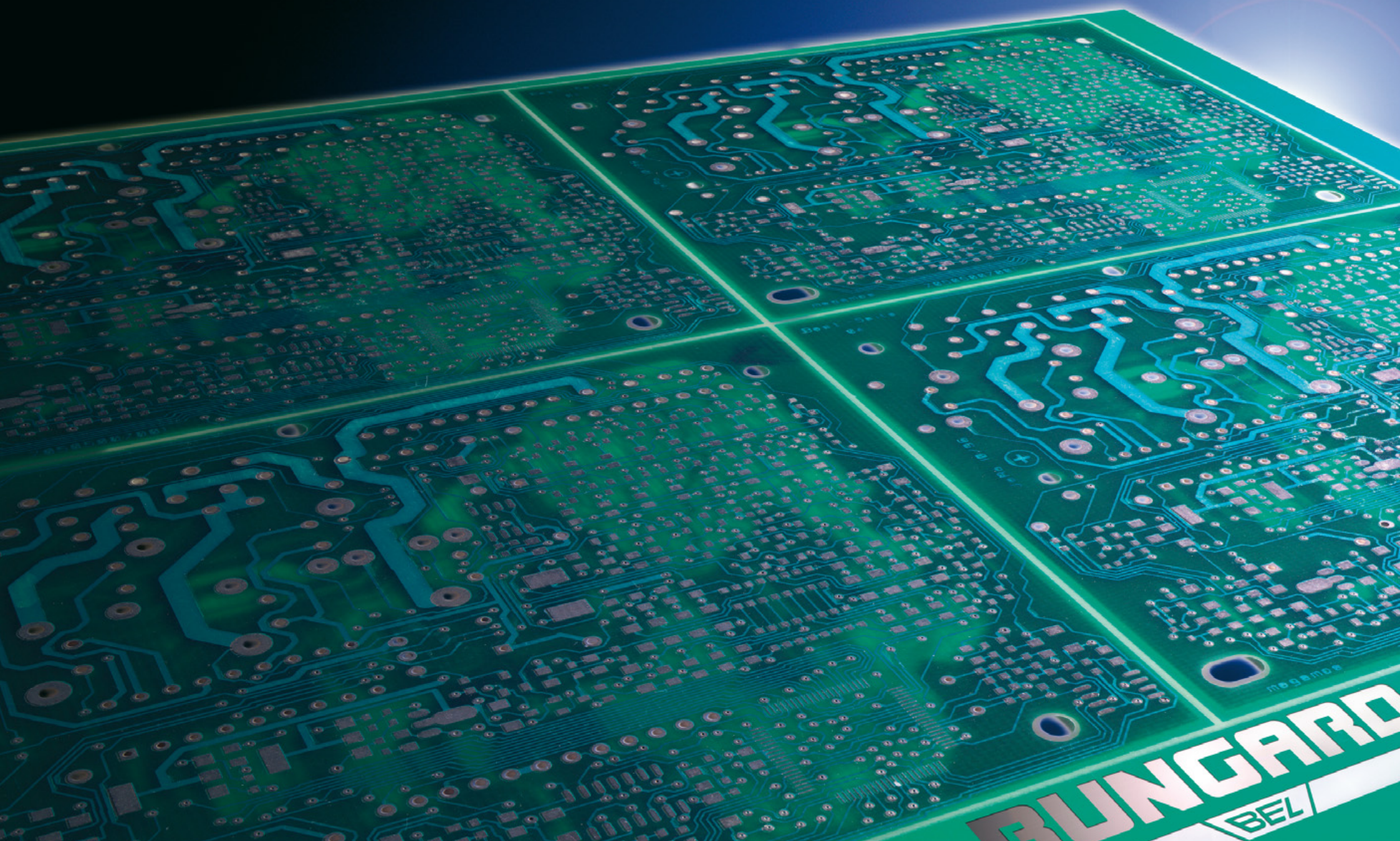


2010 English

BUNGARD
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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 positioning accuracy is +/- 1 step. The maximum speed is 130 mm/s. The Z axis as well as 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 driversoftware 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 IsoCAM, a program that you will need to convert Gerber board data into isolation milling outlines.

For further details see also page 16.

