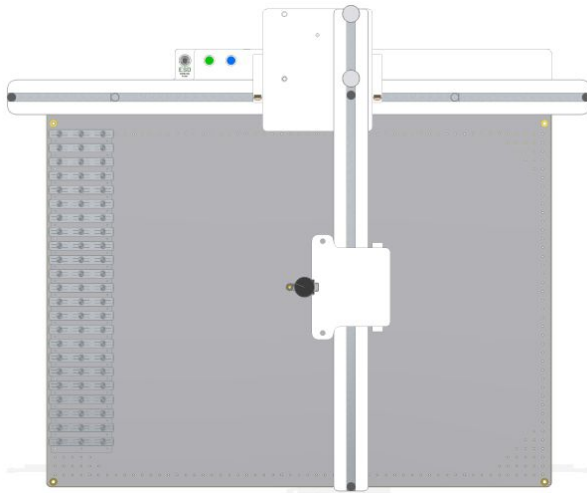


eC-placer User Manual



Please read this manual carefully before operating the eC-placer and keep it for further reference.

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Notice

Eurocircuits reserves the right to change the specifications of the hardware and software described in this manual at any time and without prior notice.

The PC program can only run in Windows and it requires .net 3.5

Using this eC-placer

Work environment

- The eC-placer is meant for indoor use where a proper power source is provided. The eC-placer should be stored in a clean and dry place if not in use.
- Do not expose the eC-placer to rain or other humidity.
- Place the eC-placer on a solid, hard, dry, stable surface. Leave proper clearance around the eC-placer (min. 10 cm). Do not place the eC-placer on a damaged or sensitive surface.

Specifications

Net weight: 15 kg approx.

Gross weight: 21 kg including the wooden crate

Dimensions: 670×580×200 mm

Power supply:

Nominal voltage
100-240V, 50-60Hz, 1A max
with 3 different plugs:
EU,UK,USA

Environment temperature:
5°C -40°C (41°F -104°F)

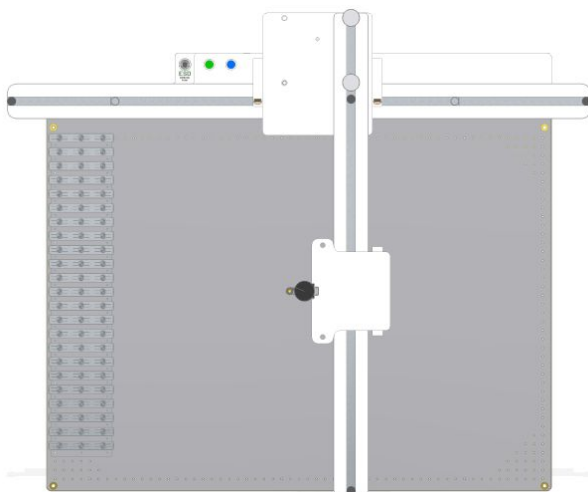
Power: 24W



How to deploy the power adapter?

See the "Assembling the power adapter" section.

Key features



The eC-placer is designed for mounting SMD components on prototype PCB's

- Manual pick & place tool with X, Y and Z movement and rotatable vacuum head.
- Easy nozzle change - similar to medical and disposable needles.
- Option to pick from tape or reel; easy-to-use feeder. The components can be moved along the X and Y axis, and rotated.
- Additional functions::
 - Placing from a template (for instance from an SMD stencil) with controllable limiter and brake; for higher precision and easy placement of larger components



- o Maximum PCB size that can be mounted : 400 x 440 mm.
Maximum PCB size using templates : 400 x 220 mm.
- Adjustable width of the feeder: 8-12-16-20-24mm.
- BGAs can be placed from an SMD components template
- 2 foot switches:
 - o one for the vacuum pump
 - o one for the X and Y brake
- Smallest component size 0402 (1×0.5mm)
- Adjustable USB microscope and PC viewing software guide your work
- ESD-compatible design, with earth bonding point connector
- ESD-safe table with 10×10 mm hole-matrix
- Easy conversion from right hand to left handed setup
- Overall dimensions: 670×580×200 mm
- Power input(without computer): 90...264V AC, 47...63 Hz, 24W;
EU,UK and USA plug



Declaration of compliance

Producer:

Eurocircuits Kft.

3324 Felsőtárkány

Berva-völgy HRSZ.: 2401/9.

Product Description:

SMD assembly device

100-240V, 50-60Hz, 24W

Shock protection class: II.

Type: -eC-009V00

This eC-placer complies with the following directives and standards:

Directives:

2014/35/EU

2004/108/EC

2011/65/EU

Standards:

IEC/EN 61010-1:2001

IEC/EN 61010-2-10:2003

IEC/EN 61326-1:2013

Identification plate

Input voltage, power

Version

eC-009V01

Rev: 00

eC Placer for Printed Circuits Boards

DC 24V = 1A

Eurocircuits Kft.

S/N: 15 009 01 01 0001

Made in Hungary



Manufacture Year (20xx)

Serial Number



This symbol indicates you should not throw away the used eC-placer with household waste. Return it to the manufacturer.



Safety precautions

Please read the following safety precautions before using this eC-placer.

- a) The manufacturer shall not be liable for any equipment damage or personal injury caused by incorrect installation or use, other than that covered in this manual.
- b) The eC-placer should only be used by trained personnel.
- c) Only install on a horizontal stable surface, never on a slanted surface.
- d) Do not modify any accessories and never use broken parts.
- e) Tighten all the screws (do not use excessive force to avoid breaking the screws or damaging their threads).
- f) Before operating the eC-placer, always make sure that the power cable is not worn out or damaged.
- g) DO NOT attempt to modify or repair the eC-placer yourself. In case of failure, contact us at euro@eurocircuits.com.
- h) This eC-placer is not a toy. Keep it away from children or pets.
- i) Maximum ambient temperature: +40°C (104°F).
- j) Minimum ambient temperature: +5°C (41°F).
- k) The power outlet MUST be easily reachable to cut off the power in case of emergency. The power can only be cut by unplugging the eC-placer from the power outlet. Even after you have turned off the eC-placer using the ON/OFF switch, it is still connected to live power.

