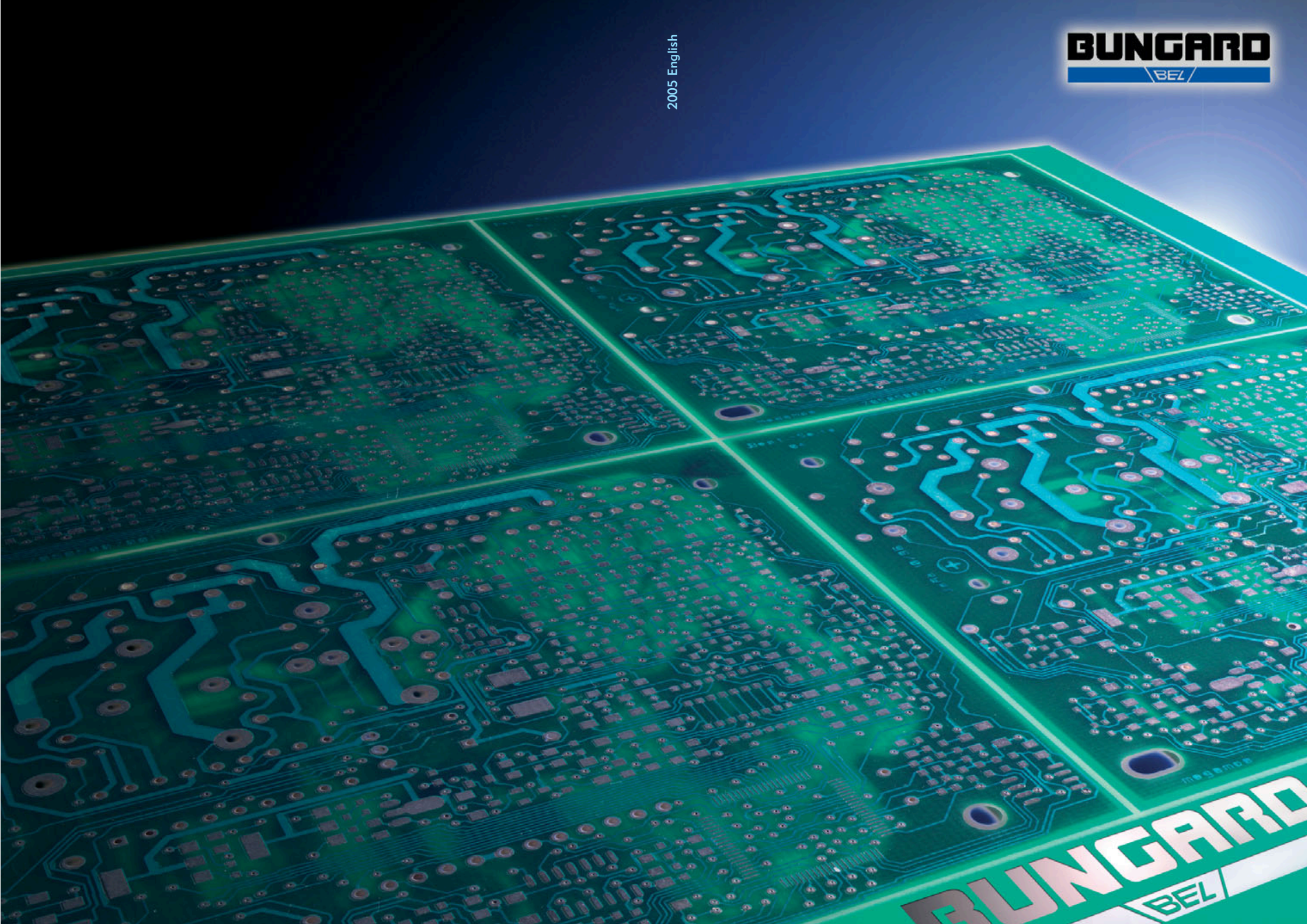
2005 English

BUNGARD

BEL



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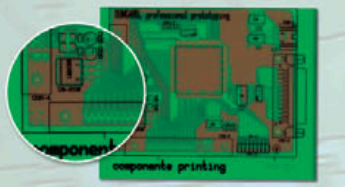
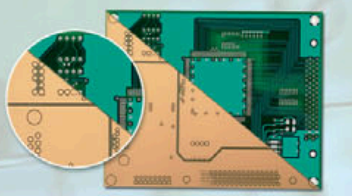
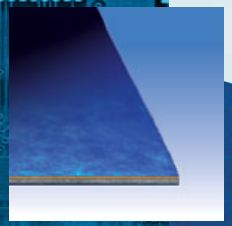
Sample Components printing



Sample outside multilayer



inside multilayer



ORIGINAL BUNGARD

PRESENSITIZED BOARD

The name ORIGINAL BUNGARD stands for highest quality and processing safety of presensitized laminates. Like no other comparable product, this material allows a fast, flexible and faultless production of PCBs in small series and prototypes.

We use first-choice laminates approved and certified by IPC 4101A. Several types of laminates, i.e. FR2, CEM1, FR4 and PTFE are available in thicknesses of 0.5, 0.8, 1.0, 1.6, 2.0 and 2.5 mm with either 18, 35 or 70 microns Copper. The max. panel size is 510 x 1150 mm. Our cutting service provides sheets down to 50 x 50 mm min. size, with an accuracy of 0.1 mm.

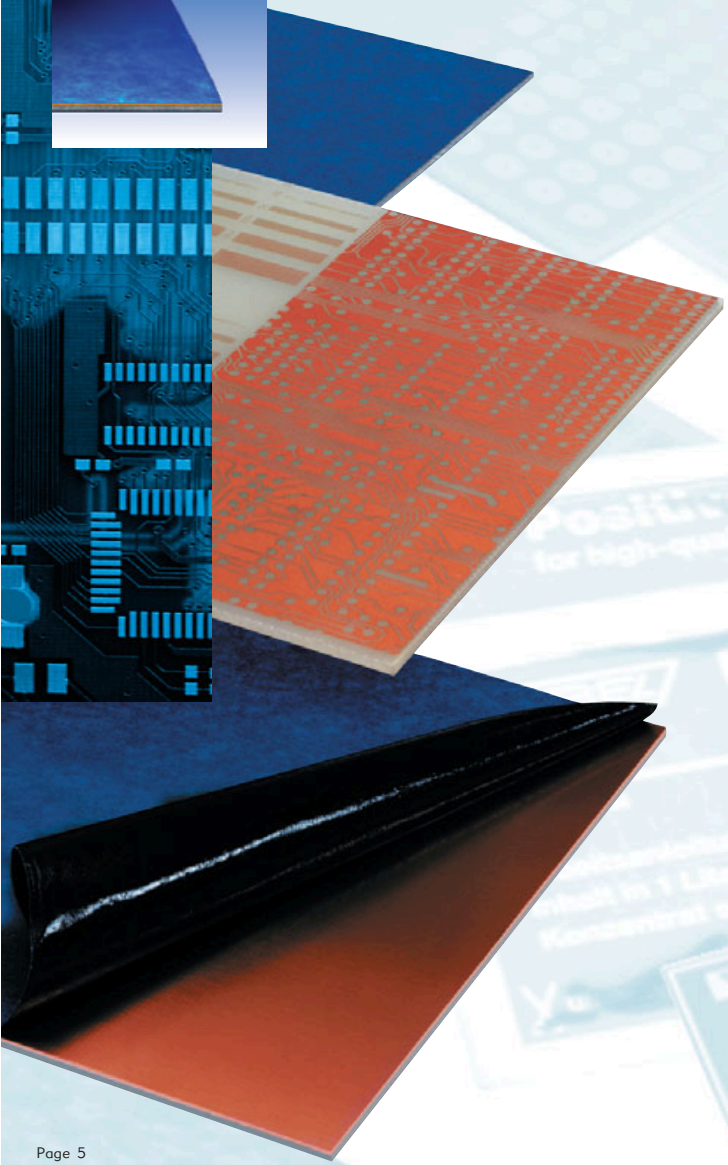
Photoresist
We coat the boards with a special positive working liquid resist made after our own recipe. The resist features highest exposure sensitivity, short processing times and large safety tolerannces. The equal and dust-free coating has a defined thickness of 5 μm. The maximum spectral response is in the range of 400 nm. The line resolution is limited only by the type of exposure unit. Typical exposure times are 120 secondes on our Hellas unit. The resist allows multiple exposure.

