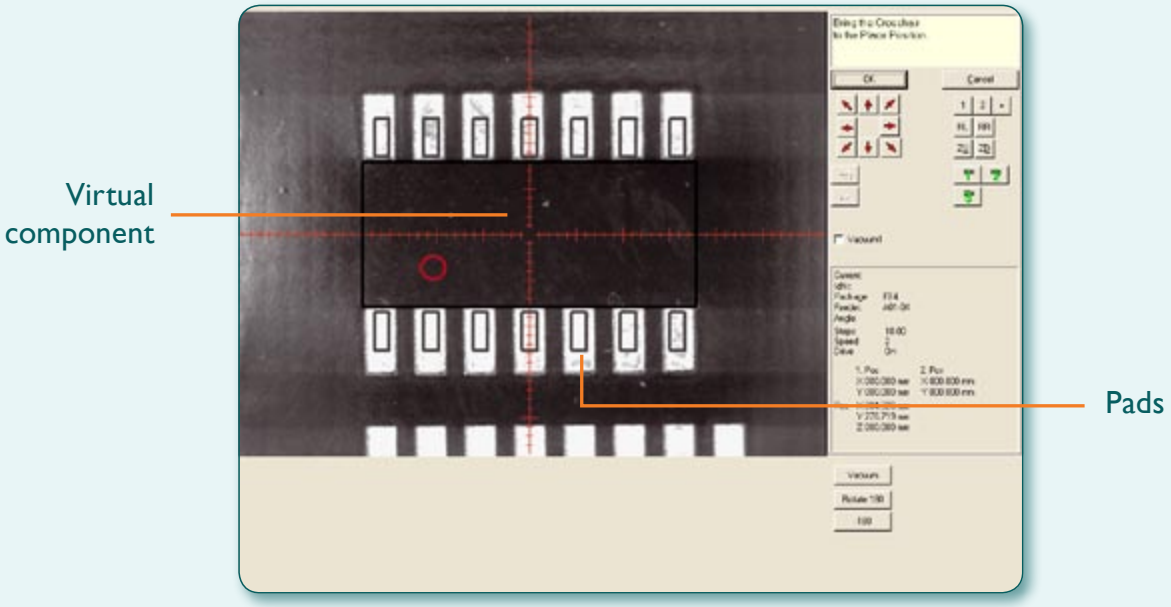
Component editor

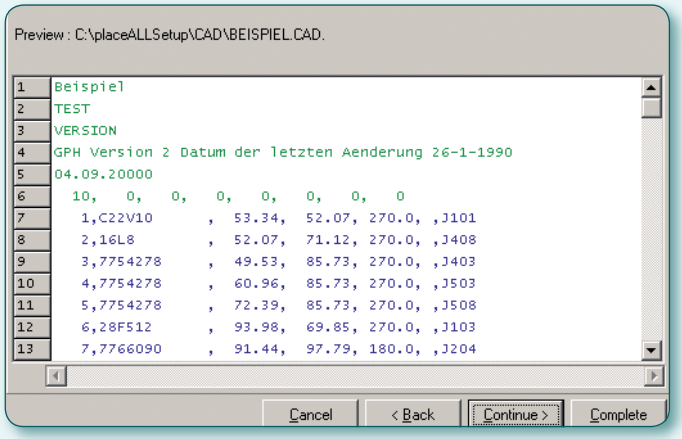
If any components that are not part of the default library are used, the graphic editing function is used to create a new model in just a few steps.



Teach In

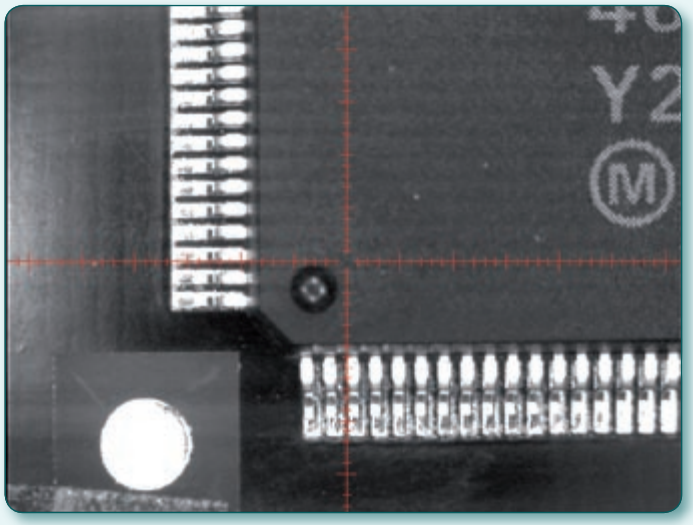
To create a project, the user drives the head to the particular position; a virtual component is shown as an overlay in the camera window. The virtual component can now be adjusted exactly and brought into the right position. After that, its position is logged into the Pick & Place project file.