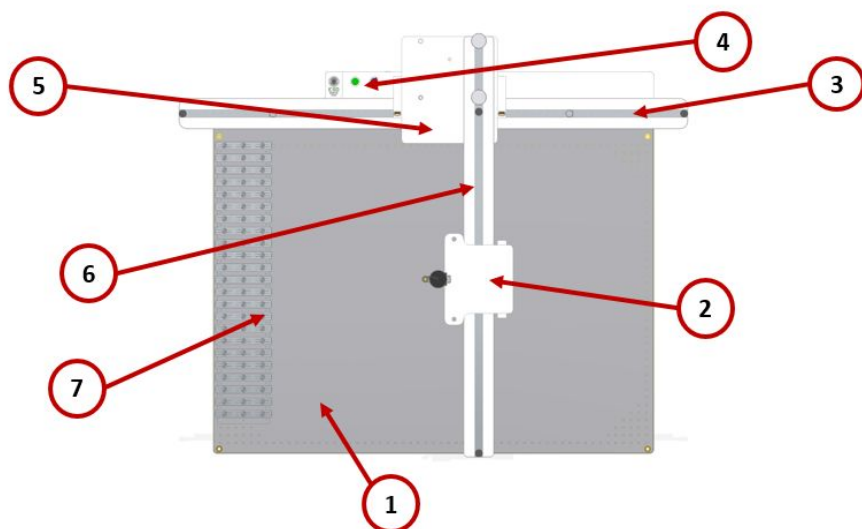


- l) Make sure that the flex cables cannot get stuck or get caught by anything during the movement of the YZ-block.
- m) The flex cables are sensitive. The sealing becomes more rigid in a cold environment.
- n) If you choose a big tip for small components, the vacuum may suck the components inside the tip. This can cause congestion of the air system.
- o) The PCB pins and the Stencil pins are small. Keep them out of reach of children.
- p) The brake is driven by electromagnets. Do not put items that are sensitive to magnetic fields around the eC-placer (credit cards, hard disks, compass, etc...)

If you have a pacemaker, consult your doctor before using the eC-placer.

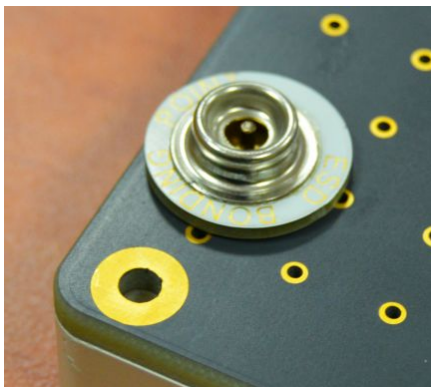
Parts of the eC-placer

Main parts



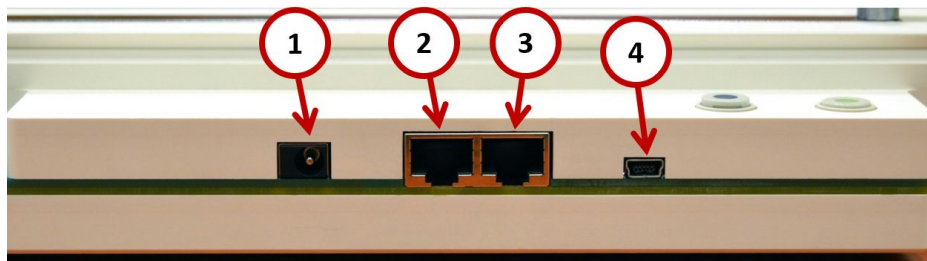
1 Base panel with hole matrix
 2 YZ-block
 3 X-rail
 4 Back panel

5 XY-block
 6 Y-rail
 7 Feeder



Put the ESD bonding point to one of the corners of the base panel where it does not disturb the movement of the X-rail or the placement of the feeder.

Back Panel



1. DC supply connector

Use the recommended 24VDC 1A power supply, delivered with the eC-placer.

Connector type: 5.5mm / 2.1mm



2. Vacuum pedal connector

Connector for the pedal activating the vacuum pump.

3. Brake pedal connector

Connector for the pedal that locks the movement of the X- and/or Y-axis

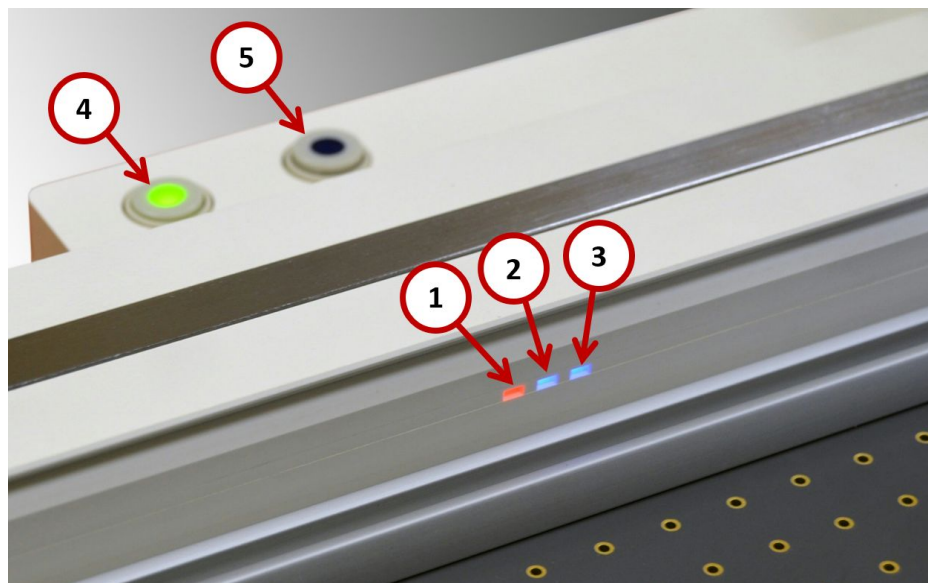


None of these are Ethernet ports although they look similar.
Do not plug any other devices to these connectors.

4. USB connector (service-port)

Connects the eC-placer to a PC for firmware updates (and further functions).

Buttons and function indicators



1. 2. and 3. Operating mode indicator LEDs

4. Main power switch.



Green light indicates the ON state of eC-placer.

5. Operating mode switch.

Press the button short to change between modes.

press the button longer (more than 1 sec.) to switch the LED lights around the placement head ON or OFF.

The blue LEDs indicate the current operating mode of the eC-placer.

The number of blue LEDs indicates the selected mode, Red LEDs indicate the brake is on.

When the brake is switched on or off, you hear a click.

Mode 0 - Free movement of the axes

All of the LEDs are off. Only the (4) green button indicates that the eC-placer is on. You can freely move the placement head in X and Y direction and you can operate the vacuum pump with its pedal.

Mode 1 - Y-axis fixed

One LED is blue.

Pushing the brake pedal fixes the Y-axis when the pedal is pressed

Mode 2 - Pick & Place from stencil to board (copy/paste function)

Two LEDs are blue.

Pushing the brake pedal limits YZ-block movement over the X-axis between the two ends of the rail which is on the X-axis.

Mode 3 - Head movement is locked in X and Y

Three LEDs are blue.

Pushing the brake pedal fixes the movement over the X- and Y-axis; you can move the component only in Z-direction (up and down)

For a detailed description of the modes see the "Using the eC-placer" section.



Assembling the eC-placer

Unpacking

Open the wooden crate.



Take all parts carefully from the foam wrapping as shown in the pictures below.





