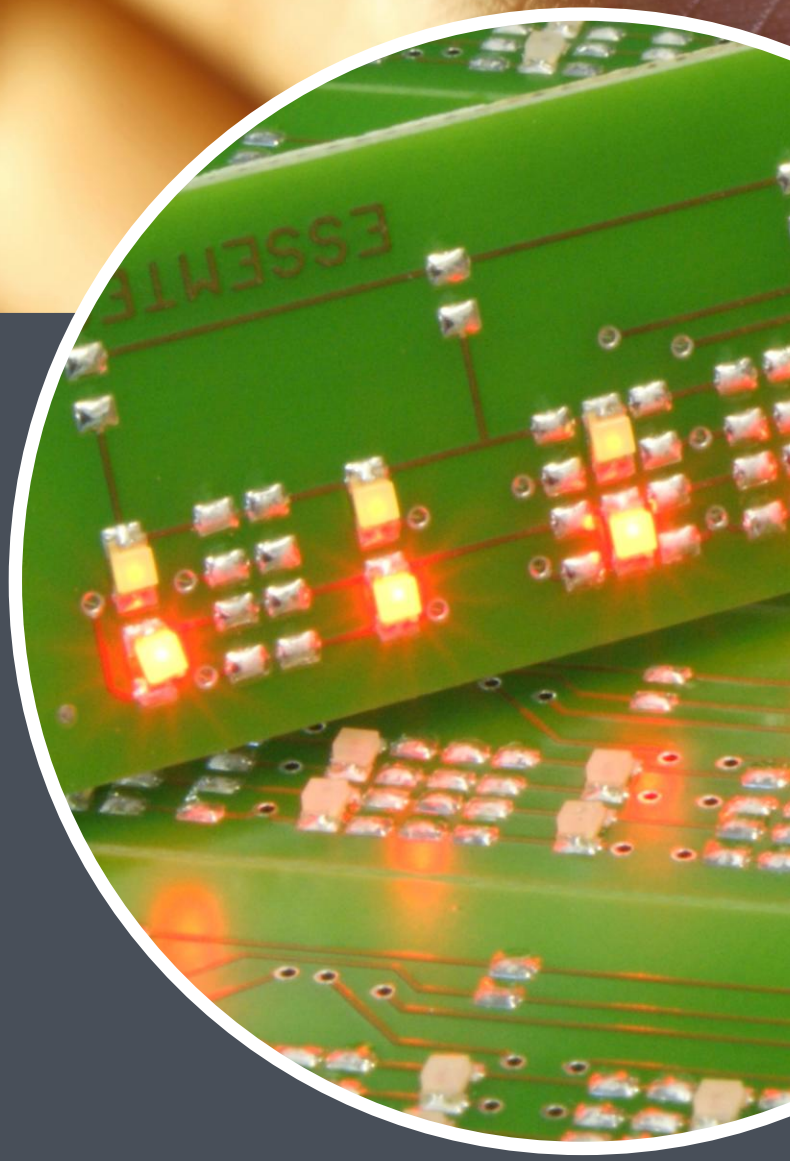
essemtec

# **LED** Production Technologies

Machines for LED manufacturing and assembly



**LED Manufacturing**

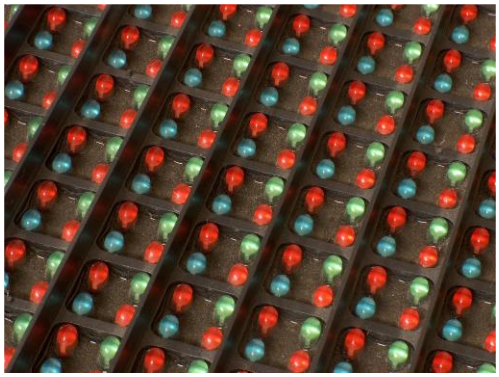
- Dispensing
- Die Bonding

**LED Assembly**

- Pick&Place
- Dispensing
- Soldering
- Curing

swiss made

# Production Systems for Light-Emitting Diodes (LED)



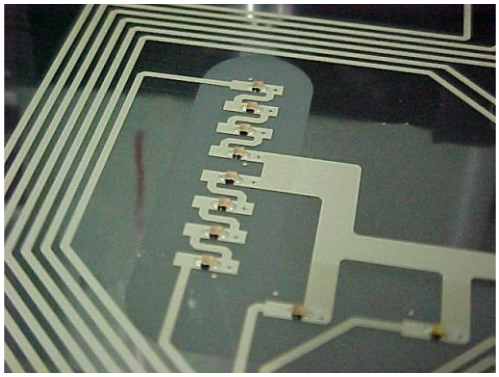
Dispens technologies from Essemtec are used for sealing and encapsulation of LEDs, for lens creation or for adhesive metering.