CAD data converter

CAD data from any CAD system can be interfaced easily to the projects using a format editor. The conversion process is very fast and can be done offline on a separate PC. During this process the Pick & Place machine can continue to be used for its main task of placing components.



Virtual inspection

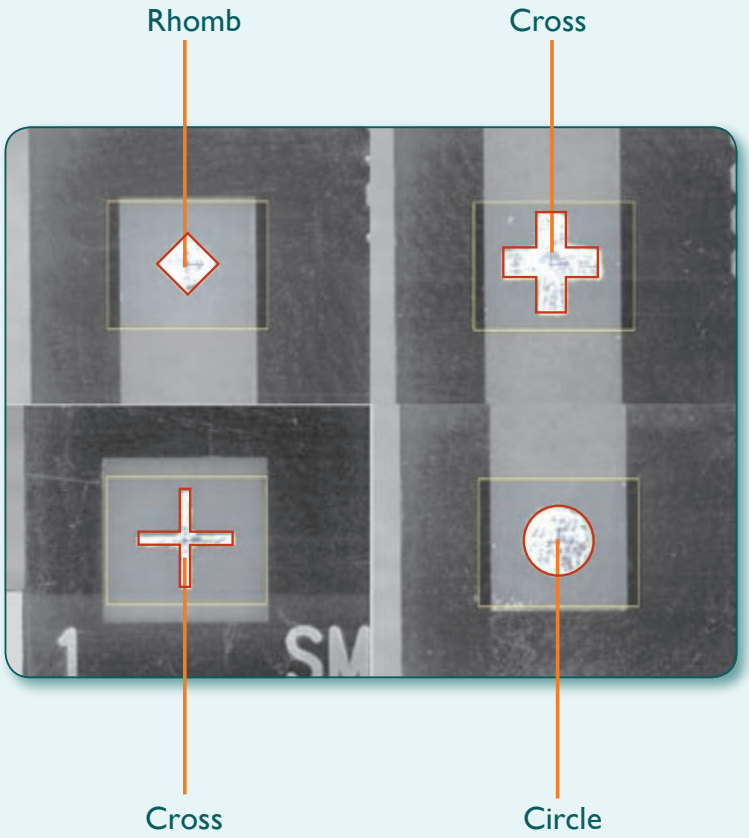
After acquiring the CAD data the virtual inspection can be used to simulate the Pick & Place process. The camera moves across the current circuit board. At each placing position the corresponding component is blended in virtually.

The position and polarity of the component can be checked and corrected if necessary. In this way error-free prototypes can be produced in a very short time.

Advanced working assistance

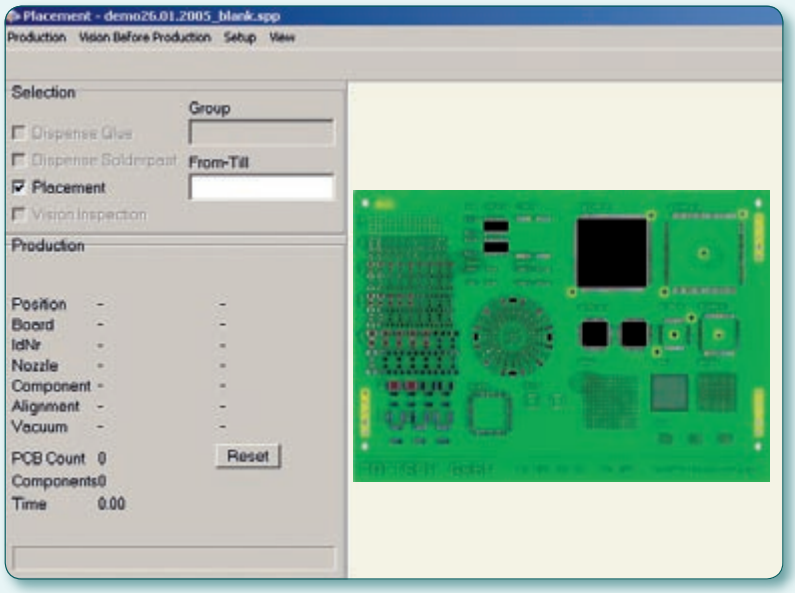
Automatic fiducial recognition

To set up an assembly, reference marks such as crosses, circles, rhombi etc. can be read in automatically. The camera captures the exact position of the circuit board before the placing begins.