Referring to our special developer, at 20 °C the developing time is less than 45 secondes. On the other hand, the resist is absolutely stable for more than 5 minutes in the developer. It is resistant to acid etching or galvanic chemicals and even permits alcaline etching at a pH less than 9.5.

The boards are protected against mechanical damage and unwanted exposure by a special, blue coloured adhesive film. Due to this protection, no flitters appear when cutting or milling the boards.

Each board is subject to chemical and physical controls and tests before and after coating.

A shelf live of more than 1 year under normal storage conditions is guaranteed.

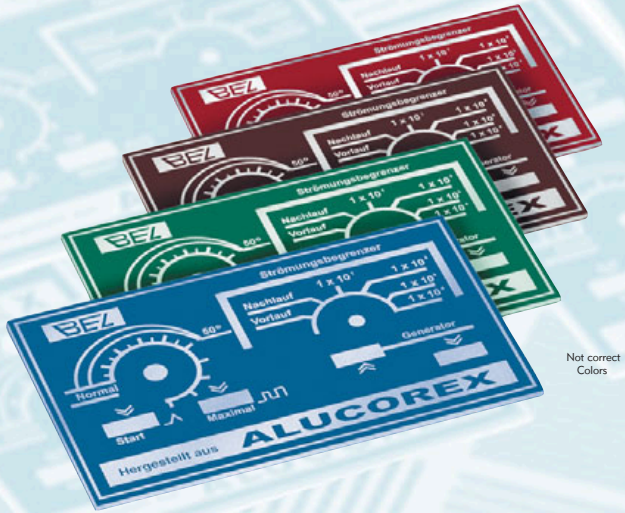


ALUCOREX

PRESENSITIZED ALUMINIUM

Presensitized, anodized aluminium for front panels, scales, labels and pad printing clichees.

- Available colours of anodization: black, blue, red. Clichees are green.
- Black coloured boards are available either in brilliant or mat surface.
- All boards except clichees are double sided.
- 1 year shelf live warranty.
- Easy to use.
- Detailed instructions included.
- Cutting service provides sheets down to 50 x 50 mm min. size, with an accuracy of 0.1 mm.



Not correct Colors

SMD STENCILS

FOR SOLDER PASTE APPLICATION

In SMTechnology, the question of how to apply the solder paste is gaining more and more importance.

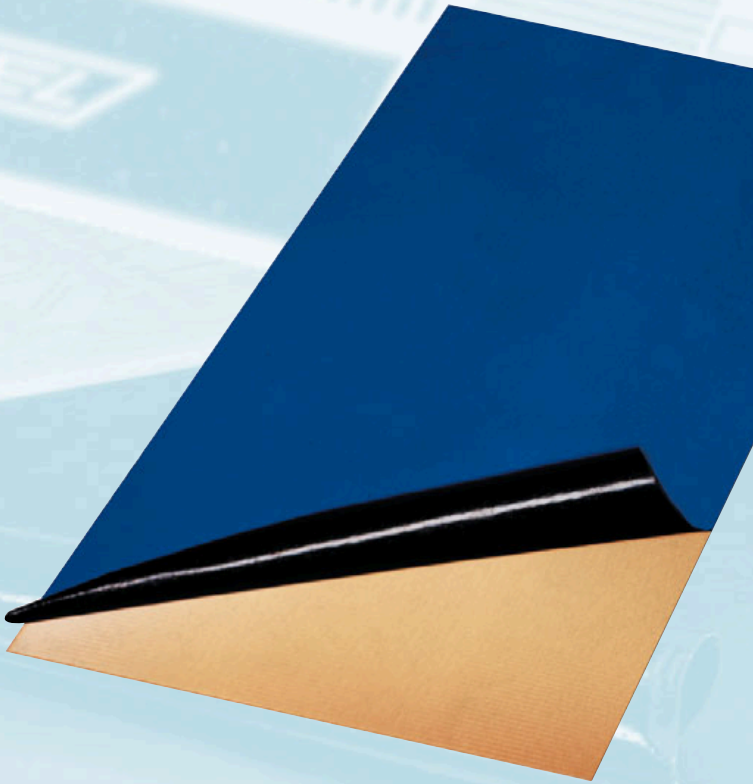
As far as screen printing is concerned, one has to mention the efforts for the preparation and maintenance of the screen as well as the questions of its wear out and of the achieved thickness of the paste.

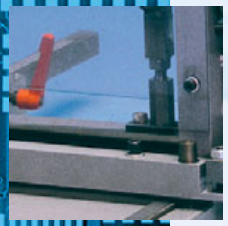
We think that a tendency away from screen printing and towards printing by stencils comes into view.

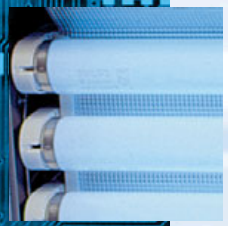
The reasons for this change seem to be obvious. To state only some of a stencils' advantages, one had to mention the uniformity of the print, the thickness of the transferred paste and the higher durability. But up to now there was one principal problem with stencils: They were not easily available.

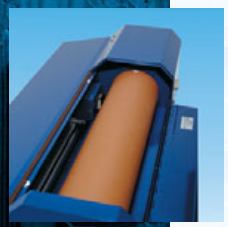
From now on, there is a quick, cheap and easy way how to make your metal stencils on your own. We offer both positive or negative presensitized brass stencils in almost any desired dimension and in different thicknesses and hardnesses.

Being coated with a chemically resistant photoresist of high line resolution and steepness, these templates offer you all the advantages already known from our pre-sensitized PCB boards.









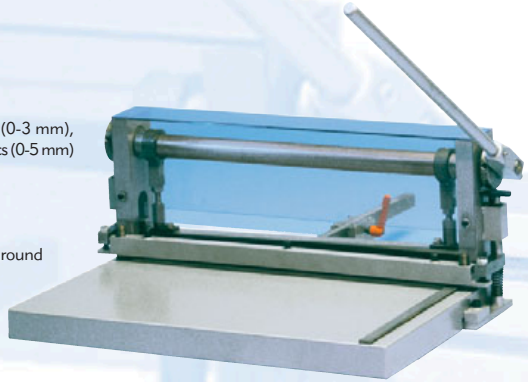
NE-CUT

BOARD CUTTER

Ne-Cut was developed for cutting PCBs (0-3 mm), aluminium (0-2mm), steel (0-1 mm), plastics (0-5 mm) and even films and artworks.