Content of the crate

- Base plate with X-rail
- XY-block
- Y-rail with rubber pin and 2 M5 screws
- YZ-block with placement head and LED light
- Feeder with 22pcs adjustable dividers
- X-axis limiter with 2 rubber pins
- 2 foot switches (pedals)
- DC 24V Power Supply with EU, UK, USA plugs
- USB microscope with holder and accessories
- 2 flex cables
- Air tube
- 4 different sizes of vacuum needles
- 3 rubber heads for vacuum needles
- 10 PCB-pins (equal as for the eC-stencil-FIX)
- 4 stencil Pins (equal as for the eC-stencil-FIX)
- Quick Manual with software download link
- 1 ESD Bonding Point for ESD wrist strap
- BGA head

Optional components

These components are sold separately

- Additional feeder
- eC-ESD wrist strap
- eC-ESD-plug
- ESD grounding-cord

Assembling the power adapter

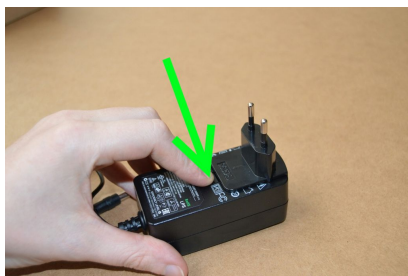
The power adapter is included in the box. It has exchangeable plugs. Choose the proper one according to your country as indicated on the plugs. Install it as shown on the pictures.



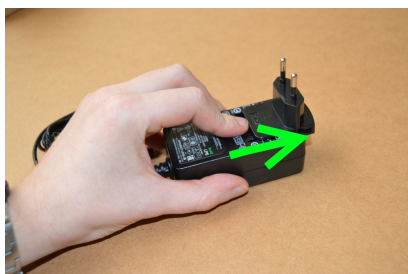
The power adapter has exchangeable plugs



Set the desired plug on the rail and push it to its place until it clicks.



To remove push down the button...



... and push the plug forward.

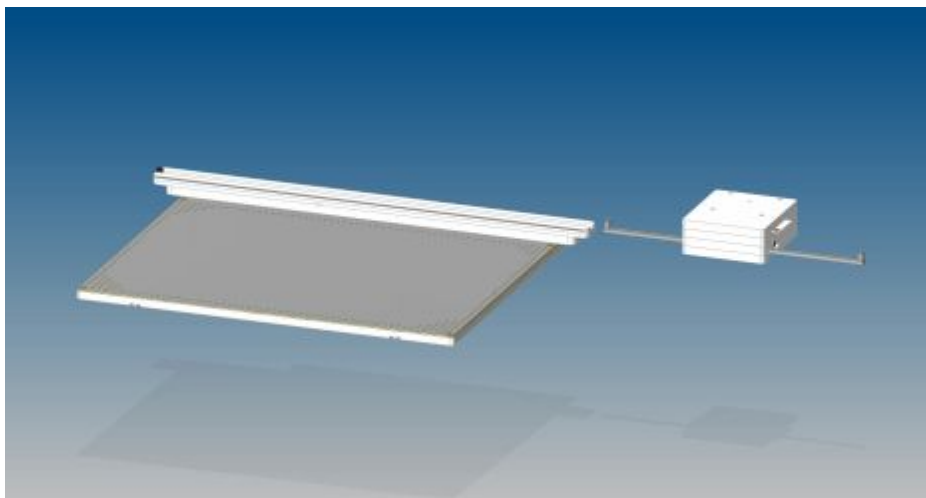
Prepare for first use

1. X-rail - X-rail limiter and XY-block

Add the wider flex cable to the XY-block.

Put the XY-block over the X-rail limiter.

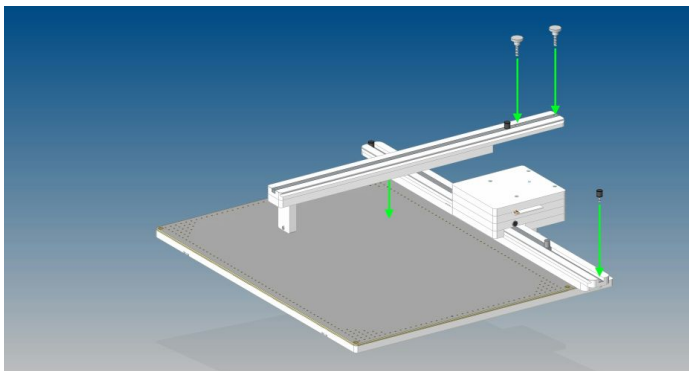
Slide the X-rail limiter and the XY-block over the X-rail. Pay attention to assemble it parallel with the X rail.



2. Y-rail

Add the back black rubber stopper.

Add the Y-rail and tighten with two M5 screws. The Y-rail can be positioned left or right on the XY-block, for right- or left-handed use of the eC-placer.



3. YZ-block

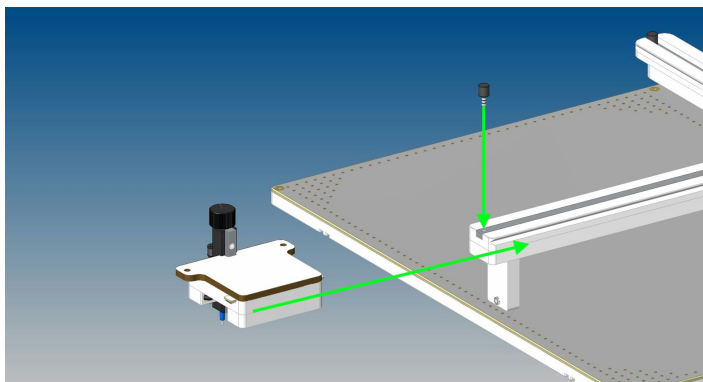
Add the smaller flex cable to the YZ-block.

Add the YZ-block onto the Y-rail; note it should be parallel with the rail.

Add the 2nd black rubber stopper.

Fix the flex cable to the other side of the XY-block.

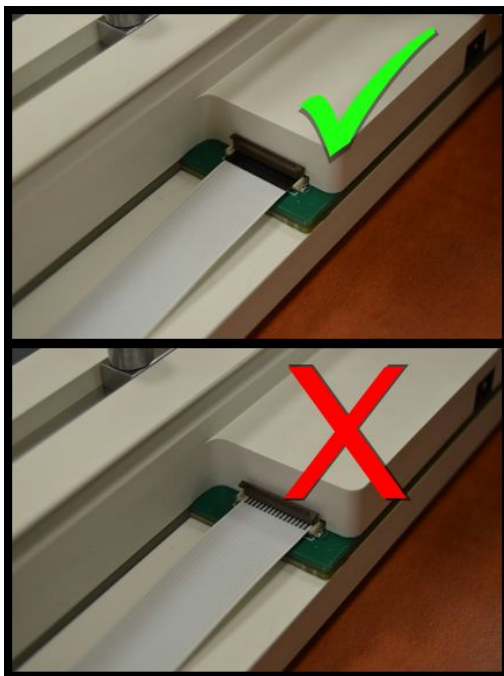
Add the front black rubber stopper.