Monitoring the placement process

To inform the user of the current status of the Pick & Place process, the circuit board is shown on the monitor. It displays virtual components one-to-one with the real assembly.



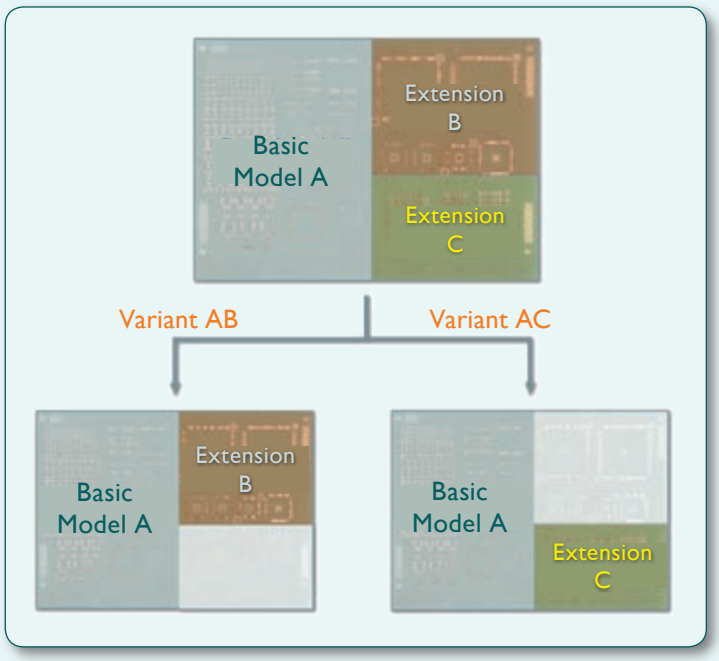
Automatic kitting control

The automatic kitting control checks the first component delivered from a newly kitted feeder using a measuring station, checking the value and tolerance. Wrongly kitted tapes can be quickly recognized and can be replaced before the assembly process starts.

For demanding applications such as defense, medical engineering or aerospace, where very precise components are used, each part can be checked before it is placed. Only components, that fit into a settable tolerance range are allowed to be used.

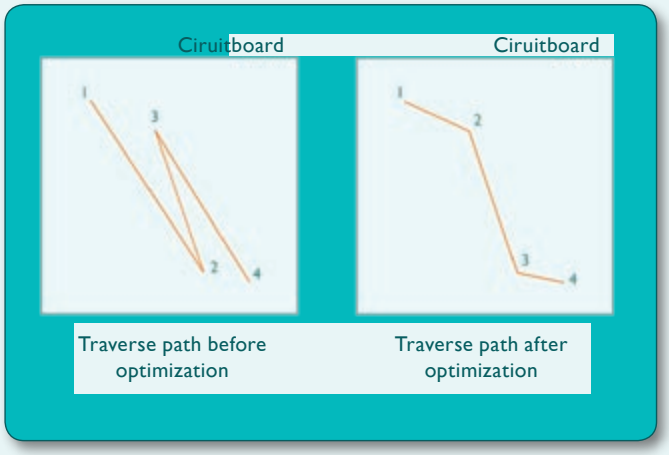
The entire Pick & Place process is continuously logged in real time, and can be accessed for SPC and traceability.

Advanced working assistance



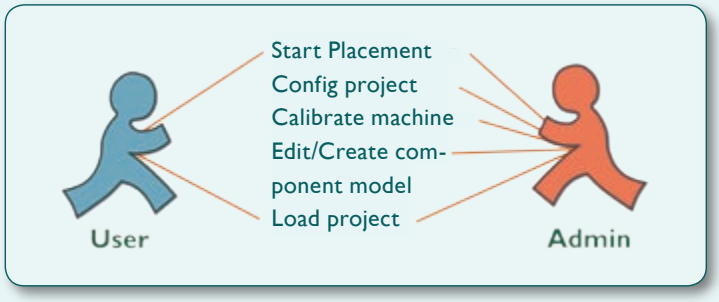
Variant assembly

Where a circuit board is produced in different variations, the placeALL® software can handle the possible variations independently. When selecting another variant, only the corresponding combination of characters (AB, AC, BC etc.) needs to be entered. This selects the variant to be assembled, so changeover times are reduced greatly.