Features

- Cutting width max. 530 mm
- Two blades made of hardened and ground steel
- Spring loaded built-in clamping unit in the front
- Transparent cover hood for user safety and visual control
- Metric scale in the right front
- Fully adjustable back stop with metric scale for batch work (0...300 mm)
- Smallest cutting size (front) 45 mm
- Durable full steel construction
- All important parts angular adjustable
- Simple exchange of blades
- Adjustable cutting angle
- Adjustable clearance



NE-CUT	
Sizes (LxHxD):	74 x 29 x 45 cm
Weight:	66 kg
Warrenty:	1 year in house (on parts and labour)

FILMSTAR

PHOTOPLOTTER

Our FilmStar is a small raster photoplotter designed for users who need to make their quality film artwork at a low price and quickly on the spot. Beside Gerber files (both standard and extended), FilmStar also works with hires BMP files like those that you can export from standard software, say Corel Draw™® or similar. Although FilmStar is a small and slow photoplotter it does a very good job. The astonishing low price is a result of both sophisticated design and low manufacturing cost.

The film is fixed on the rotating drum. The laser diode moves step by step along the rotating drum by means of a precision stepper motor driven screw. Also the rotating drum is stepper motor controlled. FilmStar receives the plot data from the user´s PC. The driver software is included in the delivery. This software allows to do D-Code conversion and editing, film arrangement, film and drill panelization, reverse and mirror image, preview, print preview, etc.

FILMSTAR
• Maximum film size: 400 mm x 320 mm
• Maximum plotting area: 380 x 300 mm
• Resolution: 508 ... 8192 x 8600 dpi,
• Plotting speed: 10 mm of film width / minute for 1016 dpi
• Source of light: Laser diode 670 nm (red)
• Data input: Gerber (RS 274D, RS 274 X), high resolution BMP
• Photoplotter software, included on CD:
• Gerber viewer; Automatic aperture converter for all known Electronic CAD layout systems
• D-code editing, output preview & print
• Interactive, absolute or relative image positioning, film and drill panelization
• Reversed (negative) plotting, image mirroring
• Control software requires computer with Windows 98 ... XP, USB port
• Dimensions (LxWxH): 700x350x200 mm

HELLAS

VACUUM EXPOSURE UNIT

High precision vacuum exposure unit especially designed for double sided contact exposure of presensitized base materials such as tampon printing clichés, PCBs, front-panels, daylight films and other UV sensitive coatings.

Features

- 2 x 6 superactinic UV -tubes, each 20 W
- Special reflectors for minimum undercut
- Analogue light emission display
- Lower exposure surface from 8 mm special glass
- Upper exposure area from structured mylar foil in a sturdy frame
- Working area 570 x 300 mm
- Suitable for fine-line PCBs
- Maintenance free vacuum (80%) with gauge display, 1380 l/hour continous rating
- Digital timer 1 second - 9 min 59 sec. with count-down, auto-reset and beeper
- Built-in cooling fan
- Separate choice of upper/low exposure possible
- Sturdy steel housing

HELLAS	
Dimensions (LxHxW):	62x24x65 cm
Weight:	40 kg
Power supply:	220V ~, 50 Hz, ca. 800 W
Warranty:	1 year in house warranty for parts and labour

EXP 8000 / 12000

PARALLEL BEAM EXPOSURE UNITS

The EXP 8000 / EXP 12000 series is a high speed double sided expsosure machine mainly designed for industrial production and equipped with two 4000 W (6000W) mercury halide lamps. These lamps in about 90 cm distance from the PCB ensure almost parallel light.

Construction

Sturdy, welded tube frame with coated sheetplates. The chassis consists of a sliding drawer system. A yellow light table is an optional add-on item for the machine's front.

Operation

EXP 8000 (12000) guarantees a perfect exposure within a minimum of time and energy consumption by two UV sensors. The required exposure energy is preset on a keyboard and shown on a digital readout. The two intelligent UV-light emission controllers (one per side) automatically measure the energy supplied per side and stop the exposure at preset energy amount.
A vacuum pump provides a close and uniform contact between artwork and board. The exposure cycle starts when the drawer is pushed in. At that moment the lamp shutters are opened and the lamp's powersupply is increadsed from stand-by to full power. In stand-by mode, the energy is reduced to 25% in order to save energy and avoid heat problems. The machines have powerful cooling fans. When the exposure is finished the vacuum is stopped.

Features EXP 8000 / EXP 12000:

- max. Working area 600 mm x 600 mm (recommended: 400 mm x 500 mm)
- Microprocessor controlled UV-light emission
- vacuum assisted drawer
- suitable for fine line PCBs
- Suitable for exposure and curing of solder mask.
- built-in yellow light table

EXP 8000	
Power suppy:	400 V, 50 Hz triple phase
L1/L2/L3:	5 A / 10 A / 5 A
Unit Size (W x H x L):	820 x 1950 x 1800 mm
Weight:	270 kg

EG02

UNIVERSAL TRAYS

These appliances are destined to substitute the simple plastic tray. They are suitable for all acid or alkaline chemicals, e.g. developer, etching medium.

There are two main advantages of the EG 02 trays. On the one hand, due to the integrated 'seesaw' with its handle, the user is able to move the boards up and down but will not get into contact with the filled in liquid. On the other hand, the chemicals will remain fresh for a longer time because the lid and the 'seesaw' reduce their exposition to air.

EG 02	
Sizes:	49 x 10 x 35 cm
Filling:	6,5 l
Weight:	4,5 kg

JET 34D

SPRAY ETCHING MACHINE

Powerful spray etching or spray developing machine mainly designed for use in PCB labs. Low budget.

Features

- Maintenance free system with self-cleaning nozzles
- Etching speed of 35μm Cu within 90 seconds (warm Fe-III-Cl)
- Line resolution better than 0.1 mm
- Strong 1000 W heater with thermostat and over-heat fuse
- Big lid for easy loading, with built-in security switch
- Maximum board size: 300 x 400 mm
- Carrier for fixation of small PCBs, with handle outside of machine
- Easy and clean handling without etchant contact
- Overflow wash tank in the front for rinsing etched boards
- 3 cog valves (etching tank, rinse overflow, rinse inlet)
- Digital timer with countdown, auto reset and beeper
- Sturdy construction fully made of PVC and titanium
- Suitable for all common etchants
- Also well suited for spray developing of dry film resist

JET 34D	
Dimensions (WxHxD):	ca. 60 x 110 x 70 cm
Working Level:	90 cm
Power supply:	220 V~, 50Hz, ca. 1.5 kW
Tank capacity:	16 l
Weight:	35 kg
Warrenty:	1 year in-house on parts and labour

SPLASH

SPRAY ETCHING MACHINE

A professional spray etcher for high quality double sided PCBs. Can also be used for spray developing of dry film resist.

