FRITSCH

Competence in SMT

Fritsch GmbH
Bestückungs- und Montagesysteme
Kastler Straße 11
D-92280 Kastl-Utzenhofen
Germany

Tel. +49(0) 9625-9210-0
Fax +49(0) 9625-9210-49

www.fritsch-smt.com
info@fritsch-smt.com

TIME IS MONEY

FRITSCH

Competence in SMT

placeALL® 500

Modern SMT-manufacturing challenges the producer with new requirements. Former arguments, which were crucial in the past aren't as important today. New requirements emerge instead and can't be served by outdated machinery efficiently.

An important reason for a modern Pick&Place system is decreasing lot sizes accompanied by increasing component-complexity, which can be produced more cost-efficient. A large amount of modern products use a high degree of Fine-Pitch components and BGAs besides other popular SMD-parts. Whereas placing-speed was the ultimate goal formerly, it isn't that important anymore today. Much more crucial is the reduction of setup times and the increase of placement quality from lot 1 onwards. Average lot sizes today are often less than 100 units.

High flexibility together with a highly accurate and fast placement of components is imperative in today's manufacturing.

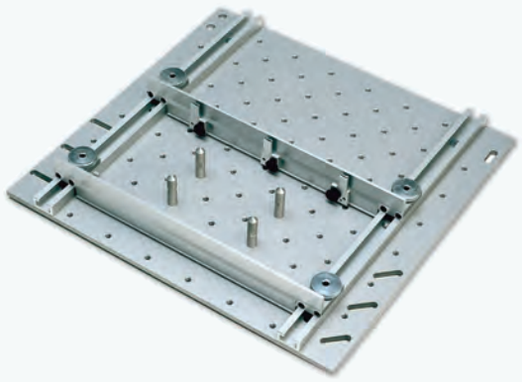
The **placeALL® 500** provides a series of hard- and software tools, which ensure high profitability. They were developed precisly for todays needs and offer :

placeALL® 500

- **Fitting up to 200 parts simultaneously on one system**
- **Modular system**
- **Placing up to 2500 parts per hour**
- **Automatic feeder recognition**
- **Universal CAD data converter for all file formats**
- **Lot size 1 standard**
- **Component library with over 300 parts**
- **Inline-capable using SMEMA-standard**
- **Dispense system for glue or soldering paste**
- **Fine-Pitch down to 0,4mm lead pitch**
- **Automatic reference-marker- und bad-circuit-board-recognition**

Basic devices

The **placeALL 500** is a modular built system and offers a placement capacity of up to 2500 components per hour. The stable and anti-warp assembly allows the handling of component sizes down to Fine-Pitch of 0.4 mm, µBGAs and 0402 parts.
With maximum 200 feeding positions and intelligent software the setup times are reduced to an absolute minimum. The Pick&Place system can be integrated into a production line using the SMEMA-standard inline conveyor or operated as a standalone machine.



Circuit board mounting

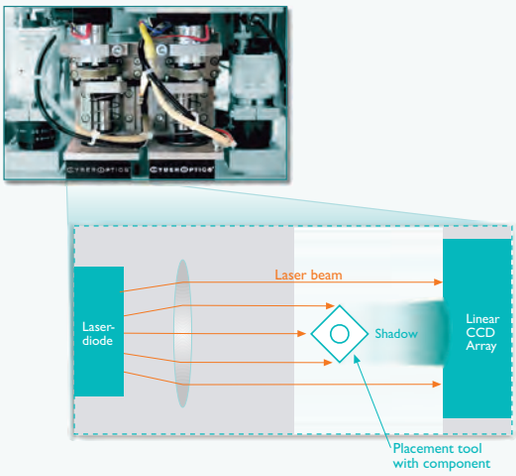
With the universal circuit board quick-clamp system for single- or double-sided boards with different sizes can be locked into position. Under-board support pins can be freely inserted to support especially large circuit boards. Alternatively chamfered board pins can be used. To handle flexible boards a vacuum tooling can be integrated into the placeALL machine. Tooling frames for single circuit boards and customer-specific seatings can be realized directly in-house.