Traverse path optimization

Before production starts, the optimal traverse path for the project is calculated. Optionally the software displays the feeder positions that would reduce the assembly paths further to increase the placement speed. This optimization is especially efficient when producing a large number of boards, and when the machine is used in line.
The optimization process is applied in a similar way when dispensing (see picture on the left).



User management

The user administration makes it possible to assign different rights to different users. The person who is able to edit programs or update component libraries can be defined, and other users can be locked out of these functions. These rights can be easily edited by clicking on the different production steps in the software.

Software modules overview

PABarcode

All smartFEEDERs can be set up using a wireless barcode reader. Together with the warehousing module you can read out the current stock. By using the reader for a setup, it is ensured that the correct component is set up on the correct feeder.

Order number: 908. 230. 310

PAStatistics

To calculate an order, all available data such as assembly time per circuit board is documented and analyzed by this module.

Order number: 908. 230. 315

PANetstate

All machine messages are transferred to a separate PC on the network and displayed there. The user is informed i.e. if production is finished and can initiate further steps.

Order number: 908. 230. 325

PATrace

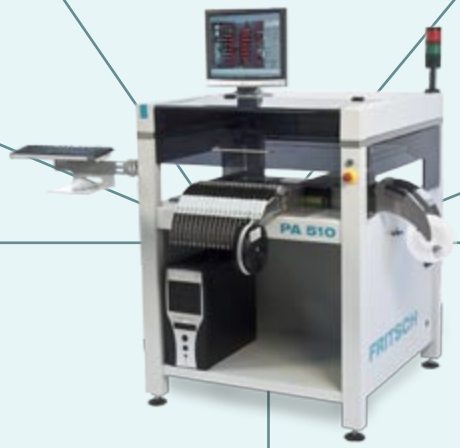
This module documents which component from which lot has been used on which circuit board and with which order. This enables historical production runs to be interrogated, in case of a recall enquiry.

Order number: 908. 230. 320

PAOffline

With this CAD conversion, assembly and dispense data as well as the whole libraries can be edited at a separate workstation. The processed data can be transmitted to the Pick & Place machine afterwards.

Order number: 908. 230. 400



Inline control

This unit processes the division of the assembly data on multiple machines in a line. This ensures a balanced loading, and the whole production line is monitored.

PAStorage

This module manages all SMD parts, circuit boards and other components used in production (like heat sinks or other standard parts) that you have in stock. The assembled components are debited from the stock automatically as they are used. The user is informed by settable minimum stock levels, whether a stock item has to be reordered. PAStorage distinguishes between the whole warehouse and the parts currently stored on the machine. This unit is the foundation of the modules PAOrder, PAInventory and PAJobs.

Order number: 908. 230. 335

PAOrder

Together with PAStorage the minimum stock level is shown and, if necessary, components are reordered from the supplier after the user has confirmed it in the system.

Order number: 908. 230. 340

PAInventory

- Output of inventory lists
- Inventory balancing

Order number: 908. 230. 345

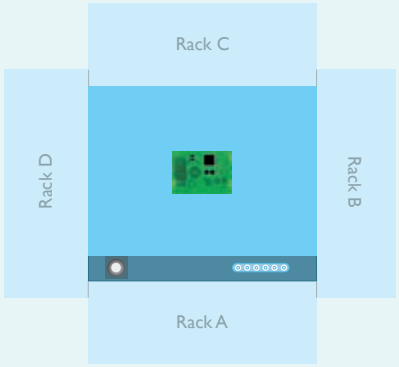
PAJobs

As production setups or change-over times are the most cost-intensive activities, PAJobs analyzes which of the predefined orders takes least time to set up and suggests it to the user for production.