## LED Manufacturing

- **LED encapsulation**
- **Production of LED lenses**

## LED Assembly

- **Dispensing of conductive glue**
- **Dispensing of adhesives**
- **Placement of LED (SMD or through hole) onto PCB, foils and other materials**
- **Soldering or curing of LED connections**
- **Manufacturing of complete keyboards with LED and keys (metal domes)**
- **Turnkey solutions for the flex board assembly (standalone or reel to reel)**



With Essemtec's pick&place technologies LEDs of any form can be mounted precisely: Naked chips (dies), SMD-components, through-hole components or complete LED modules.

LED technologies continuously record high growth rates. The high efficiency, the low energy consumption, the small dimensions and the versatile applications increase the popularity of these semiconductor products to developers, manufacturers and end-users.

Essemtec's production systems are used for the manufacturing and the assembly of LED since many years. Due to the flexibility of the machines and their developers standard and special applications can be realized within very short time.

Soldering and curing technologies from Essemtec are available as batch or in-line systems. Hot air convection, UV or IR machines are configured according to the application.

### Dispenser

The flexible, automatic dispensing system CDS6200 can be used for any liquid media. The machine can be configured with different valve types for the dispensing of dots, lines or curves. Non-contact metering or "jetting" of various liquids is possible:

- Adhesives
- Conductive glues
- Solder paste
- Encapsulation
- Sealing media
- Optical plastics
- Fluids and pastes with fillers
- etc.

### Pick&Place system

The fully automatic pick&place system FLX2011 is highly flexible and can be used for various applications. It is available in different sizes as standalone, in-line or batch type with or without vacuum table. Additionally it can be equipped with one or two dispensing valves. Therefore, it is an universal system for all application tasks such as:

- SMD assembly
- Through hole mount
- Connector assembly
- Die placement (die bonding)
- Metal dome placement for keyboards
- etc.

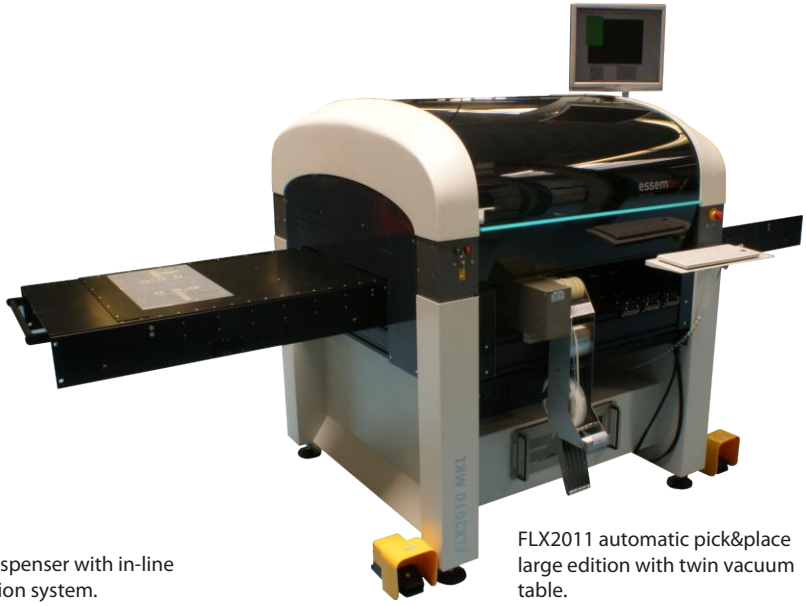
### Soldering and curing

The RO-VARIO is a versatile soldering and curing machine. The number of zones, the process technology and the type of transportation system (chain, mesh belt, chain over mesh) can be defined by the customer. Due to its flexible configuration, the machine can be used for various processes:

- Full convection reflow soldering and curing
- UV curing
- IR soldering and curing