Component centering

The component centering device is an essential part of the Pick&Place machine. It aligns the components exactly before placing them. This is most important for leaded Fine-Pitch parts, BGAs, CSPs, µBGAs and other special components.
There are different kinds of centering devices: Laser centering and optical(Vision) centering devices. Each of them can be assigned to particular tasks and components.

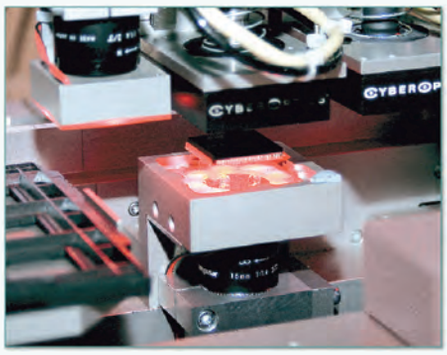
Laser centering (on the fly)

The patented laser centering device from **CyberOptics®** company projects a laser beam using a laser-diode on the component surface. By rotating the component and analyzing the shadow length, the part is centered. This centering device is mounted directly to the assembly head eliminating side trips. The angle-and position-measurement is processed on the fly, while the head is moving.
A lot of time is saved compared to stationary centering systems. The device can handle 0402 chips and parts up to 30x30mm border-length and a pitch of 0.5mm.



Optical centering (Vision System I)

This stationary vision system can be integrated into the machine when needed. The camera takes a picture of the component and a computer analyzes it. The image recognition software measures each of connection points or the outside shape of the part and calculates a correction factor. With this system the machine can accurately handle Fine-Pitch parts down to 0,4 mm pitch, BGAs/CSPs/µBGAs up to 50x50mm in size and special parts .



Feeder types

The pick&place machine can be equipped with different component feeder types :

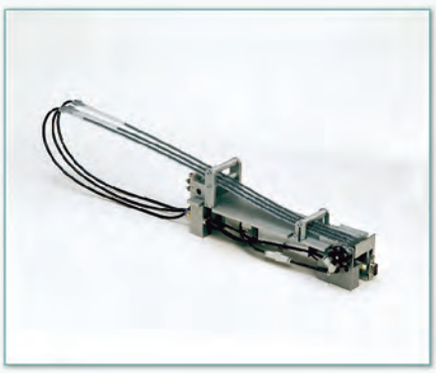
- Single-feeder for taped components on 8, 12, 16, 24, 32, 44mm reels
- Block feeder for 8mm reels (10 pieces on 5 slots)
- Stick feeders for 5, 10 or 20 sticks
- Universal receiver for belt sections
- Tray-Changer
- Custom feeder for special components (rivtes, leaded LEDs etc.)

Tape feeder

To process SMD components which come on taped reels we offer tape feeder in the following width of 8, 12, 16, 24, 32 and 44mm. All this feeders come as standard feeders and as smartFEEDERS (intelligent). The feeders can easily be fitted to the machine without having inaccuracies. For feeding 0402 components we offer half step feeders, which guarantee the short feed distance.

Block feeder

To keep set-up cost of projects and jobs as low as possible offer block-feeders double the number of 8mm tapes as normal feeders. This allows a large part count standard set-up on the system possible. Only a few project specific components then need to be changed when changing set-ups. Even in an inline system can you have up to 100 different component values on board, all block feeders are build as smartFeeders so the position of the feeders and values on the machine are recognised and the user is advised of the actual feeder details. The set-up of these feeders can be done easily using a barcode reader.



Stick feeder

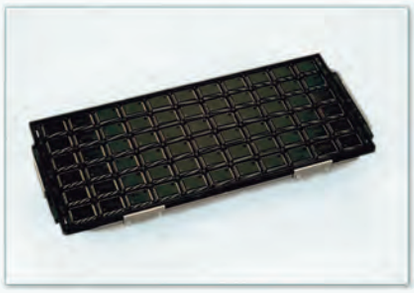
The compressed air driven stick feeder concept makes it possible to feed different size components side by side. During the feeding a pneumatic cover protects the components and makes it possible to feed them safely and reliably. Our stick feeders are available in 5, 10 or 20 stick blocks.

Tape-strip feeder

This feeder-type is especially used for the assembly of prototypes. The belt-section feeder delivers up to ten 8 mm (or less) belts simultaneously.