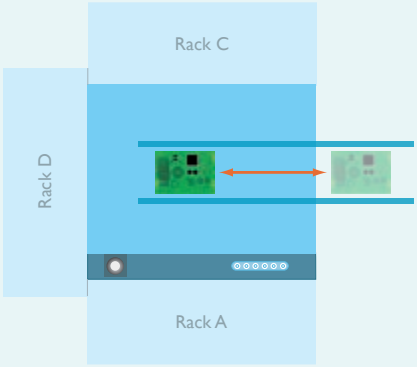
Order number: 908. 230. 350

Inline transport

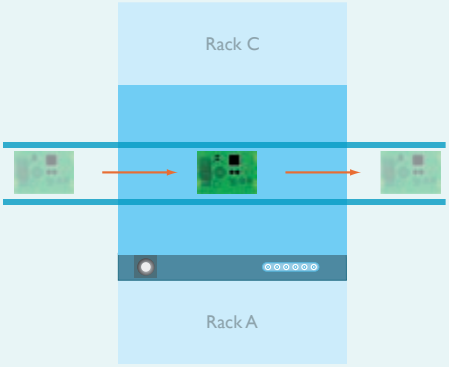
A classical production line can be built using our inline transport system. When the circuit board enters the machine, it is locked into position using a pneumatic block and fixed there securely with an automatic lifting plate (with freely positionable supply pins). The line is controlled according to the SMEMA standard, the READY-contact or customer specific parameters. All Pick & Place machines can be used inline in the ways shown below. Switching between these systems can be done easily on location.



Standalone system
Up to 200 parts kittable



Batch system
Up to 150 parts kittable



Inline system
Up to 100 parts kittable

Optical centering

The optical centering device can be upgraded to an existing machine at any time, see page 3 for more info.

Software modules

All software modules described on page 10 can be added to the placeALL® software at any time.

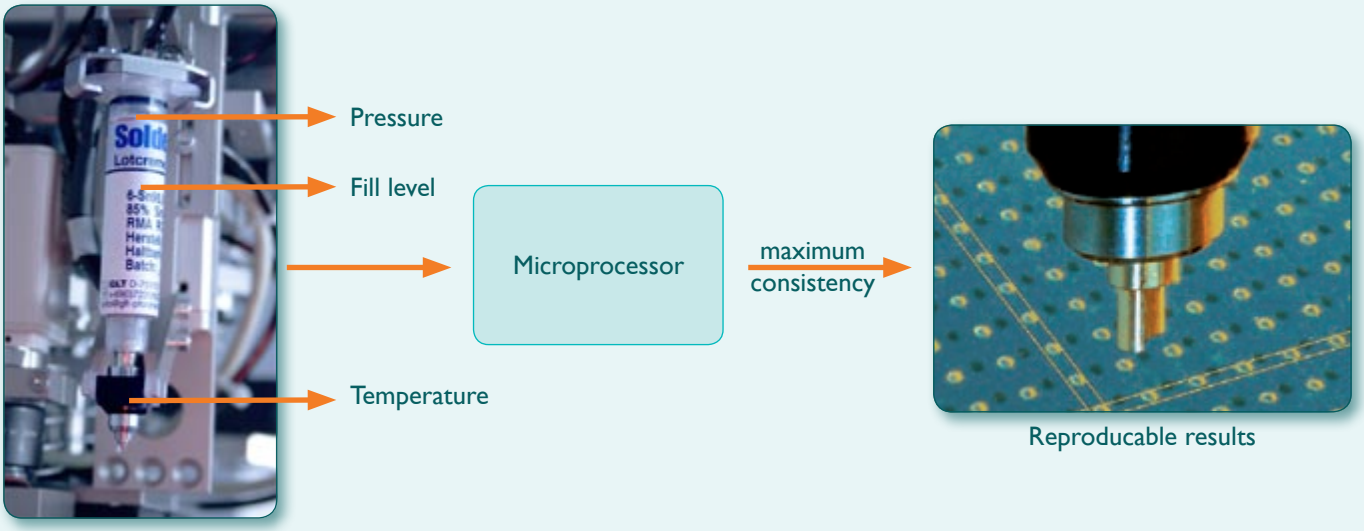
Dividable machine frame

To pass through door frames with less than 80 cm in width, the placeALL® machine frames can be built dividable, each part being smaller than 80 cm.

Modular concept

Dispenser

When producing short runs and prototypes, it is best practice to dispense solder paste or glue with the automatic placer and afterwards assemble the components. We offer two different types of dispensing Systems: The simpler Time-pressure-system is mostly used for solder paste/glue with coarse structures. The patented dispensing System CD-04 offers maximum consistency by monitoring and controlling additional parameters like temperature, fill-level of the dispensing box etc. It is microprocessor controlled and can dispense minimal amounts down to 0.001 or up to 10 mm³. By this method, it is possible to dispense paste for Fine Pitch components with a pitch of 0.5 mm with accuracy.



Service kit

Remote access to your machine by our technicians is possible using the service kit, after having your approval. This connects us directly into your placeALL® and the installed software to rapidly provide an overview of the machine's status if any questions occur.

Automatic fiducial recognition

The automatic fiducial recognition can be added to your Pick & Place machine at any time. See page 8 for more details.