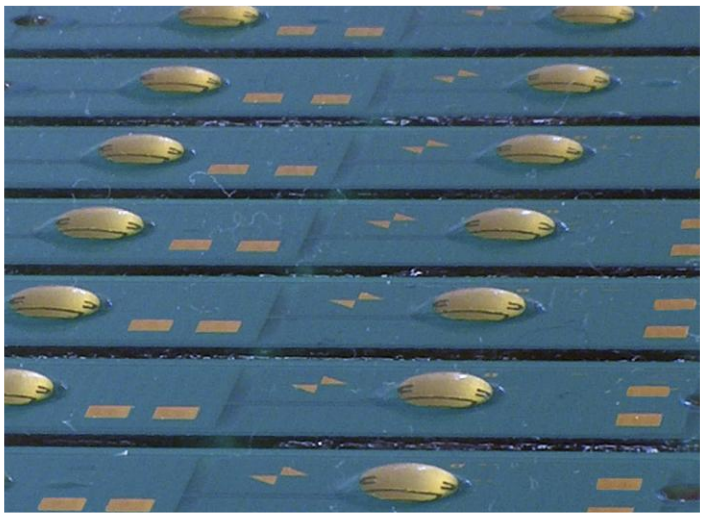

RO-VARIO, configured for full convection reflow soldering with 8 heating and 2 cooling zones.


CDS6200 dispenser with in-line transportation system.

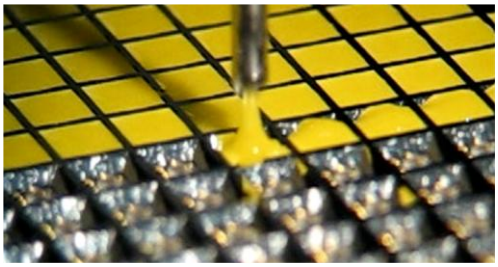


FLX2011 automatic pick&place large edition with twin vacuum table.

# Manufacturing of LEDs



LED lens creation on PCB level using a Jet dispensing system.



LED encapsulation in arrays requires precise, reproducible control of the dispensing volume.


High speed dispensing of glue using a Jet dispensing valve.

Building of production lines is simple due to standardized transport systems and interfaces.

For the manufacturing of light-emitting diodes (LEDs) various high precision pick&place, dispensing and soldering/ curing processes are required for which Essemtec's production machines are perfectly suited.

**Phosphor encapsulation**

Dispensing of the phosphor encapsulation for high power LEDs requires a highly accurate volume control. The CDS6200 dispensing machine is designed for such applications and can be equipped with a suitable precision dispensing valve.

**Lens dispensing**

The lens of an LED can be created directly on board level using a dispensing process. This requires best volume and position control achievable with a CDS6200 dispensing machine.

**Process adaptation**

Different dispensing valves are available such as Jet, archimedean screw or a heat/cool valve with time/pressure control. Due to the free choice of the dispensing technology (valve) the automatic dispenser CDS6200 can be adapted to any process requirement.

**Die placement (Die bonding)**

The SMD pick&place system FLX2011 can also place naked chips (dies) directly from trays onto various substrates. Adhesives are applied using the integrated dispenser or with an external metering system such as the CDS6200 (see above).

**Simple line integration**

Automatic machines with in-line transportation system are equipped with the standardized SMEMA interface. Therefore, the building of integrated production lines is simple.

# LED on flex-boards

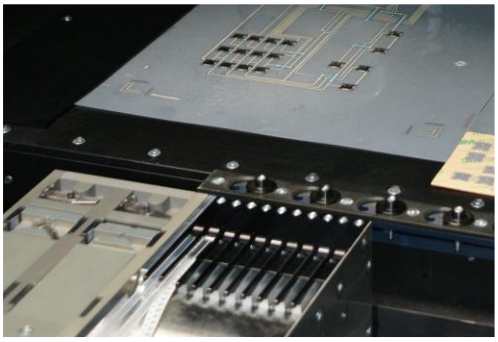
LEDs are often used with membrane keyboards and flex boards. The assembly on weak substrates requires special technologies to provide good electronic contact and mechanical strength.

The automatic machines FLX2011-MKL are multi-functional production cells for the manufacturing of membrane keyboards and other flexible circuits. The machines can dispense solder paste, conductive glues and adhesives and can mount SMD components and metal domes.

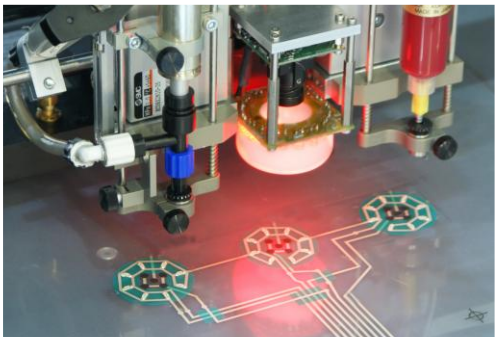
The vacuum table provides a big process area for large foils or many small flexible circuits. The integrated vision system searches for reference points and automatically corrects position offsets of each foil.

For more comfortable handling and security the vacuum table can be equipped with a shuttle mechanism for handling access outside of the machine. More throughput can be achieved using a twin vacuum table which has twice the size of the standard table and its ends protrude alternately from both sides of the placement machine.