BUNGARD CCD

CNC MACHINE

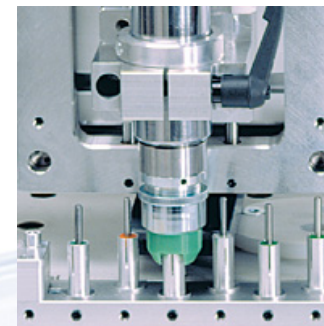
The Bungard CCD is a high quality Computer Controlled Drilling machine with Automatic Tool Change (ATC) or with Manual Tool Change (MTC).

Extent of delivery:

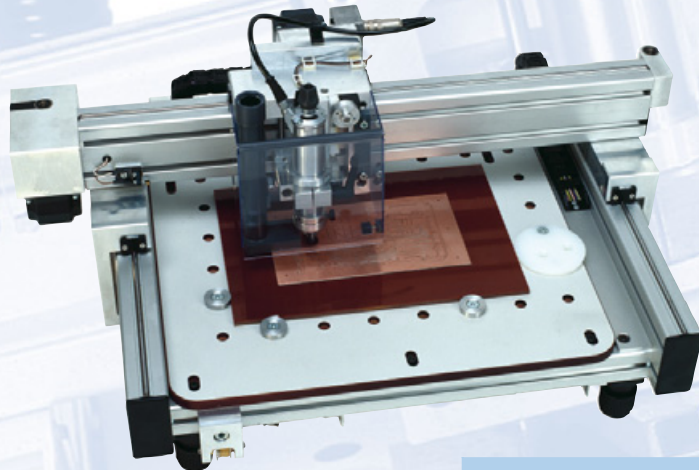
- Mechanics unit
- Control unit, full set of cables
- High speed, long life spindle with quick stop brake and load control
- Automatic tool change, simultaneously 16 out of 99 tools per job (ATC)
- Manual semi automatic tool Change (MTC)
- Integral depth limiter and pressure foot
- Windows driver software RoutePro 2008 for drilling and routing
- Powerful 500-1500 Watt (adjustable) vacuum cleaner, remote controlled

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 clamp or span fixing or for reference pins (fiducials)
- KaVo high precision spindle motor, 150 Watt, 60 000 rpm, with heavy-duty long-life bearings, including 1/8" (3.2 mm) chuck
- Software controlled spindle speed. Electronic spindle load control with software feedback



- Spindle quick stop (1s) DC brake and speed-up booster
- Heavy duty 2x2 phase high-torque stepper motors on all 3 axes for true milling capability and correct tool speed
- All X/Y and Z traverse speed, working speed, working depth, spindle rpm and depth iterations individually configured on a per-tool basis, resulting in:
 - Always adequate cutting speed over the entire spindle RPM range, no need for 100 K rpm spindles, no excessive wear to costly spindle bearings
 - Standard travel area: 325 x 495 x 37 mm (larger and smaller machines available)
 - Automatic tool change, simultaneously 16 out of 99 tools per job (ATC)
 - Quick manual tool change by turning a knob, with machine position locked, no recalibration of height required
 - Drill break detection and length control
 - Smallest tool diameter: 0.1 mm (micro end mill at 60 000 rpm)



Picture of CCD /2

Picture of CCD /2 soundproof hood



BUNGARD CCD + CCD/2

Power supply: 110-240 V, 50-60 Hz, + vacuum cleaner (1500W)
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 37 mm³
 Weight: approx. 35 kg