Features

- Professional spray etching technology
- 100 μm line definition
- Etching speed with standard Fe-III-Cl: 35 μm Cu in 120s
- Max. board size 210 x 300 mm
- Magnetic coupled spray pump
- Built-in 1000 W heater
- Thermostat controlled
- Overheat protection
- Security lid switch
- Digital timer with count-down, auto reset and beeper
- Special shadow-free PCB holder (titanium)
- Drop-off position for holder (see picture)
- Built-in rinse compartment with integral drop-off zone
- Also suitable for spray developing

SPLASH	
Power supply:	230 V~, 50 Hz, approx. 1150 VA
Dimensions(LxWxH):	60 x 66 x 120 cm
Working Level:	90 cm
Weight:	30 kg
Tank capacity:	ca. 25 l
Warranty:	12 months on parts and labour

SPLASH CENTER

SPRAY ETCHING MACHINE

A professional unit that integrates all important steps of PCB wet processing.

Spray etching compartment:

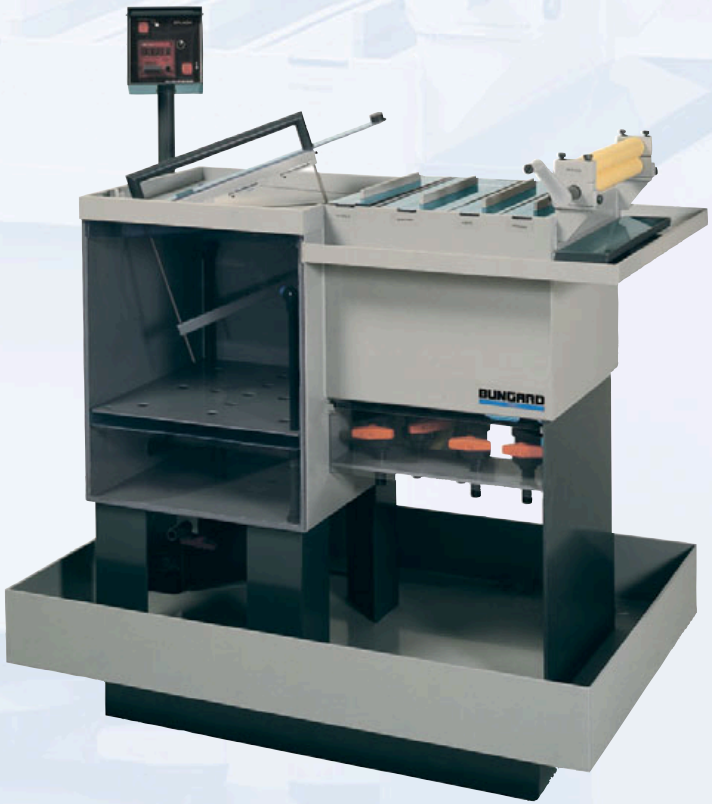
- Professional spray etching technology
- 100 µm line definition
- Etching speed with standard Fe-III-Cl: 35 µm Cu in 120s
- Max. board size 210 x 300 mm
- Magnetic coupled spray pump
- Built-in 1000 W heater
- Thermostat controlled
- Overheat protection
- Security lid switch
- Digital timer with count-down, auto-reset and beeper
- Also suitable for spray developing
- Special shadow-free PCB holder (titanium)
- Drop-off position for holder (see picture)

Four Treatment tanks (from left to right side):

- Static pre rinse
- Static plus fresh water spray rinse (including magn. valve and foot-switch)
- Tank with filter basket and bath movement by pump, for resist stripping or developing
- Spare tank, i.e. for electroless tin

Features

- All tanks covered by lids
- All bathes can be emptied by front accessible cog-valves
- PCBs may pass all wet processing steps in one PCB holder
- Inclusive anti-pollution security tray



SPLASH CENTER	
Power supply:	220 V~, 50 Hz, ca. 1150 VA
Dimensions (LxWxH)**:**	100 x 67 x 121 cm
Etchingformat:	210 x 300 mm
Tank capacity:	1 x 25 l + 3 x 7 l + 1 x 9 l
Weight:	46kg
Warranty:	12 months on parts and labour

DL 500

CONVEYORISED SPRAY ETCHING MACHINE

A professional conveyorised spray etching machine, especially designed for use in small series production and laboratories. The maximum capacity within one hour is 10 m². The machine includes an etching and a rinsing and drying compartment. The DL 500 is also suitable for spray developing of dry film photoresist and dry film soldermask.

Features:

- Sturdy stand alone construction from PVC and Titanium
- Transparent top with security switch
- Working width 510 mm
- Adjustable conveyor speed 0 - 1.5 m/min.
- Joint free belt drive
- Powerful etchant pump (200 l/min)
- Double sided etching with 4 x 14 flat jet nozzles
- Adjustable spray pressure
- Line definition down to 35 µm lines and spaces on 18 µm copper
- Strong quartz heater
- Thermostate with digital read out and self-safe overheat cut-off
- Fresh-water rinse controlled by magnetic valve

Available options

- Control table
- Recycled spray rinse
- Second, stand alone spray rinse

DL 500	
Power supply:	230 V~, 50 Hz, 1.5 kW
Size (LxWxH)**:**	120 x 67 x 129 cm
Etchingformat:	510 mm
Tank capacity:	55 l
Weight:	100 kg
Werkstattgarantie:	1 year on parts and labour

IONEX A, B, KA, KB

WASTE WATER TREATMENT SYSTEM

The name IONEX stands for IONEXchanger, which is the very heart of this modern waste water treatment system. In total it consists of filtration, two ion-exchange and one PH-levelling units. IONEX is ideally suited for all waste water cleaning processes in modern PCB prototype laboratories. The drain water quality from this system is in accordance to German directives, which are of the highest standards world wide! The units exist in four variants with different sump capacities and ion exchange capacities.

Features:

- Removal of solids and all heavy metals
- Decrease of chemical oxygen demand
- Easy handling and operation
- Regeneration of ion exchange resins by supplier or by user at little cost
- Drying by squeezing rollers with tissue
- Maintenance free design, just normal cleaning/refill
- Easy disassembly and full access to all inner parts without special tools
- Not recommended for alcaline etching
- IONEX A and B perform additionally PH neutralization and discharge to the drain
- IONEX K types offer additional Kation capture for full rinse water recycling
- Built-in hose pump
- Polyethylene filter candle, 10 µm
- Lower and upper sump level control switch
- Storage sump for 110 (IONEX A) or 220 litres (IONEX B) of waste water

IONEX A / KA	
Power supply:	230 V, 50 Hz, 50 W
Weight:	30 kg
Tank capacity:	110 l
Cleaning capacity:	10 l / h
Size (HxDxL)**:**	1400 x 425 x 600 mm

IONEX B / KB	
Power supply:	230 V, 50 Hz, 100 W
Weight:	60 kg
Tank capacity:	220 l
Cleaning capacity:	20 l / h
Size (HxDxL)**:**	1400 x 850 x 600 mm

VARIODRILL

PCB DRILLING SYSTEM

VARIODRILL is a PCB drilling machine for prototypes and small batch production. The demand for operating comfort and high quality has led to an untraditional design which meets the necessary requirements for an ergonomic correct working position.

Features:

- Throat depth: 115 mm
- AC Motor, 100 Watts / 230 Volt
- Infinitely adjustable 10000 ..... 30.000 RPM
- Chuck: 1/8" (3,2mm)
- Drill size 0,6 to 3,2 mm
- Adjustable stroke speed
- Adjustable m/c tilting between 0 - 30
- Built-in 6 V - 1,5 W light
- Complete system with integral dust extraction
- Including external vacuum cleaner
- Including foot switch for easy operating
- Booth hands are free for positioning the PCB

VARIODRILL	
Chuck:	3.175 mm
Size (LxWxH):	340 x 240 x 175 mm
Weight:	ca. 7 kg
Power supply:	220 V~, 50Hz, ca. 0,6 kW

FAVORIT

THROUGH-HOLE-PLATING

Hand-operated machine, especially for mechanical through-hole-plating purposes. Professional through-hole-platings by individual tools for each rivet diameter. Optimal contacts, even without soldering. Favorit offers high quality results at a low cost level.