Tray feeder

Multiple trays can be used in the total assembly area of the machine. Therefore the assembly space can be adapted to different projects.



Custom feeders

FRITSCH combines research & development, design and production completely inhouse. Therefore we can handle customisation tasks, where the standard feeder-types cannot be used, i.e. rivet placing, leaded LED's, etc. Just ask us!

LED - Feeder

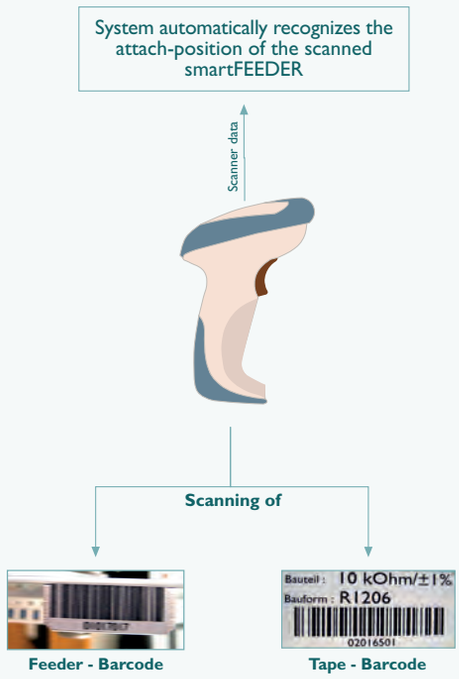
These feeders have been developed together with some of our customers to handle leaded LEDs. They are cut at a defined height and are then supplied for placement with the assembly head. Assembly of a big matrix-display is fast and easy with this feeder-type.

smartFEEDER

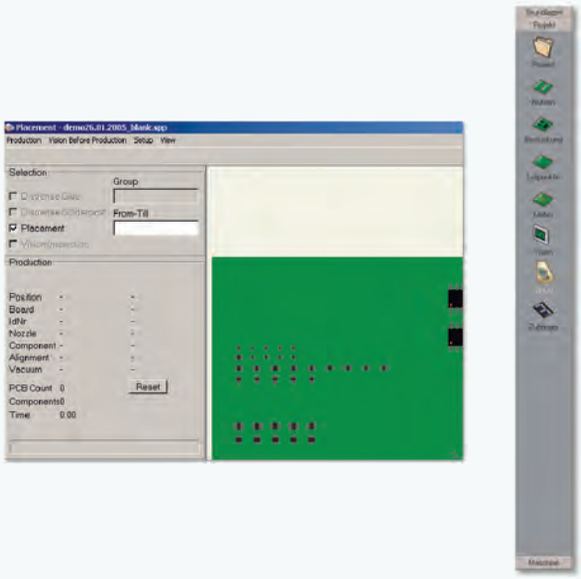
smartFEEDER are intelligent feeders that come with a built-in microprocessor control. The smartFEEDER permanently communicates with the placeALL machine. This produces the following advantages:

- Feeder position is recognized automatically during a feeder scan
- No re-programming at feeder-exchange
- Component description and quantities are stored directly in the feeder
- Replenishment is possible during production
- Free feeders are displayed on the monitor using different colors
- Display of part shortage using a minimum-level-warning (requires PAStorage)
- 100% setup-security

This optimizes production planning, gives you flexibility and reduces setup times.



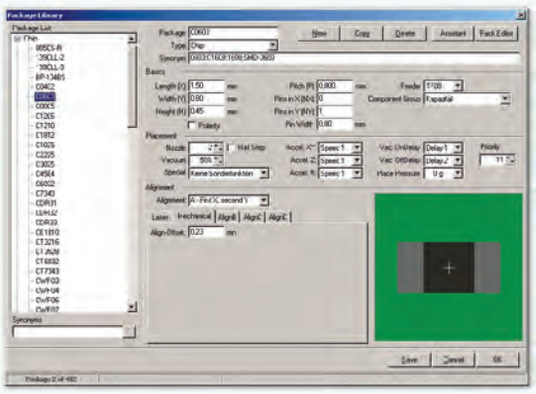
Software



Operation and programming

The user interface is menu-driven and works under Windows XP. The clearly laid out software guides the user step-by-step to the objective. To setup a new project or alter an existing one, each of the steps (see picture on the left) are run-through from top to bottom. For each step the parameters can be simply choosen with a mouseclick. Furthermore the user can rely on a detailled help system for each point. The smartASSISTANT monitors all actions, gives advice and shows every error source in plaintext, so the handbook-browsing is omitted.