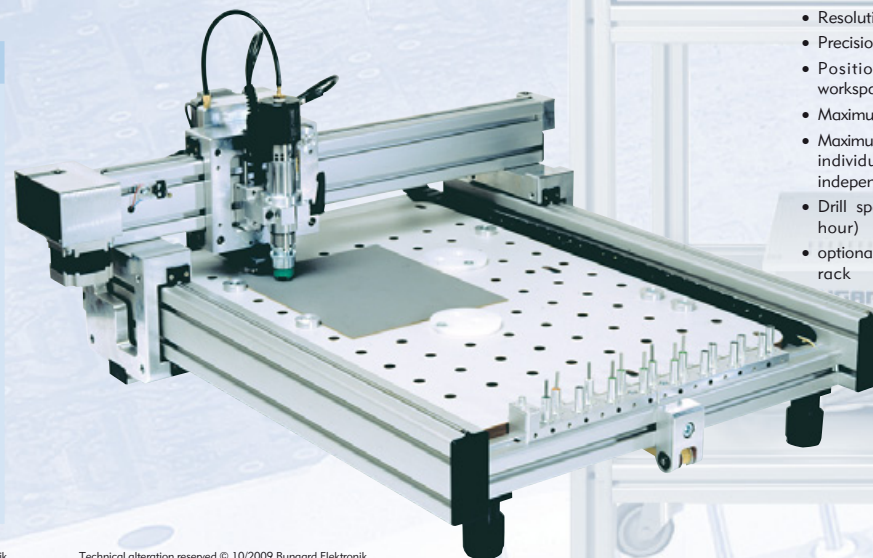
Sizes mechanics CCD /2:
 (W x D x H) 70 x 55 x 30 cm
 Board size max.: 270 x 325 x 37 mm³
 Required desktop size: approx. 80 x 80 cm
 Weight: approx. 30 kg

Available options:

Protective hood, CAM / Isolation software, monitor + camera, cooling device, compressor, etc.

Explains:

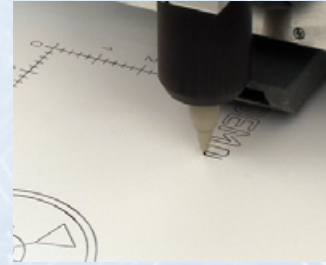
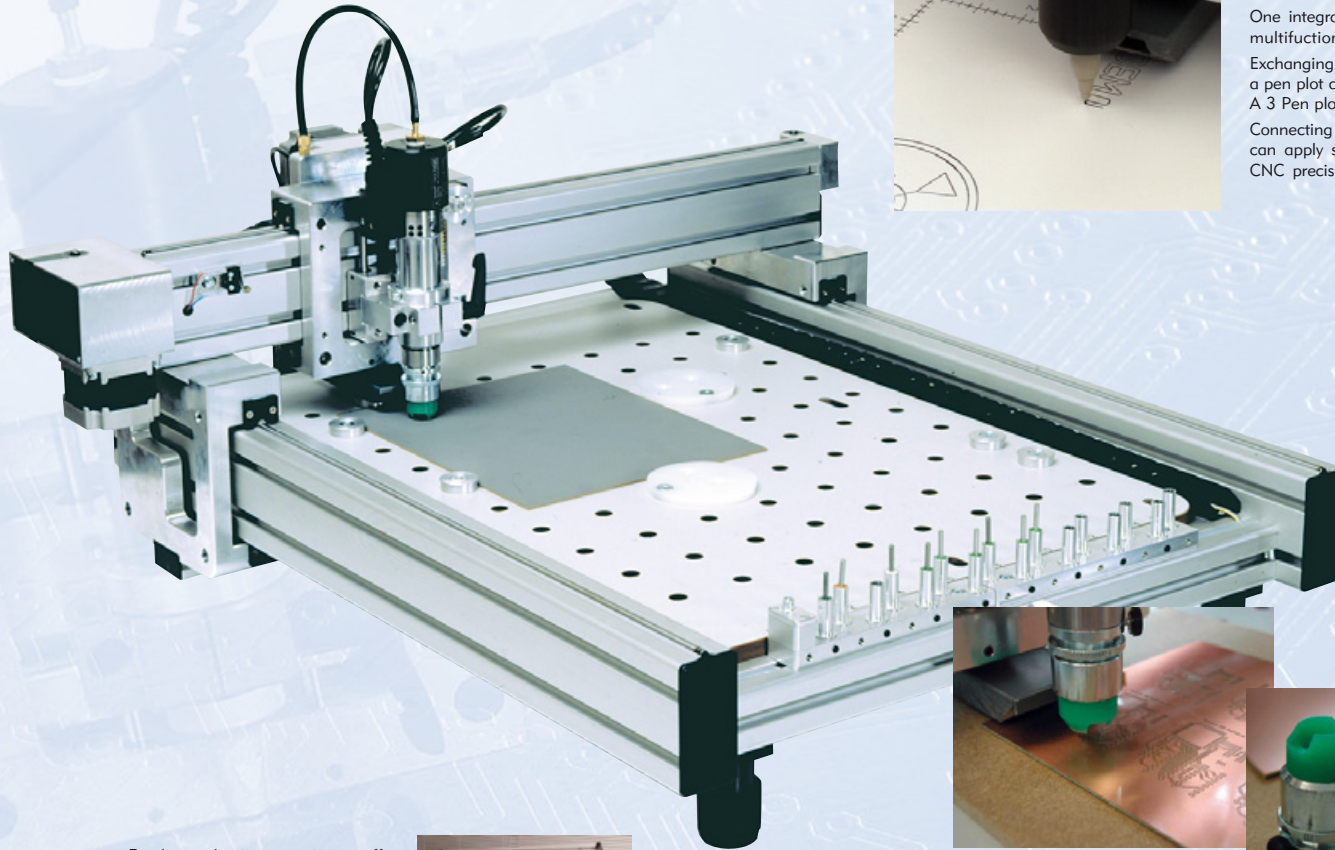
MTC = Manual Tool Change
 ATC = Automatic Tool Change