Special features:

- Adjustable depth limiter
- Maximum board size: 400 mm

Extendet of delivery:

- The offered system includes complete press + tools
- Inclusive 1 x 1000 rivets
- Inclusive 1 set of tools
- Various tools and rivets are available
- Please specify the inner diameter you require
- Different tools have to be used for different diameters

FAVORIT						
Size (WxHxD):	ca. 9.5 x 21x 30 cm					
Working depth:	200 mm					
Weight:	ca. 4 kg					
Rivet with inner diameter/mm:	0.4	0.6	0.8	1.0	1.2	1.5
Required drill diameter/mm:	0.6	0.8	1.0	1.5	1.7	2.0

DRILLS AND ROUTERS

SOLID CARBIDE

High quality, precision ground solid carbide drill and routing bits with 3.175 mm (1/8") shaft

All tools have 7.5 mm wide collars with a distance of 21 mm from the tip to the upper side of the collars. The collar shows the tool diameter or is colour coded.

The tools come in re-usable plastic boxes.

Within each class of tools different diameters can be mixed to give one unit of 10 pc.

SOLID CARBIDE DRILLS

For drilling PCBs. Two flutes, right-hand turn. Diameter 0.3 ... 3.2mm in 0.1 mm increments

CONTOUR ROUTERS

RPU Type

For Aluminium routing/milling. 2 flutes, upward swarf ejection, fish tail tipped. On-stock diameters: 0.6, 0.8, 1.0, 1.2, 1.5, 2.0, 2.5, 3.0 mm

G 30 N Type (white collet)

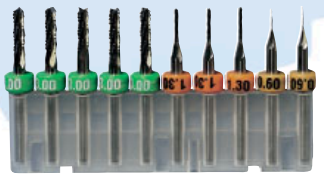
For isolation routing and fine engraving, 30° tip angle

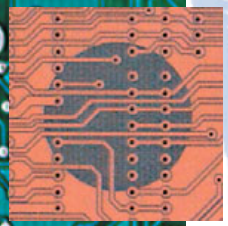
G 60 N Type (red collet)

For isolation routing with depth limiter or for engraving. Two flutes, 60° tip angle

SC/FT Type

For PCB routing, diamant shaped teeth, upward swarf ejection, fish tail tipped. On-stock diameters: 0.6, 0.8, 1.0, 1.3, 1.5, 2.0, 2.5, 3.0 mm





BUNGARD CCD /2

CNC MACHINE

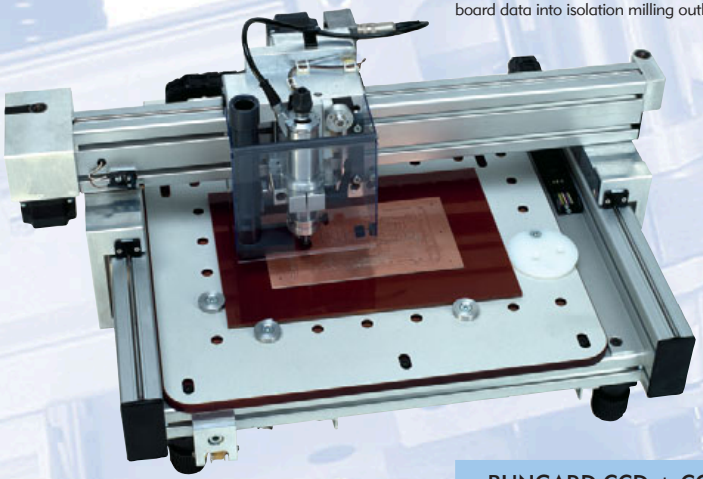
This machine serves for drilling and routing PCBs and Aluminium and for isolation milling. It is fully equipped and easy to use. The extent of delivery contains the mechanics unit, the high frequency spindle, the integral control unit, a vacuum cleaner and the driver software for drilling and milling.

The axes are driven by stepper motors and precision belts. The step definition is 1 mil, the positioning accuracy is +/- 1 mil. The maximum speed is bigger than 90 mm/s. The control unit is hardware prepared to run the axes in microstep mode at down to 6.35μm step width. The Z axis as well has a stepper motor. Other than any solenoid or pneumatic drive, only a stepper motor allows active control over Z working depth and penetration speed. An additional mechanical depth limiter is included.

The machine comes with a high frequency spindle at 150 W and 60000 rpm. The tool change action is semiautomatic, with the driver software arresting the axes and prompting the user to change the tool. This is done right on the spot by a quarter turn of a knob, and no recalibration will discontinue the drill or mill job.

The machine table has a regular pattern of mounting holes where the board holders and clamps will go. The boards can be mounted to machine zero or to any relative position, but can also be put on base plates with fixing pins, as required for double sided isolation milling.

The driver software coming with the machine will run on any standard PC. It directly reads Excellon or Sieb & Meyer drill files, or HP/GL. One software option is the RoutePro 2005 Windows 9x ... XP based driver software, a second one is IsoCAM, a program that you will need to convert Gerber board data into isolation milling outlines.



Picture of CCD /2

BUNGARD CCD + CCD/2

Power supply:	230 V, 50 Hz, approx. 250 VA + vacuum cleaner
Warranty:	1 year in-house warranty on parts and labour
Sizes (mechanics) CCD:	
(W x D x H)	70 x 80 x 30 cm
Board size max.:	325 x 495 x 35 mm³
Weight:	approx. 35 kg
Sizes mechanics CCD /2 :	
(W x D x H)	70 x 55 x 30 cm
Board size max.:	280 x 325 x 35 mm³
Weight:	approx. 23 kg

Available options:

Protective hood, CAM / Isolation software, monitor + camera, cooling device for aluminium routing, compressor

Explains:

MTC = Manual Tool Change
ATC = Automatic Tool Change

BUNGARD CCD

CNC MACHINE

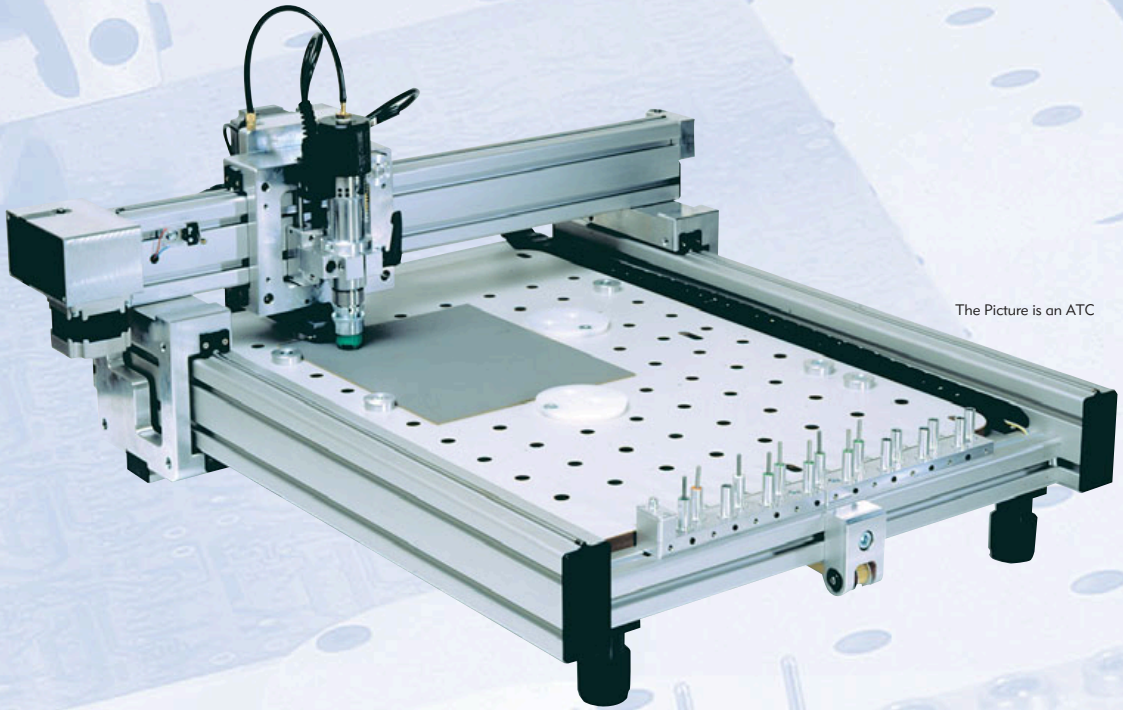
The Bungard CCD/MTC-ATC is a high quality **C**omputer **C**ontrolled **D**rilling machine with **M**anual **T**ool **C**hange (MTC) or **A**utomatic **T**ool **C**hange (ATC). It allows direct processing of Excellon/Sieb&Meyer drill data or HP/GL plot data for PCB production (drilling, milling, isolation routing, engraving) and milling/ routing of plastics, aluminium or other metal panels.

Extent of delivery:

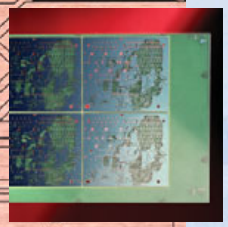
- Mechanics unit, control unit, cables
- Driver software for drilling and routing
- High frequency spindle (max. 60000 rpm), with DC brake and load control
- Powerful 500-1300 Watt vacuum cleaner
- If required: 4 hours free training at our facilities

Special features:

- Mechanics unit: rigid and flat construction with low moving weights and high quality bearings for high-speed positioning
- Machine bed with universal fixture system, suitable for both clamps and ref. pins
- KaVo high speed spindle with chuck 1/8", 140W
- Software controlled spindle speed 30000 to 60000 1/min.
- Spindle quick stop (1s) DC brake and electronic load control
- Heavy duty stepper motor on Z-axis for true milling capability and correct tool speed
- Automatic tool change, simultaneously 15 + 1 out of 99 tools per job.
- Drill break detector
- Smallest drill diameter: 0.2 mm
- Integral depth limiting device for (isolation) milling and engraving on uneven surfaces
- Stand alone control unit (19" rack) connects to all standard PC's with one free serial or USB port
- Driver software for Excellon, Sieb&Meyer or HP/GL data for real-time, on-line machine control, with comfortable user interface.
- All machine parameters software controlled and configurable
- Step definition: 1 mil (=0.0254 mm), precision +/- 1 step, hardware prepared for microstep mode (6.35 μm)
- Maximum speed per axis: 93 mm/s (=5.6 m/min)
- Drill speed: 5 hits/s (=18000 holes per hour)



The Picture is an ATC



ROUTEPRO 2005

FOR CCD MTC, ATC, CCD/2

Software- and Hardware package for direct processing of drill- and routing data on CNC systems type BUNGARD CCD (production date 1995 and later) under Windows 95....XP. Serial number of machine required for updating older machines.

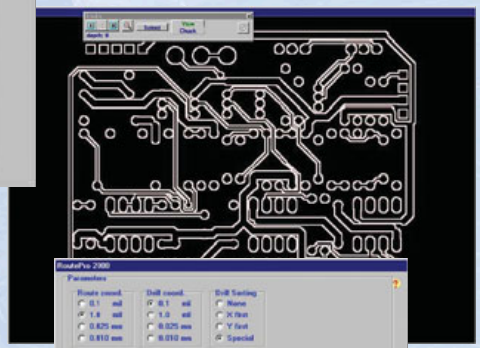
Extent of delivery:

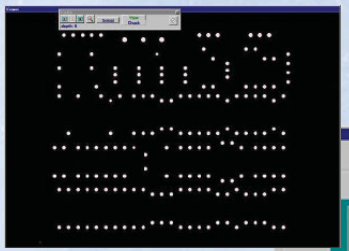
HARDWARE:

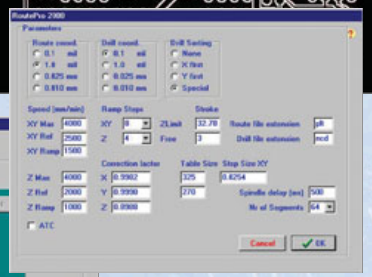
- small CPU (with DC powersupply) for Real-time processing under Windows.
  (120mmx180mmx40mm)
- cables

SOFTWARE:

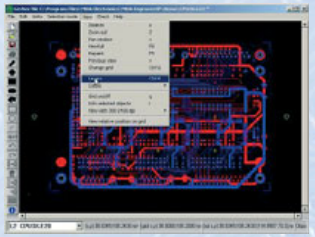
- Driver software for Excellon, Sieb&Meyer or HP/GL data for real-time machine control under Windows 95....XP, with comfortable user interface, including tool statistics and plausibility control
- drill and route data simultaniously displayed
- on-screen processing sequence display
- on-screen selection of drill and route vectors
- Automatic tool change, simultaneously 15+1 out of 99 tools per job.
- selectable tool change positions (for ATC machines only)
- Drill break detector
- Software controlled spindle, quick stop, DC brake and chuck
- All machine parameters software controlled and configurable
- Easy to use teach-in feature for drill data
- Step definition: 1 mil (= 0,0254 mm), precision +/- 1 step, prepared for microstep mode
- Maximum speed per axis: 93 mm/s (= 5.6 m/min)

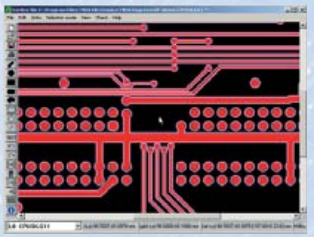






DATA CONTROL
CONVERSION
ISOLATION MILLING





ISOCAM

The situation:

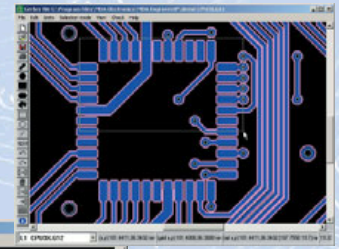
You designed a PCB with your CAD package and now want to make a prototype or a small series by etching or by isolation milling

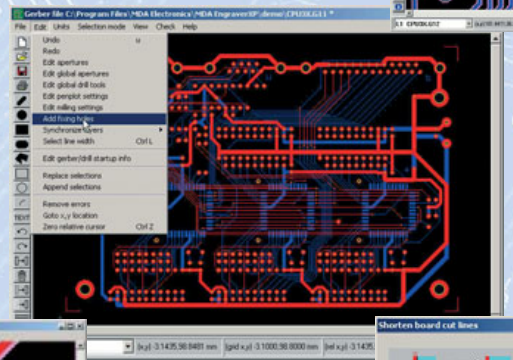
The questions:

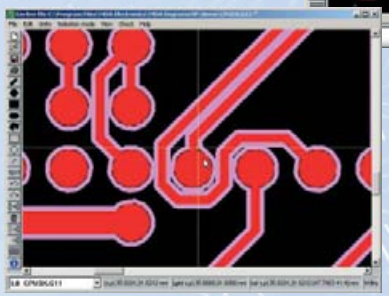
- How do you check and correct the drill-, rout- and plot-data, their dimension and layer registration?
- Do you want to make your prototype by isolation milling?