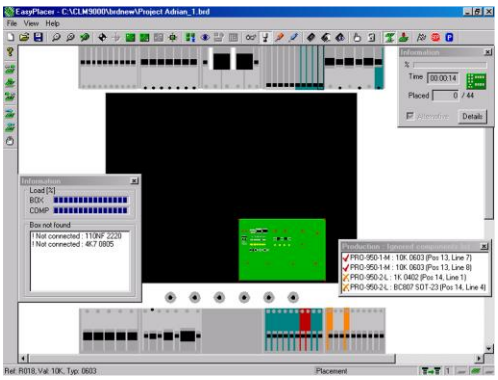
Handling tasks can be completed comfortably on the protruding side of the table, such as the placing of cover films, removal of assembled flex boards and the application of new film substrates. During this time, paste can be dispensed and components can be placed on the other end of the twin vacuum table in the machine.



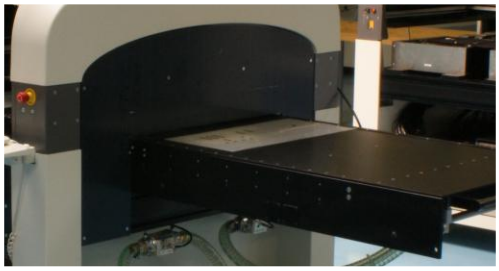
The flexible pick&place FLX2011 can be equipped with various feeders systems for SMD components and metal domes or customer specific feeding systems.



Up to two dispensing heads can be mounted in addition to the placement head. The dispensing valves can be selected according to the application.



Machines can be programmed using the original data from the CAD layout software. Separate programs for dispensing and placement processes are created.

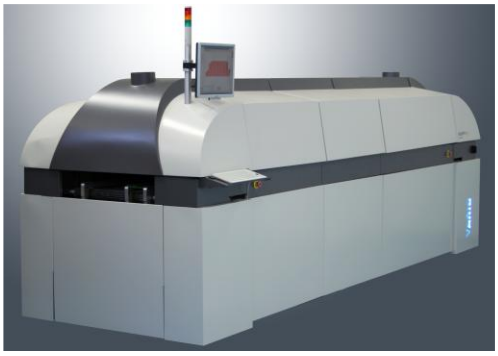


The vacuum table holds flex-boards securely. Different configurations are available with or without shuttle system.

LED assembly onto flexible substrate using conducive epoxy (green) and additional glue (black) providing mechanical strength.

# Soldering and curing of LED

Automatic pick&place FLX2011 in combination with a UV curing station.


RO-VARIO, a high variety soldering and curing system. The number and type of process zones as well as the transportation system can be configured according to the target process.


Special oven for soldering of LEDs onto polyester foils, a customer specific adaptation of the reflow oven RO300FC.

LED are either soldered or glued onto the substrate. Depending on the type of solder or adhesive convection heat, IR or UV radiation is required for the process. Thousands of Essemtec's reflow and curing systems are in daily operation. Many special solutions have been realized on customer demand and large know how is available.

**UV Curing**

For UV activated glues most often tunnel or batch type curing systems are selected which are equipped with according UV radiation modules.

**Soldering and curing with hot air or IR**

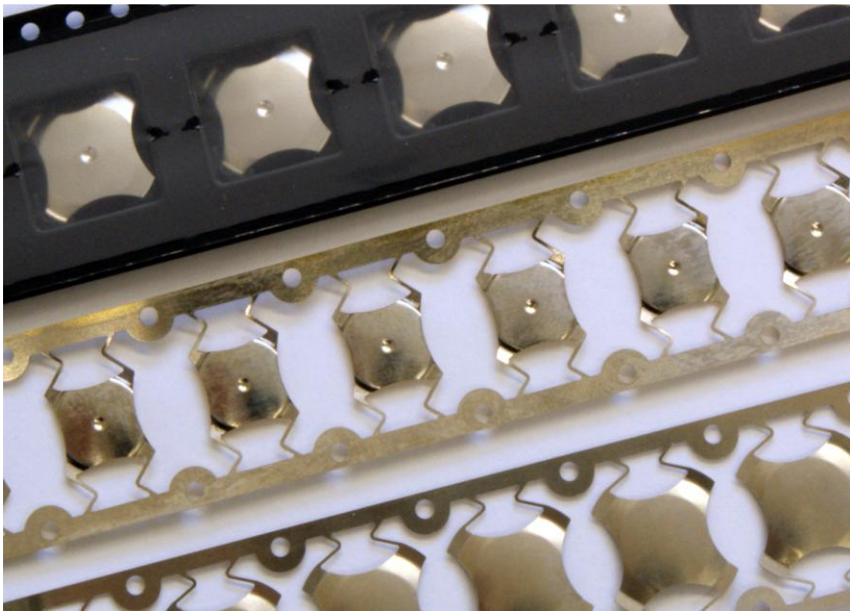
For such applications a wide variety of standard machines is available. The range covers table top models up to in-line or reel-to-reel systems. The number of heat- and cooling zones is selected depending on the application. Transport systems can be adapted, too, for example with product specific substrate holders.