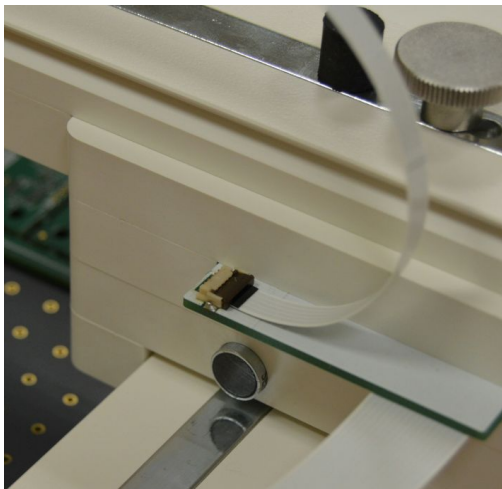
4. Connect the wider flex cable

Connect the wider flex cable to the other side of the connector.

The black side should be up (gold plated pads down).



Place the YZ-block flex cable to its place (different position for left or right handed mounting); the black side should be on top.



5. Plug the wires

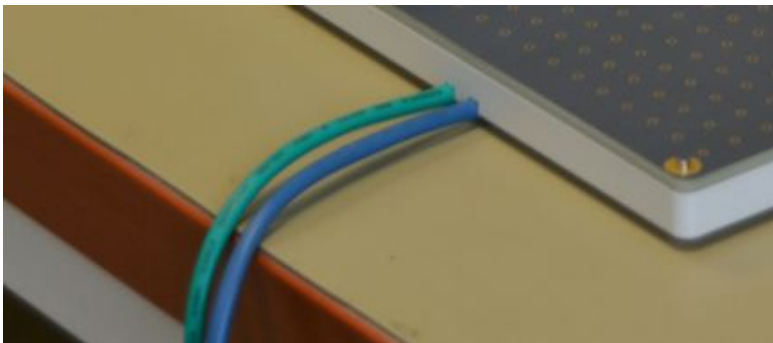
Connect the Power Supply and the cables for the pedals as shown on the picture.



Important: this is not an Ethernet port, it is for connecting the pedals only. If you connect a router or any other device to this Ethernet port you may damage both the eC-placer and the connected device.



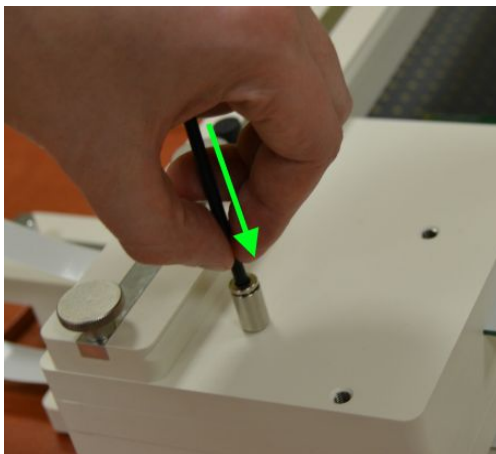
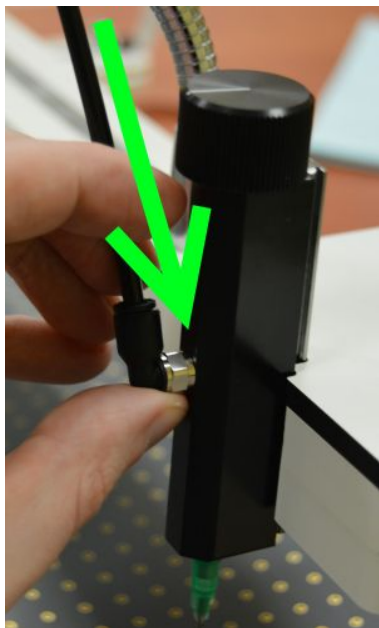
The cables can be guided around the back of the table or you can use the grooves in the bottom of the base plate to guide the cables to the front.



6. Air tubes

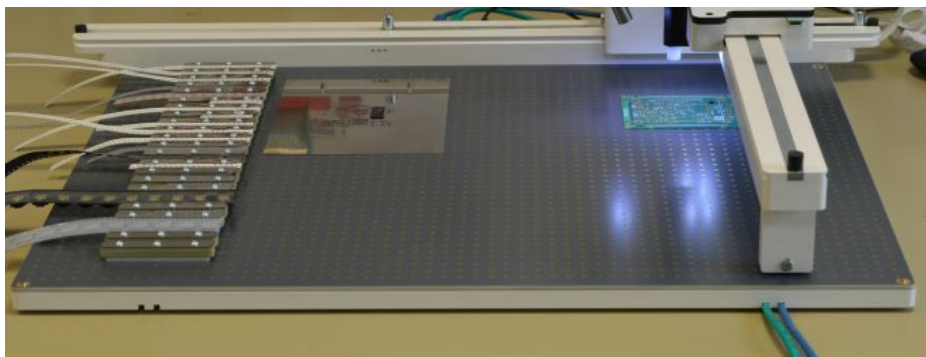
Connect the air tubes into their places as shown on the pictures below. Connect one end to the Z-axis, the other end to the XY-block. To prevent the tube from loosening accidentally, the tube is locked by the connector. To pull it out, press down the ring around the connector.

The tube is 75cm long and has a diameter of 4mm.
The tube is antistatic to avoid static charges.



7. Position the PCB and feeder

For right-handed use, place the feeder on the left. There are small pins on the bottom of the feeder to fix it to the base panel.



8. ESD plug

Since ESD becomes more and more important nowadays an ESD-plug can be connected to the eC-placer (optional). It contains a 1mega Ohm resistor.

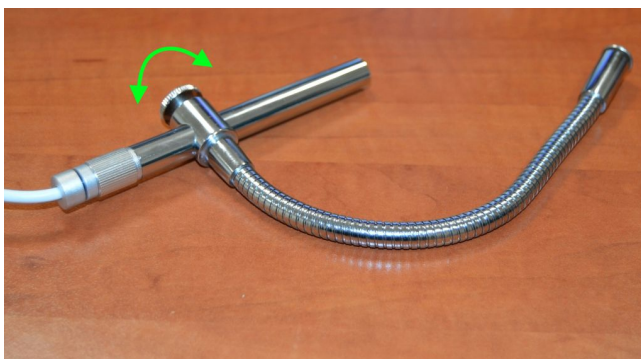


9. Assembling the camera/microscope

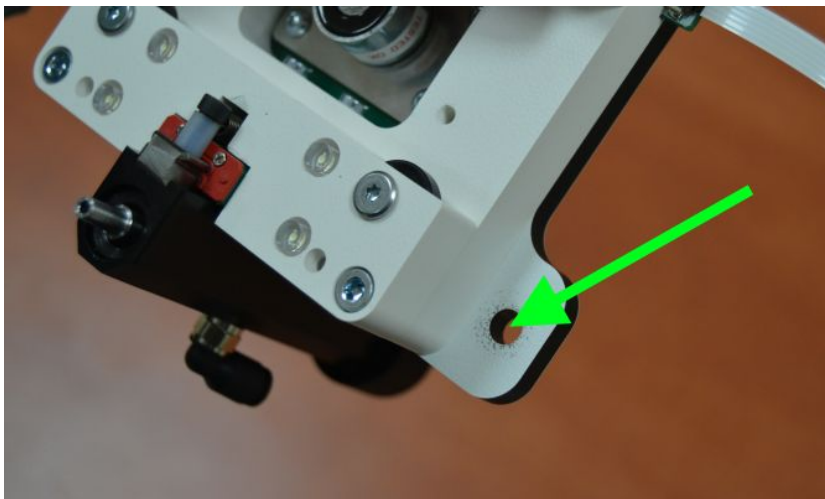
The camera may produce some heat. This is not an issue, it is normal.