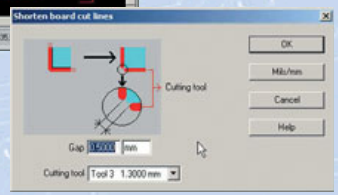
The answers:

- IsoCAM reads your Gerber, HP/GL, and drill files. It offers you editing facilities like shift, mirror, copy, paste, delete and more on single vectors, groups of elements or entire layers.
- IsoCAM can convert data into all of the above mentioned formats. Windows Post-script output allows making film artworks.
- IsoCAM comes with a worthy isolation milling converter with the feature of using two different tools in once and with the possibility of creating copper rubout areas.
- The aperture table and the tool rack can be edited, saved and printed. A converter automatically reads the aperture information from most CAD packages.









ISOLATOR

Another, even more sophisticated CAM package is available. This should be your favorite choice if you

- need more than just an isolation milling engine or
- want to make front panels or do cut-out routing of PCBs or
- have to prepare board data for external customers or
- need data uplink to PCB production houses or
- have to prepare data for both cnc machines and photoplotter artwork at a time

In any of these cases ISOLATOR is superior because it was made for universal data preparation in the true meaning of the word CAM, and it is derived from a family of software that has a strong background in PCB industry.

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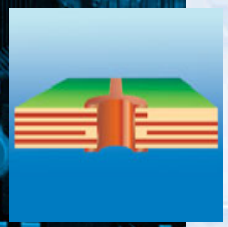


COMPACTA 30

THROUGH-HOLE-PLANTING LINE

Compacta 30 ABC (Tenting)

Professsional equipment for laboratory prototyping of through-hole plated PCBs up to 210 x 300 mm size. Clean system including built-in rinsing compartment. Maintenance free and made for easy processing and handling. This particular machine type is optimized in terms of space requirements and costs. Compacta 30 ABC is suitable for most direct plating processes on the world market such as the Bungard PS/2 plating system. Bigger and customized units are also available.

Processing sequence for the ABC panel plating (tenting) technique:

- Cleaner /Conditioner
- Pre-dip
- Catalyst
- Intensifier
- Copper plate

Equipment:

- 5 treatment tanks, 2 of them with heaters
- 1 galvanic copper bath with air injection
- 1 triple-cascade rinse with cog valve flow control
- 1 spray rinse tank with solenoid valve, foot switch and flow control
- 1 free tank (i.e. for electroless tin)

Rectifier:

- 1 Rectifier for copper plating 6 V / 40 A, seperate current and voltage display and setting. Residual ripple < 0.1 % DC

Bath control:

- 2 PTFE/PFA coated heaters, controlled by analogue instruments, full digital timers with countdown, auto-reset and beeper. Air injection into the copper plating bath. Board movement by DC gear motor, adjustable speed.

COMPACTA 30

Tank dimensions	treatment tanks	galvanic copper tank
Length:	400 mm	400 mm
Width:	100 mm	275 mm
Depth:	300 mm	300 mm
Capacity:	10 l	30 l

Total size (WxDxH):	88 cm x 100 cm x 135 cm
Working level:	95 cm
Weight:	approx. 80 kg
Heaters:	2 x 400 W
Rectifier:	1 x 6 V, 40 A
Power supply:	230 V, 50 Hz, 6.3 A

Picture of COMPACTA 30 ABC

COMPACTA 40 ABC 2Cu

THROUGH-HOLE-PLATING LINE

Based on the same principle of construction as our 30ABC series, the Compacta 40 ABC 2 Cu is optimized for higher productivity. You can manufacture boards with a maximum size of 300 x 400 mm^2 . This enlargement plus an integral, second plating bath leads to almost 4 times higher, dayly througput with only little more space requirements.

Alternatives for improved surface qualities:

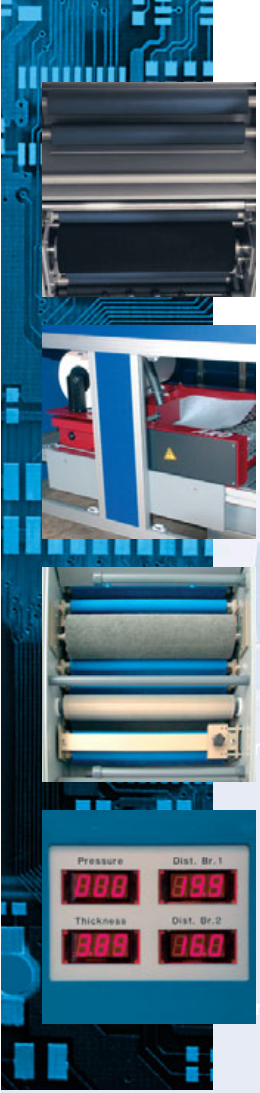
Bungard is also experienced in galvanic Nickel-Gold-systems for long lasting, bondable surface quality. Moreover tin-, blackening- or sealbond- systems are available. Contact us for your individual, customized solution.

COMPACTA 40 ABC 2Cu

Tank dimensions	treatment tanks	galvanic copper tank
Length:	500 mm	500 mm
Width:	100 mm	300 mm
Depth:	450 mm	450 mm
Capacity:	20 l	60 l

Total size (WxDxH):	120 cm x 118 cm x 139 cm
Working level:	95 cm
Weight:	approx. 130 kg
Heaters:	2 x 400 W
Rectifier:	1 x 6 V, 80 A
Bath agitation:	DC gear motor
Power supply:	230 V, 50 Hz, 2,5 kW

Picture of COMPACTA 40 ABC 2Cu



RBM 300

BRUSHING MACHINE

A professional brushing machine designed for use in small series production and laboratories.