**Soldering and curing on special foils**

Flex-board applications (especially PET/Polyester foils) require special heating processes to avoid shrinking or foil warping. Based on the full convection reflow oven RO300FC Essemtec has developed a special process control for such applications guaranteeing perfect solder joints and less heat stress for the foil.

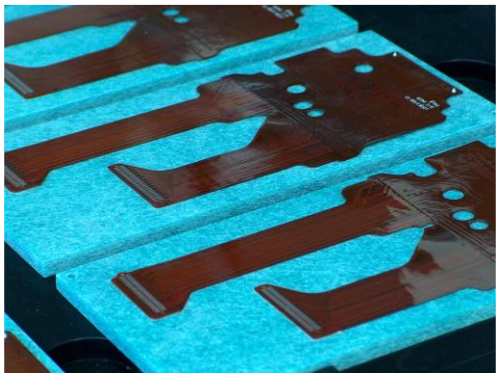
# Turnkey solutions

Flexible metal dome feeders for sticks, e.g. from Nicomatic.

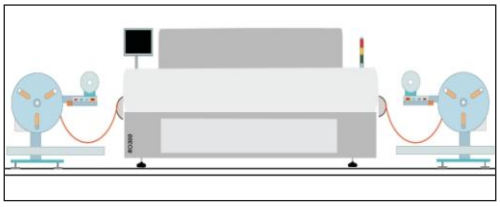


Metal domes in tape are separated using SMD standard feeders or with a punching feeder directly on the placement machine.

Conventional through-hole LEDs can be mounted with the flexible SMD pick&place system FLX2011, too.



Double-sided flex board assembly by means of heat-resistant vacuum supports.



For high volume production, Essemtec's assembly machines can be equipped with a reel-to-reel system.

LEDS most often are not mounted by their own but together with other components such as SMD, switching devices (metal domes), connectors and other parts. Essemtec has the know how and the product range to offer complete assembly solutions from one single source.

Standard feeding systems for taped components or parts in sticks are available. For other devices such as through-hole LEDs or metal domes specialized or customer specific feeding systems can be provided. Due to the flexibility of the machines even external feeding systems can be integrated into a turnkey solution.

The applications shown on this page can only be a small assortment of what has been solved already and what is possible. Contact Essemtec to find a solution for your LED production task!

Contact information is found on the last page of this brochure.

# Flexibility made in Switzerland

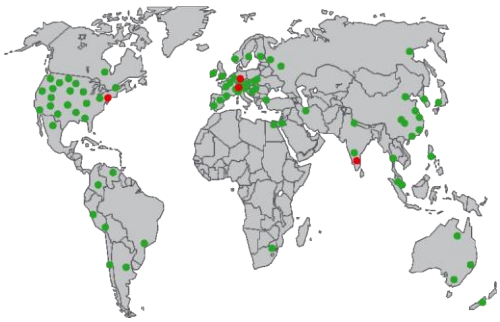
### The Company

Essemtec AG in Aesch, Switzerland, is developing, building and distributing flexible production systems. Founded in 1991, the enterprise has become a world leading manufacturer of machines for electronics production.

**One partner for the whole SMT process**

- Turnkey lines
- Lowest cost of ownership
- Flexible production equipment
  - Automatic dispensing systems
  - Screen/stencil printers
  - SMD pick&place machines
  - Reflow, soldering and curing systems
  - Production optimization software
  - Component storage systems
  - PCB handling units

essemtec flex



**Customized support solutions**
- Remote support software
- 24 hour hotline
- Local support
- Local spare parts

**Flexible services**
- Financing solutions
- Investment protection

**Individual know-how transfer**
- Process training
- Intranet for customers
- Worldwide competence centers

**Essemtec Solutions**
- Customer specific application solutions

### Swiss Made

Swiss Made stands for accurate and high quality lead products which are well known world wide. These products are designed and produced on the highest standards. Essemtec commits itself to these guidelines of quality.

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For a complete list of all representatives and more product information please visit our website:

**www.essemtec.com**