Follow the steps below.

1. Take the microscope and its holder.
2. Assemble them and tighten the screw by hand until it is secure. Be careful, do not tighten with too much force then you may damage the camera.



3. Fix the camera-arm to the hole at the side of the YZ-block. There is one hole for right-handed use and one hole for left-handed use.



4. Setting the brightness of the camera

Set the brightness of the LEDs at the end of the camera with the potentiometer on the side of the cable holder.

The white button does not have any function.

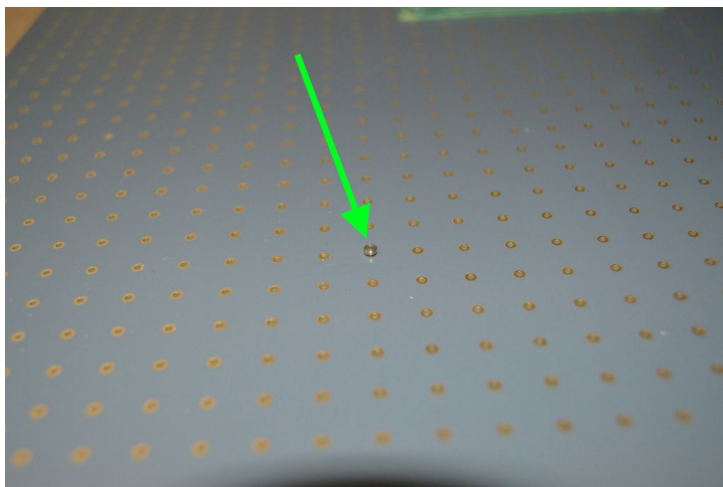
When the brightness of the LEDs is fluctuating try another USB port, or use an USB3.0 port if possible.

You have to restart the program. See later under "Use of the PC software"

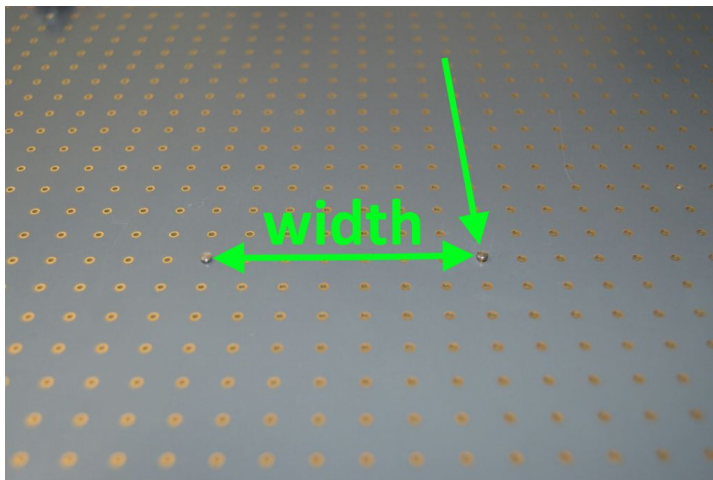


Using the eC-placer

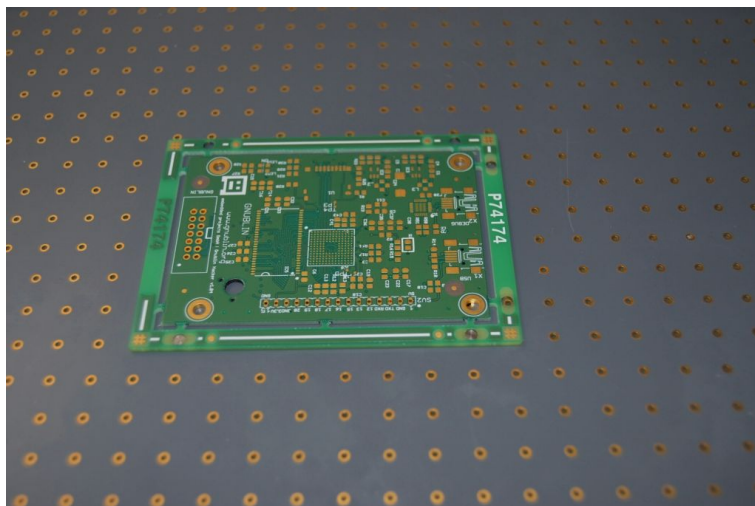
Placement of the PCB for eC-registration compatible panels



Put a PCB-holder pin into a hole on the base panel.



Put the second pin at the correct location, at the same distance as the distance between the two positioning holes in the PCB-border.



Place the PCB to the pins.



Component placement modes

Mode 0 - Free movement of axes

No LEDs lit = Free movement of the head.

Components are picked up using the vacuum head and can be placed anywhere on the PCB.

This is the most flexible mode, but you have to be skilled to place your components accurately .

Mode 1 - Y-axis fixed

One LED lit = Array placement mode.

Used to place a row of components along the Y-axis. Sets a stop on the X-axis so the head can only move along the Y-axis at that location. Secure the PCB on the machine bed using the eC-registration pins. Move the head to one of the component positions in the array. Use the foot-switch to fix the stop on the X-axis. Move the head freely to pick up components and come back against the X-axis stop to place components in the array along the Y-axis.

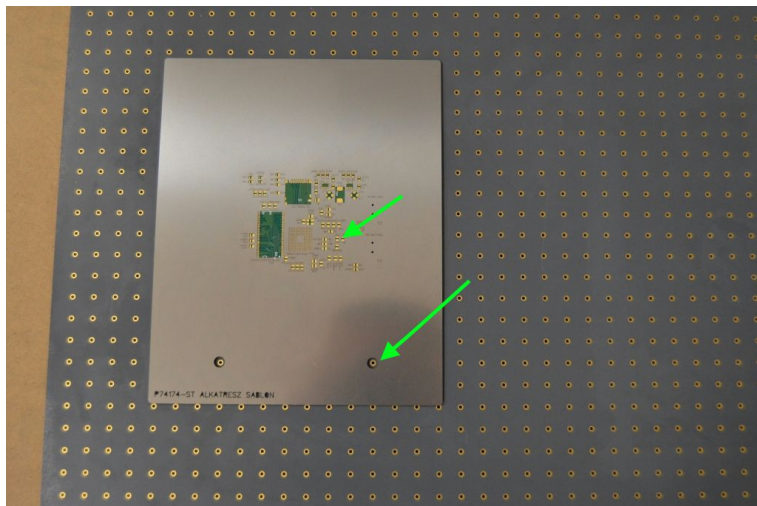
This mode is only precise if you pick the components always in the center.