Integration into an existing network is trouble-free.

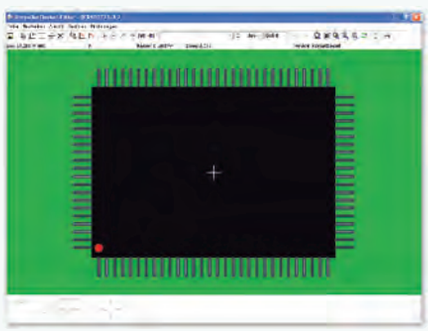


Component library

The integrated component library holds all assembly and model data of each component. These are :

- Component dimensions
- Traverse speed
- Placement tool to be used
- Adjustable vacuum levels
- Centering type (Laser orVision)
- Coordinates and volume of glue or solder paste dots
- Pin-1-display and Vision control points

The supplied spectrum of over 300 different component parts covers nearly all possibilities of everyday use. The library is one of the biggest on the market in this category. If however a part is not part of the standard library it can be easily added using the provided graphical editor. This tool can also be used to modify existing parts of the library.

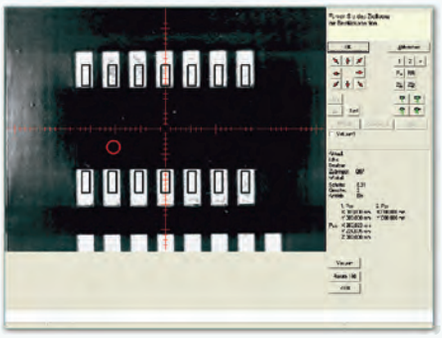


Component editor

If components are used, which are not included in the 300 parts in the library, a graphical component editor is at your hands. This new parts can be realized in a few simple steps, together with specifications of glue and solder-paste dots.

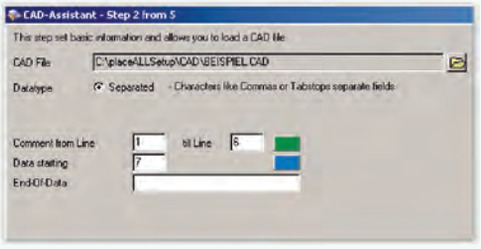
Teach In

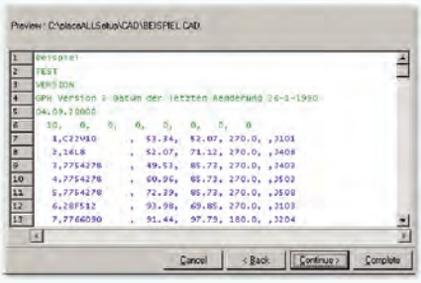
It is possible to enter the placement positions manually into the placeALL machine, for this the user drives the teach-in camera to the desired position. A virtual component is displayed in the camera window (see picture on the right). This virtual part can then be aligned exactly and brought into the correct position. After teaching this position the data is added to the program. Displaying a virtual component is a big advantage compared to the traditional basic crosshair.
This manual type of machine programming plays a less important role these days. In most of the cases CAD data is available or provided, this can be imported directly in to our systems reducing programming time dramatically.