Technical data

	placeALL® 510	placeALL® 600	placeALL® 600L
General data			
Assembly heads	1	1 or 2	1 or 2
Machine dimensions (L×W×H)	970×940×1240 mm	1060×1060×1350 mm	1420×1060×1350 mm
Position light	Red/Green	Red/Green	Red/Green
Max. components kittable			
- standalone	200	208	284
- inline	100	124	200
Available feeder types			
- Tape	8, 12, 16, 24, 32, 44, 56, 72 mm		
- Stick	Universal for up to 10 sticks		
- Tray	Yes		
- Tray exchanger	–	10×Tray	
- Strip	For all belt widths		
- Custom feeder	On demand (i.e. wired LEDs, Labels etc.)		
Dividable frame < 80 cm	Δ (not upgradable)		
Weight	250 kg	450 kg	550 kg
Placement area			
Min. circuit board size			
- stand-alone	5×5 mm		
- inline	30×30 mm		
Max. placement area without Vision	620×445 mm	620×400 mm	1020×400 mm
Max. circuit board strength	10 mm		
Max. component height	20 mm		
Placement speed			
Max. placement speed	4.000 cph	Single head: 6.000 cph, Two heads: 10.500 cph	
Measurement system			
Resolution X-Y-axis	0.5 micrometer (µm)		
Resolution Z-axis	8 micrometer (µm)		
Resolution R-axis	< 0.004°		
Accuracy			
- with Laser	+/- 100 µm		
- with Vision I	+/- 40 µm	+/- 30 µm	
- with Vision II	–	+/- 30 µm	
Smallest component	0402, Pitch 0.4 mm	01005, Pitch 0.3 mm	
Biggest component			
- with Laser	32×32 mm	22×22 mm (optional 32×32 mm)	
- with Vision I	45×45 mm (optional 70×70 mm)		
- with Vision II	–	50×50 mm	
Hardware			
Centering system			
- Laser (Cyberoptics)	•	•	•
- Vision I	Δ	Δ	Δ
- Vision II	–	Δ	Δ
Dispensing system			
- Standard (time/pressure)	Δ	Δ	Δ
- CD-04 (microprocessor)	Δ	Δ	Δ
Inline system	Δ	Δ	Δ
Second assembly head	–	Δ	Δ
Extendable to smartLINE	Yes	Yes	Yes
Software			
placeALL	placeALL 6.0		
Operating system	Windows XP or later		
Component library	•	•	•
Automatic fiducial recognition	Δ	Δ	Δ
Data input			
- direct	•	•	•
- teach in	•	•	•
- CAD Data	Δ	Δ	Δ
Offline programming	Δ	Δ	Δ
Barcode-kitting	Δ	Δ	Δ
Traceability	Δ	Δ	Δ
Warehouse management	Δ	Δ	Δ
Remote control	•	•	•
Line control	–	Δ	Δ
Job planning	Δ	Δ	Δ
Connectors			
Electrical	100-240V AC/1200W	100-240V AC/1500W	
Compressed air	6 bar, 75 psi, 0.01 micron filter, max. 150L/min		

• = Standard | Δ = Option, upgradable at any time | – = Not available

Other machines

Semiautomatic manipulator

We offer several manual and semi-automatic Pick & Place machines for building prototypes or producing small series. These manipulators offer all process steps, from dispensing solder paste / glue to placing components including Fine-Pitch. The devices can be equipped with bulk, tape or stick feeders, depending on the usage.

Rework station

The µPlacer is a selective placement and rework system. It can handle BGA, CSP, Fine-Pitch or custom components. All process steps like soldering or desoldering, placing parts, reballing or removing old solder can be carried out efficiently. During soldering, the µPlacer offers the possibility to monitor the melting process or inspect hidden solder balls afterwards.

Inline system

To achieve a higher placement rate and to be more flexible, multiple Pick & Place machines can be chained. The placement positions are split on demand, so either both mach lines handle the same product or two products can be assembled at the same time. Kitting times are further lowered by the raised feeder capacity.

Reflow oven

We provide different standalone or inline reflow soldering systems with approved glide zone heat chamber system for lead-free or leaded soldering or the curing of glue. Qutlines of boards or components can be easily measured and analyzed using the integrated thermal sensor. Several multi-channel measuring instruments are also available.

Worldwide distributors

A worldwide dealer network ensures the continued support of our products. Specially trained staff is available in each market. This guarantees fast response times on machines, training and spare parts.

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