Mode 2 - Copy position from stencil to board

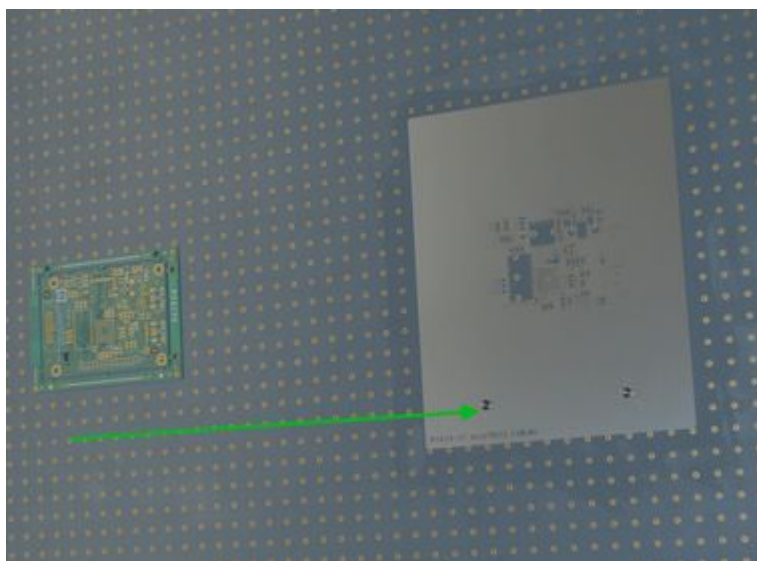
Two LEDs lit = Copy-paste mode.

Uses the eC-registration-compatible stencil already used to print the solder-paste as a template to locate components for fast and accurate placement. This is especially suited to BGAs and other large components which can centre themselves automatically into the paste openings in the stencil. Align the stencil-template and the PCB by pinning the eC-registration tooling holes in each into the 10 mm pitch tooling holes in the machine bed. Place the components manually onto the stencil-template. Use the foot-pedal to fix the distance between stencil-template and PCB. Now you can move the vacuum head over the component, lock the Y-axis and move the head the pre-set X-distance to the stop and place the component correctly on the PCB.

This mode is recommended for placing larger components, or components where connections are under the housing, like BGA components. The placement is accurate, however you need a special component template for it. The stencil you use for printing the solder paste can be used as template for this copy-paste mode.



Put the stencil on the PCB matching the pads and the positioning holes.



The distance between a position on the stencil and on the board should be 250mm. It is practical to put the PCB on the left and the stencil on the right in case of right-handed mode. Fix the stencil with two stencil pins (larger pins). This mode only works with eC-registration compatible panels and eC-registration compatible stencils.

Use the white BGA head (option) on the placing head to pick & place BGA's or other large components. Place the component at the right position, with correct rotation in the template.

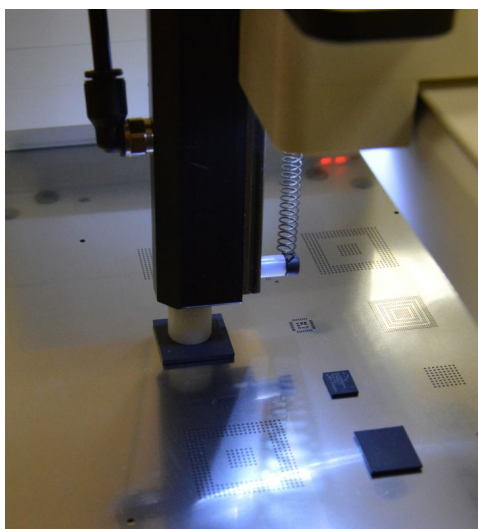
Push the magnet of the XY-block to the left metal X-axis limiter at the left side of the limiter bar.



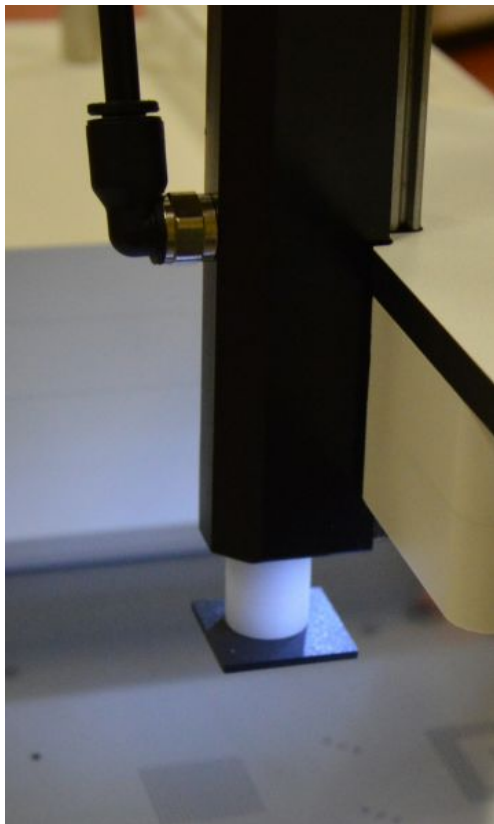
Select Mode 2 with the blue button: two LEDs are blue.



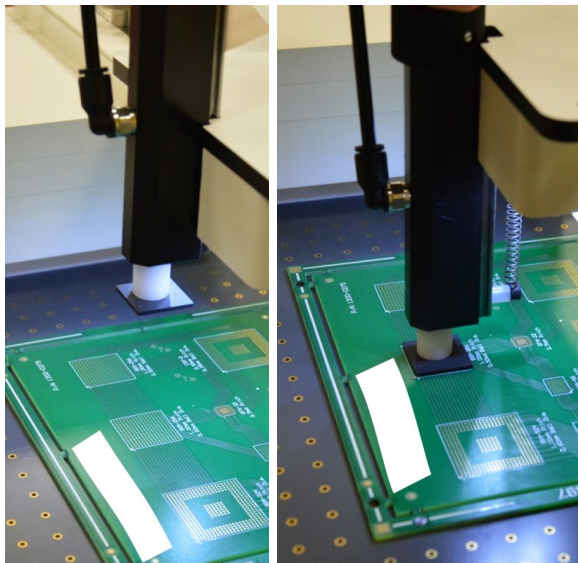
Pick the desired component and press and hold the brake pedal. Turn on the vacuum too with the other pedal (to take up the component), and hold the pedal.



Now you can lift the component.



Move the XY-block over the X-rail until you bump against the right side limiter. You should now be on the exact position over the PCB to place the component on its footprint.



Now you can lower the head with the component and release the vacuum pedal.

Repeat this for all similar components.