CAD data conversion

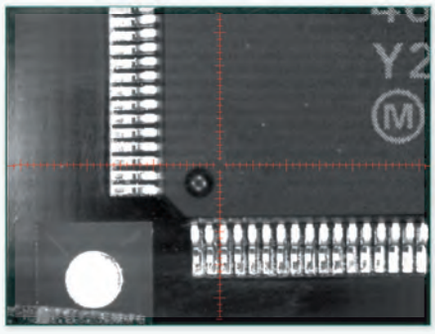
Our universal CAD data conversion module is part of our standard placeALL software. It marks the conversion between the CAD system and the placeALL machine. Using a conversion editor program, all CAD systems can be converted easily in a few software guided steps. Different setup files can be saved and reloaded when required. Therefore the conversion process takes very little time and can be carried out offline on a separate workstation leaving the placeALL all the processing power for the core tasks of assembling circuit boards.
(more details at "component library")

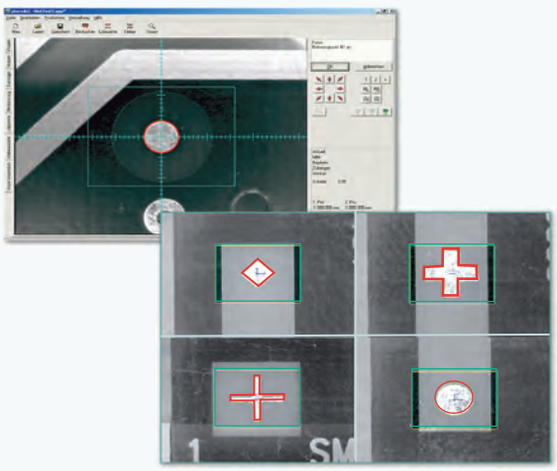




Visual inspection

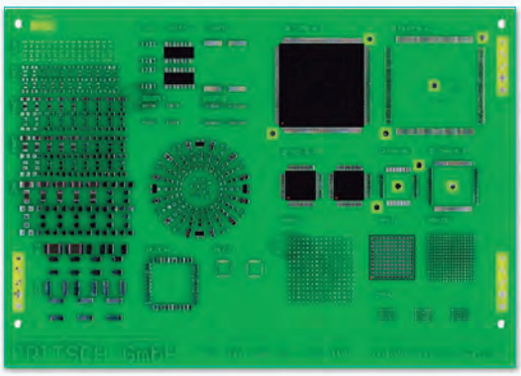
After transferring the CAD data into the machine, the virtual data verification can be used to simulate the assembly process. The camera is therefore placed above the circuit board to be assembled. At each stop position the virtual component is displayed virtually/ graphically. The part and the position can be checked and corrected if necessary. By this method prototypes can be produced error-free without wasting much time. You also can check already assembled circuit boards with this system too.





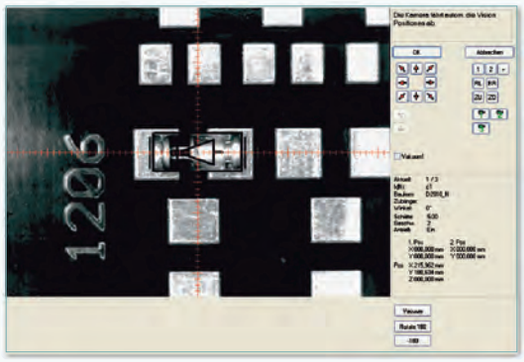
Automatic reference-marks and bad circuit board recognition

This option allows the automatic recognition of reference marks (fiducals) on circuit boards. The system is also recommended for use with an inline transport system. For PCB offset correction a mark (dot, cross, ring etc.) on the circuit board can be utilized. During the assembly of multiple PCBs in a panel, bad single boards can be marked manually for exclusion. These boards are recognized by the system and are skipped automatically.



Viewing the assembly process on the monitor

To update the user about the current status of the process at one glance, the circuit board and virtual assembly of components are displayed during actual production. This means, that as soon as a component is placed on the circuit board, this part is added on the display too.



Virtual quality inspection

To ensure correct placement of the components after assembly, the virtual quality inspection was developed. All placement positions are shown one after the other and you can check polarity and rotation of the component on the monitor.

PABarcode

All smartFEEDERs can be set up using a wireless barcode reader. Together with the warehousing module you can i.e. 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.

PAStatistics

To calculate a job all data - i.e. assembly time per board - is documented and analyzed.

PANetstate

All machine notifiactions are transmitted to a seperate workstation in the network and displayed there. The user is informed i.e. if production is finished and can initiate further steps.

PATrace

This modules documents, which component from which lot is used on which circuit board and with which order. By this specific production runs can be selected, i.e. in case of a recall enquiry.

Offline - version

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 placeALL machine afterwards.