Features:

- Single side action
- Aluminium, PVC, Stainless Steel construction
- Transparent top lid with security switch
- Working width 300 mm
- Board thickness 0.3 - 3 mm
- Conveyor speed 0.2 - 2 m/min
- Adjustable brushing pressure and oscillation speed
- Oscillation stroke 10 mm
- Mechanical drying by squeezing rollers
- Additional built-in hot air dryer

RBM 300	
Usable width:	300 mm
Material width:	(rigid boards) 0,3 - 3 mm
Brushing speed:	1360 rpm
Oszillation stroke:	10 mm
Oszillation frequency:	ca. 10 - 110 l/min
Stroke speed:	ca. 0,2 - 2 m/min
Power supply:	230 V~, 50 Hz
Size (L x W x H):	760 x 590 x 415 mm
Weight:	80 kg
Warrenty:	1 year in-house on parts and labour

RBM 402 F

BRUSHING MACHINES

The RBM 402 F series is the highest developed brushing machine in our range. It is ideally suited for professional prototyping or small batch production in modern PCB laboratories. The machine performs double side operation. Upper and lower brushing rollers are adjustable in pressure and have a digital read-out for the settings. Oscillation and transport speed are variable. The wet procession system comes together with a powerful squeeze + hot-air dryer. The „F" is indicating an integral, automatic filter system. That is urgently recommended in order to comply with German and European waste water pollution directives. These „F" machines are equipped with a 100 m filter tape (5 μm) and a waste water level control. As the load of filtered particles increases, the sensor will automatically start the filter transport, so that fresh tape is supplied. Tabletop configurations are also available.

RBM 402 F	
Working width:	400 mm
Conveyor speed:	0,2 - 2 m/min
Oscillation stroke:	10 mm
Oscillation frequency:	10 - 110 l/min
Brushing roller size:	89 x 410 mm²
Brushing speed:	1360 rpm
Board thickness (rigid boards)**:**	0,3 - 5 mm
Minimum board size:	80 x 175 mm²
Water outlet:	19 mm
Rising system water outlet:	40 mm
Power supply:	230 V, 50 Hz 16 A
Dimensions (L x W x H):	1110 x 730 x 1160 mm³
Weight:	210 kg
Warrenty:	1 year in-house on parts and labour

Picture of RBM 402 F

RLM 419 P

DRY FILM LAMINATOR

The RLM is a dry film laminator especially made for small companies, schools, research and development departments. All commercial laminates for PCB manufacture and mould-etching technique can be processed. Due to adjustable pressure control and adjustable laminating speed, solder mask application is also possible without problems.

Features:

- Easy and fast mounting of resist rollers of all common coil diameters
- Detachable inlet table for easy access to lower resist roll
- Infinitely adjustable laminating speed
- Electrically heated lamination rollers with uniform temperature distribution
- Separate transport rollers for non-creasing laminate transport
- Digital setting and read out of lamination temperature
- Manually adjustable lamination pressure
- For all common dry film resists
- Suitable for solder mask application

RLM 419 P	
Lamination width max.:	400 mm
Transport width max.:	440 mm
Lamination speed:	0,2-1,2 m/min adjustable
Resist tension:	adjustable
Lamination pressure:	adjustable
Temperature range:	20 - 199° C digital setting
Power supply:	230 V 50 Hz / 2 kW
Weight:	38 kg
Dimensions (WxDxH):	69x63x57cm

AIR 2000

CONVEYORIZED PCB DRYER

Air 2000 is a conveyorized PCB Dryer. Adjustable transport speed ensures perfect drying of holes and surfaces after all wet process sequences.

Features:

- Continuous drying
- Variable transport speed
- Suitable for different board thickness
- Low surface temperature
- Short heating-up time
- Huge area capacity
- Table type
- High grade processing

AIR 2000	
Working width:	300 mm
Board thickness:	0.2 - 4 mm
Minimum board length:	80 mm
Transport speed:	0.2 - 1,2 m/min
Heat up time:	5 sec.
Dimensions (WxDxH):	352x520x362 mm
Power supply:	230 V 50Hz

RDC 10 / RDC 15

DIP COATERS

Machine developed for laboratory dip coating of modern liquid photoresists.

Features:

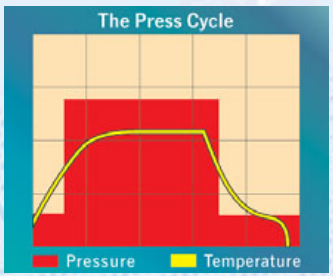
- Constant insertion speed
- Adjustable drawing speed
- Adjustable dipping time

	RDC 10	RDC15
Stroke length:	0 - 450 mm	300 - 800 mm
Maximum load:	1.5 kg	5 kg
Weight:	15 kg	20 kg
Dimensions (W x L x H):	20 x 40 x 67 cm	25 x 65 x 101 cm
Insertion speed:	fix or adjustable	
Drawing speed:	0.1 - 0.5 m/min	
Dipping time:	1.5 - 30 seconds at choise	
Dipping time:	15 - 300 seconds at choise	
Power supply:	230 V, 50 Hz, 100 VA	

RMP 210

MULTILAYERPRESS

This high performance multilayer press was designed for PCB labs to enable quick prototyping of multilayer PCBs of up to 6 or 8 layers according to industry standards. A compact and floor standing aluminum rack contains all parts of the unit including pressure supply, press plates and heaters. The large loading door that allows quick and easy access to the pressure part is of course security switch protected. A compressor, which is integral part of RMP 210 is stored in the back of the machine. In the front, you will find additional storage room for tools or boards (lower door). The unit is controlled by two digital and adjustable thermostates, one digital timer, as well as a pressure valve with meter. Two strong air ventilators are activated automatically during cooling cycle.

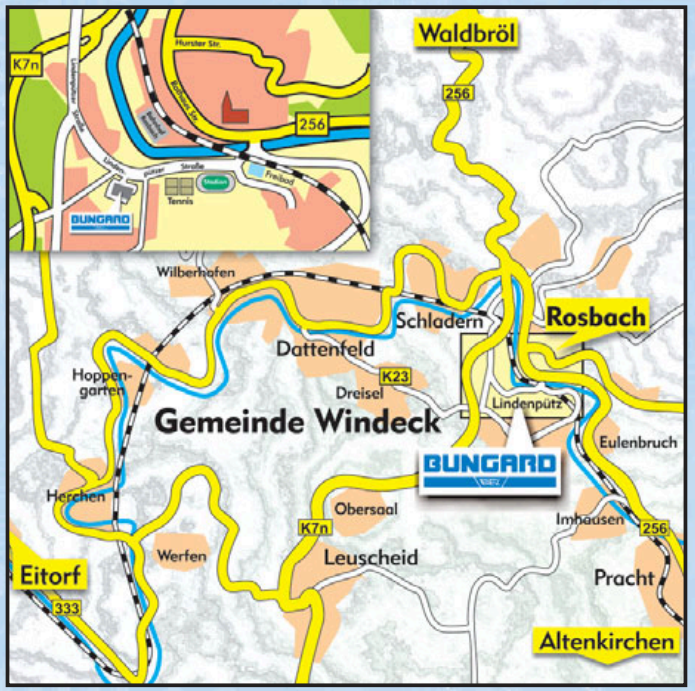


Steps of multilayer production with RMP 210:

- Boards are pinned and stack is inserted into press plates.
- Pressure is created.
- Heater is activated.
- Heat up procedure.
- Press procedure at preset temperature.
- Cooling down under pressure.
- PCB stack is taken out of the machine.

The entire sequence will take approx. 3 hours. Gross size of the PCBs is 250 x 350 mm which corresponds to a PCB net size of 210 x 300 mm.

RMP 210	
Board size:	250 x 350 mm gross 210 x 300 mm net
Pressure:	> 12 tons working
Temperature:	175 °C (adjustable)
Heating up:	30 min.
Pressure time:	60 min.
Cooling down:	approx. 120 min.
Machine size (WxDxH):	65 x 65 x 130 cm
Weight:	130 kg net
Power supply:	230 V~, 50 Hz, 16 A



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