Mode 3 - Head movement is locked

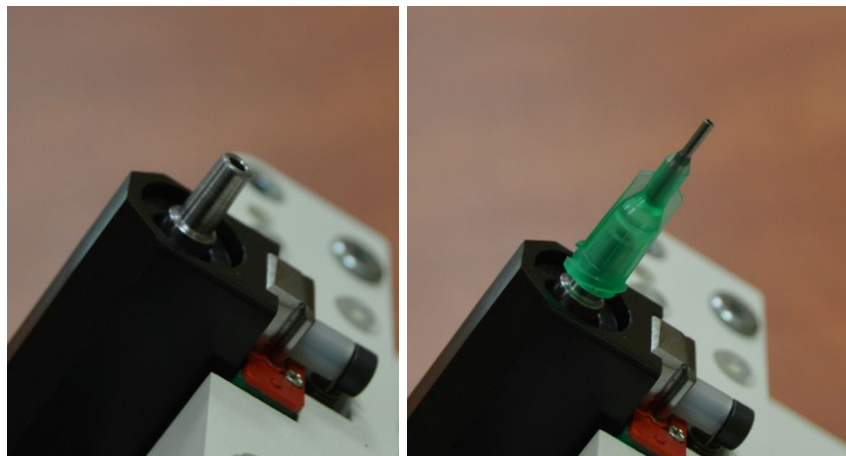
Three LEDs lit = Head completely fixed.

At any position in X and Y use the foot-pedal to lock both X- and Y-axis.

Now you can easily rotate and/or lower the component without the risk of moving the head.

It is recommended to use the camera assistance for small components and it is important to pick up the component in its center.

Placing the nozzles on the placement-head



Since the connector of the tip is a standard Luer-taper connector you can simply replace it manually.

Using the nozzles

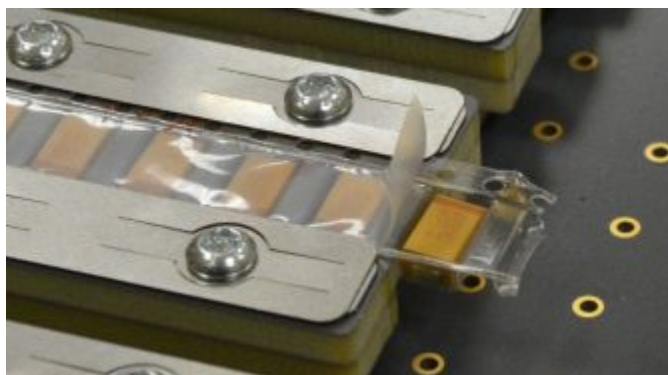
For BGA components we recommend our BGA head. (sold separately)

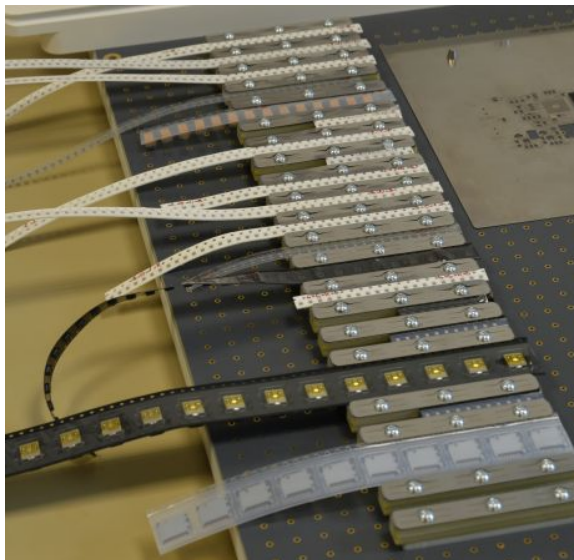
Always use a nozzle size in reference to the component size. Never use large nozzles for very small components as you may block the vacuum system.

Using the feeder



Place the tape in the feeder gaps just under the top metal plate. Note that the perforations should face up and the cellophane cover should be up in order to pick the components from the tape with the nozzle.





Using the eC-ESD-wrist-strap (sold separately)

Connect the eC-ESD-wrist-strap to the ESD bonding point. Make sure it fits well on both ends of the cable.

Wear the eC-ESD-wrist-strap on your left hand in right-handed mode.

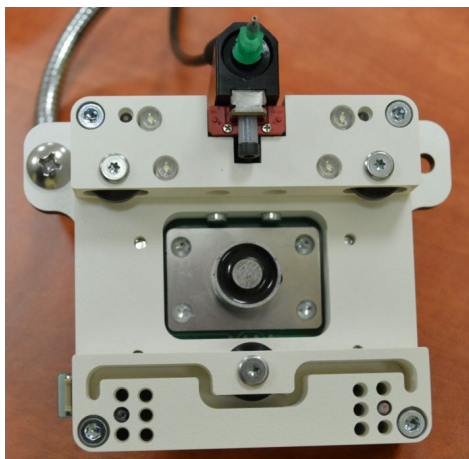


Adjusting the friction force between the YZ-block and the Y-rail

You can adjust how smooth the YZ-block moves over the Y-rail by placing the pins in the holes at the bottom of the block.

We set it at a default value at delivery, but over time, as the parts wear out, it can be necessary to adjust it.

Remember to set both sides to the same value.



The scale of friction level is shown in the picture.

1 is the smoothest, 6 is the toughest.



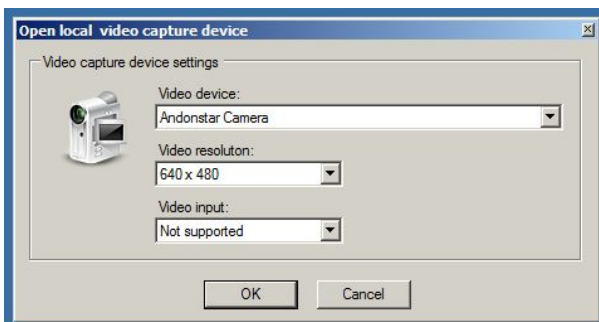
Use of the PC software

Download the PC software from our website. The software does not require any installation, just start it.

You can download the PC software from the following link:
<http://www.eurocircuits.com/ec-equipment-ec-placer>

On the PC, a screen resolution of minimum 1024×768 is required.

1. Connect the camera via a USB port.
2. Start the software (player.exe) Note that it can only run under Windows and that it requires .net 3.5.
If Windows asks for it, install it.
3. Select the resolution you want. We recommend 1280×960 or higher.



Soon the picture of the camera appears.