Inline control

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

smartFEEDER

Data

PA Storage

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 automatically. The user is informed by adjustable minimum amounts, if a stock position 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, PAInventur and PAJobs.

PAOrder

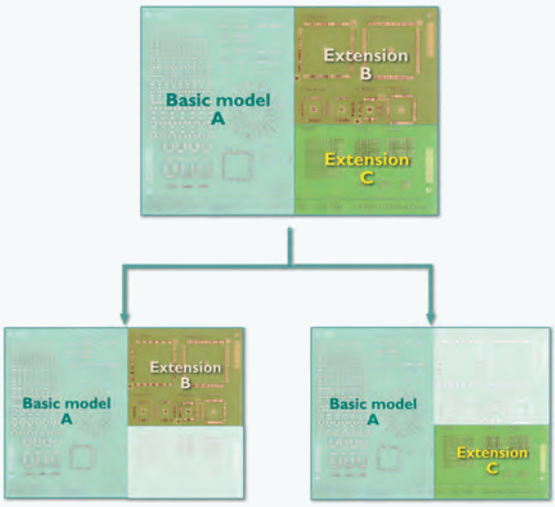
Together with PAStorage the minimum amount of each stock position is shown and - if neces-sary - are re-ordered from the supplier after the user has confirmed it in the system.

PAInventory

- Output of inventory lists
- Inventory balancing

PAJobs

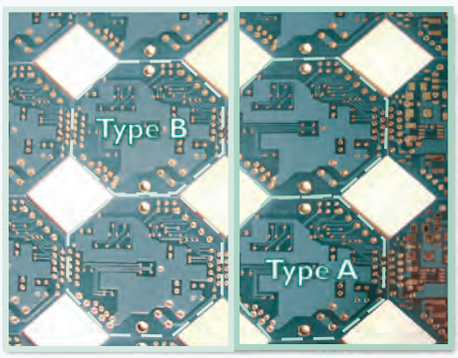
As production setups or change-over times are the most cost-intensive ones, PAJobs analyzes which of the predefined orders takes the least time to setup and suggests it to the user for production.



Variant assembly

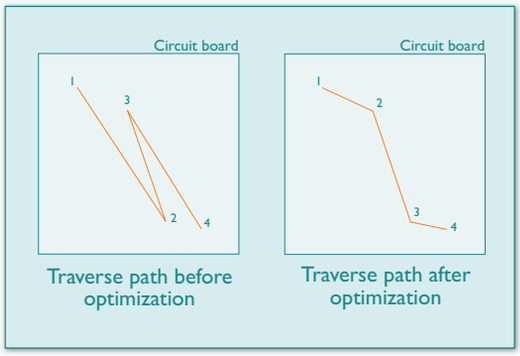
These days some circuit boards are produced in different variations. The placeALL software can manage them independently. For the production of such PCB's only the corresponding letter combination has to be entered, the preset combination is then assembled by the machine in production.

An example:
If a project consists of several different configurations, the components of the basic version can be marked with "A". The first extension is referred to with "B", the second one with "C".Now a series "AB" (basic + extension B) or an "ABC" variant (basic + extension B and C) can be produced easily (see left picture).



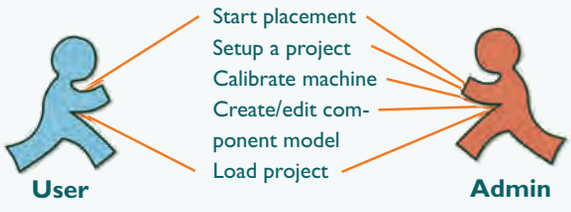
Mixed matrix-boards

To utilize the assembly area to the maximum degree, different products can be processed in one production run.
Mixed matrix-boards can be used, in which different board types are combined. The software optimizes the assembly for all defined projects.



Placement optimization

Prior to the production start the optimal assembly path is calculated. Optionally the software displays, which feeder positions would reduce the assembly paths further, increase placement speed. This time saving brings a lot especially when a large number of boards are produced. This optimization is used in a similar way for the dispensing process (see left picture).



User management

The user's administrator makes it possible to grant different rights to different users. You can define who is able to alter programs or update component libraries. These rights can be edited simply by clicking on the different production steps in the software.