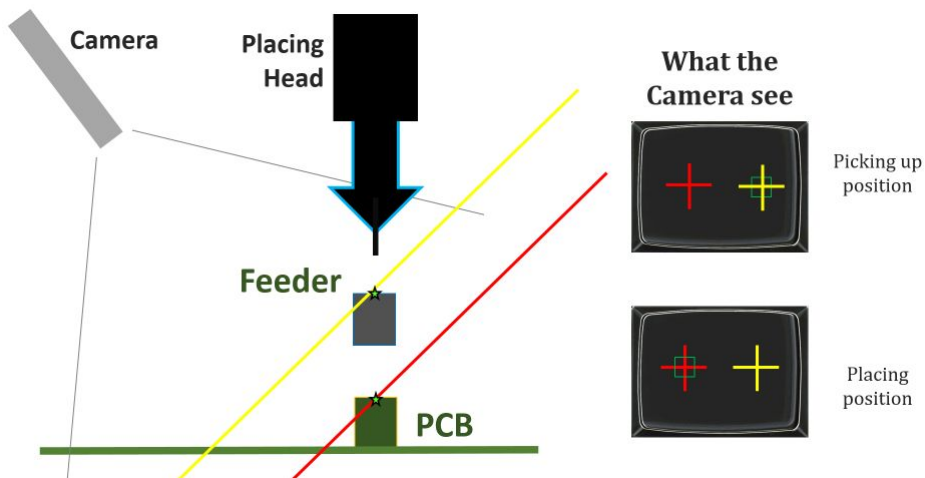
Rotate the camera to align the picture so that the movement on the screen follows the movement on the table..

Note that if you select a higher resolution, the fps will be lower.

You can drag the crosshairs with the mouse. Grab them by the yellow or red line.

Drag them to the desired position.

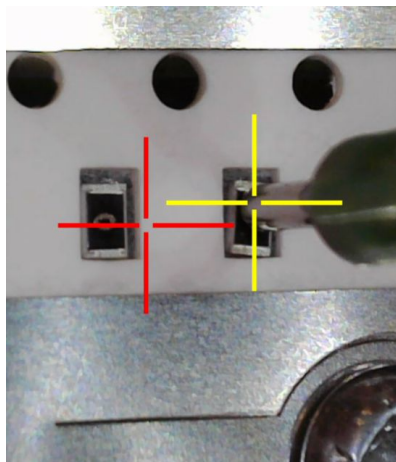
The camera has some parallax error (this is natural) since it looks at the PCB from another angle compared to the Feeder.



The figure above explains the parallax error. Since the feeder is at higher position than the PCB (different Z-coordinate), the same (X,Y) coordinate will have a different position on the screen showing what the camera sees.

Set the focus with the screw on the top of the camera.





Place the camera above the feeder.

Move the nozzle exactly on top of and touching the component in the feeder.

Drag the yellow crosshair with the mouse above the components' center point.

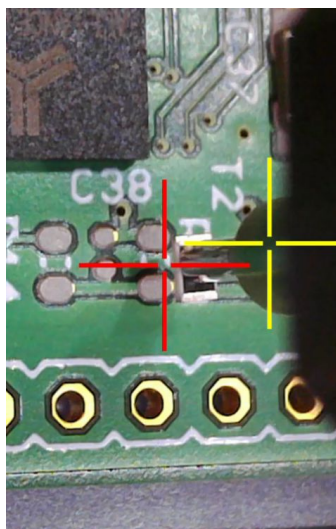
Your feeder pick position is now calibrated.

Activate the vacuum and pick up the component and move the YZ-block over the PCB and place the component onto its footprint by eye.

Drag the red crosshair to the center position of the footprint.

You have successfully calibrated the eC-placer.

Picking and placing further components can now be done by moving the YZ-block so that the yellow crosshair is at the middle point of the component you want to pick and subsequently after moving the red cross hair will be center of the footprint where you want to place this component.



BGA crosshair

Right-click anywhere in the program window near the video window. Select "BGA cross" from the context menu. The BGA crosshair appears.



Cleaning and maintenance

Before cleaning make sure the eC-placer is disconnected from the wall outlet.

Clean with a dry or moist cloth only.

In case a liquid is spilled over the eC-placer, disconnect it from the wall outlet and remove the power cable immediately. Wipe the eC-placer dry outside and also the inside. Wait at least one day until the humidity evaporates from the eC-placer before using it again.

If the cable of the power adapter wears out do not use the eC-placer until you have replaced the power adapter.

DO NOT make any internal adjustments or repairs by yourself, warranty will be voided. Contact our Support Services at euro@eurocircuits.com



Contents of the package

Type	Item	pcs	Identifier
	eC-placer	1	
Sunny SYS1357-2424	power adapter	1	
	PCB pins	10	
	Stencil-pins	10	

Nozzle head diameter

Name	Outer[mm]	Inner[mm]	Info
Metal 1 (561347)	0.7	0.4	http://www.fisnar.com/products/dispensing-tips/stainless-steel-dispensing-tips
Metal 2 (561124)	0.9	0.6	
Metal 3 (561123)	1.2	0.8	
Metal 4 (561347)	1.8	1.4	
BGA Head (ESD Pom)	10	8	see below
Rubber 1	3.5	1.5	http://www.tme.eu/hu/details/idl-p-sm830/ic-fogok/ideal-tek/p-sm830/
Rubber 2	6.5	1.5	
Rubber 3	9.5	1.5	

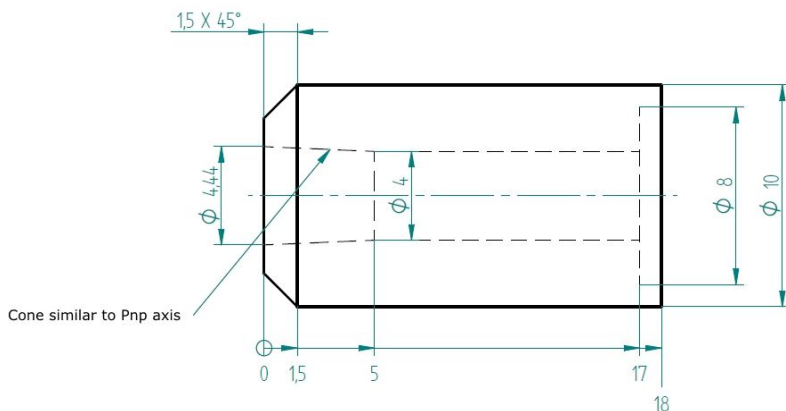
Options for the eC-placer

Additional feeder



If you place more PCBs or one PCB with many components.

BGA head



eC-ESD-wrist-strap



We recommend to wear it on your left hand. (in right-handed mode)

eC-ESD-plug





eC-ESD-grounding-cord





Waste management

The eC-placer may contain harmful parts for the environment. Do not put it into communal waste because it may harm the environment. Used electric devices are collected separately; use the recycle system.

Always obey the local law: give you old, non-working electronic devices to recycle center.

Since 13/08/2005 you can return your used device to the place of purchase; it will be disassembled and recycled properly.



Do not throw away your used device; send it back to the manufacturer or hand down to a recycle center.

Warranty Conditions

Our eC-placer is supplied with 12 months return-to-factory warranty. Faulty equipment should be returned using its original packaging to avoid transport damages- to Eurocircuits where it will be checked and repaired or replaced. This excludes consumables and accessories.

Contact

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