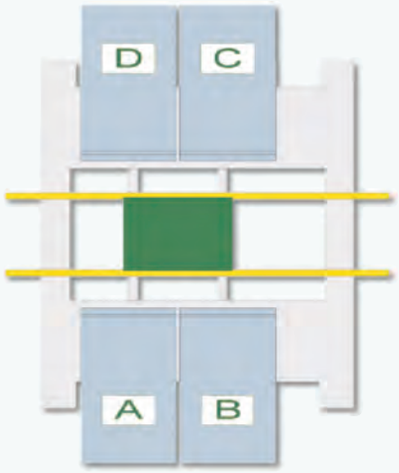
Options
Modular layout

During the machine's developement we focused on field upgradeability. By this the following options are available :

- Inline conveyor
- Vision centering
- Dispensing system
- Automatic reference-point and bad multiboard recognition
- Split machine frame
- Software modules
- Service kit

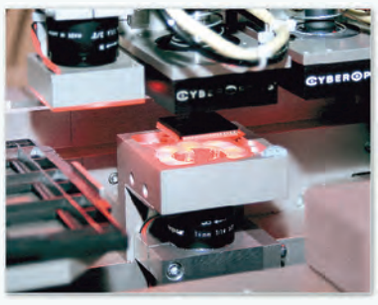
Inline conveyor

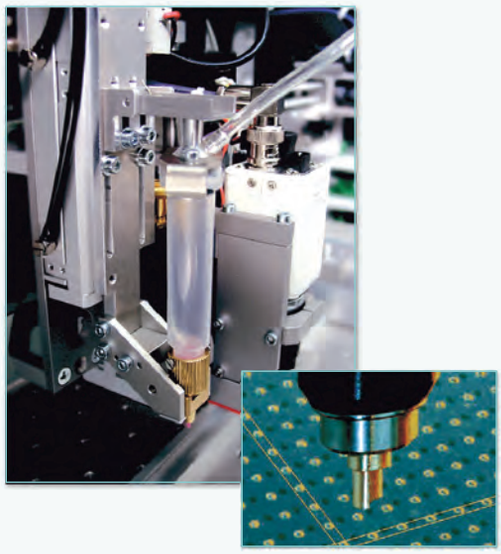
The inline conveyor system enables you to build a complete classic production line. This allows for both connecting the reflow systems as well as linking multiple placeALLs and transfer systems. When the circuit board enters the machine it is brought into position by a pneumatic stopper and fixed for production using an automatic lifting plate with adjustable under board support pins. The control follows the international SMEMA standard, READY contact or custom specifications.
During inline mode the placeALL 500 can handle up to 100 feeders.



Vision centering

All vision centering methods can be installed on demand at any time. Details can be found on page 4 of this brochure.





Dispensing system

For producing prototypes and small series it is better to dispense glue or solder paste automatically and assemble the components in a second step. We offer two different types of dispense systems:
The simple time-pressure system is normally used for glue or normal pitch components. With the patented CD-04 system a highly repeatable process is ensured by using additional parameters like temperature or cartridge fill-level as well as through the processor driven adjustments. Therefore it is possible to safely dispense volumes from 0,001 to 10 mm³. By this Fine-Pitch components down to 0,5 mm can be dispensed.

Automatic reference-point recognition

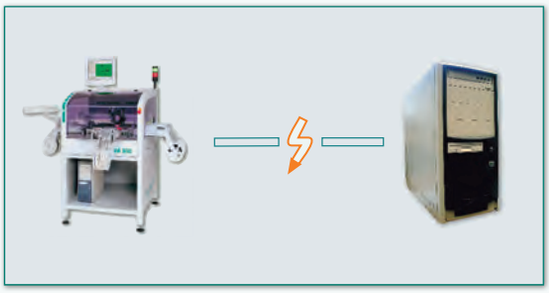
The automatic reference-point and bad circuitboard recognition can be installed on demand at any time. Details can be found on page 9 of this brochure.

Split machine frame

To pass narrow doors of 800mm width during installing of the placeALL machine, the machine frame can be build in two parts to ensure that both frame parts are smaller than 800mm. Installation is done on location.

Software modules

All modules described on page 10 of this brochure can be added to the software at any time.



Servicekit

The service kit provides the remote dial-in to the placeALL software, enabling our service staff to assist you in solving questions regarding installation or upgrading. You the customer has to approve the dial-in each time. With this method we can do remote diagnostics on possible problems and help you quickly.

other machines

Classic Line

Fritsch offers 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 tape or stick feeders depending on the practical usage.

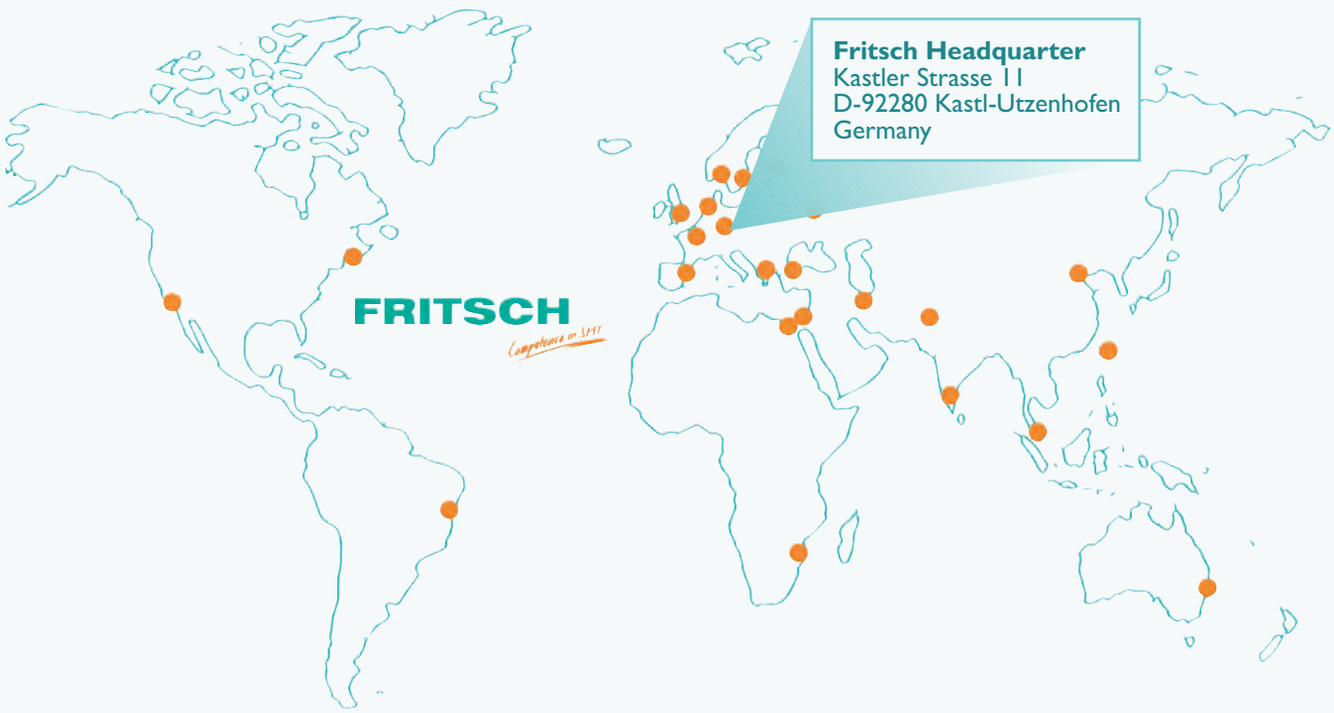
µPlacer

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

Worldwide support

A worldwide distributor network guarantees the support of all **FRITSCH** products. Specially trained service personal is available in each country. To expedite the fast supply of devices and spare parts, these are stored at the corresponding service point.

Worldwide Fritsch distributors



Distributor in your country

Fritsch Headquarter
Kastler Strasse 11
D-92280 Kastl-Utzenhofen
Germany

fon +49 (0) 96 25 / 92 10 -0
fax +49 (0) 96 25 / 92 10 -49

www.fritsch-smt.com
info@fritsch-smt.com