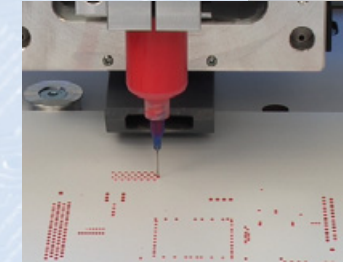
Picture shows ATC

- Max. hole diameter: infinite
- Integral depth limiting device for isolation milling and engraving on uneven surfaces, work level setting by Z stepper motor, depth fine adjustment with micrometer screw
- Removable, spring-load pressure foot for drilling of flexible and uneven PCBs
- Stack processing of several boards at once (typical stack: three 1.6 mm thick boards plus one underlay/base sheet)
- Working depth not limited by depth sensor, only by tool flute length (standard: 5..10 mm)
- Uses all common PCB drills/mills with 1/8" shank, with industry-standard length setting by collar
- Board fixture by „fiducials“ possible at no extra cost, using standard base sheet material
- Possibility of mounting boards to machine zero point. Clamp fixing devices included with machine, span fixing for heavy-duty milling is possible
- Vacuum board fixation not recommended due to problems with board penetration by drilling
- Stand alone control unit connects to all standard PCs with 1 free USB or serial port
- Fully integrated Windows (98..XP) driver software for Excellon, Sieb&Meyer or HP/GL data for real-time, on-line machine control, with comfortable user interface, including full tool management and plausibility control
- All machine parameters (speeds, acceleration ramps, X/Y/Z dimensions, scaling, tool change positions, drill detection level) software controlled and configurable
- Easy to use teach-in feature for drill data
- Step definition: Software selectable: 1 mil, 1/2 mil, 1/4 mil (= 6.35 micrometer)
- Resolution: 0.1 mil (= 2.54 micrometer)
- Precision +/- 1 step
- Positioning accuracy over entire workspace: 20 ppm (0.002%)
- Maximum traverse speed per axis: 130 mm/s
- Maximum working speed per axis: 130 mm/s, individual setting on a per-tool basis, independent from traverse speed
- Drill speed: 5 hits/s (=18000 holes per hour)
- optional CCD noise and dust protection rack

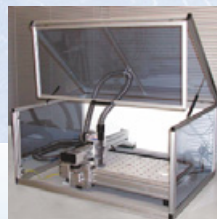
ACCESSORIES CCD



One integral part of the CCD is to keep it multifunctional.
 Exchanging the high frequency spindle with a pen plot adapter changes the CCD into an A 3 Pen plotter.
 Connecting the CCD with a dispenser, you can apply solder paste and adhesives with CNC precision



For dust and noise protection we offer soundproofing hoods and racks.



On request the CCD is delivered with a vacuum table.



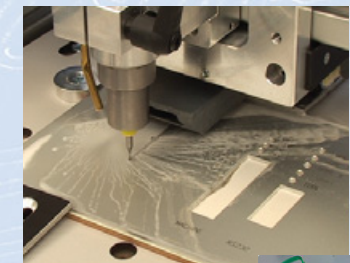
Depth limiter.



Pressure foot for drilling and routing.



The USB camera will allow optical inspection of your board.



With few steps you can equip the CCD with a coolant supply.



ROUTEPRO 2008

Software is extend of delivery of all new Bungard CCD systems for direct processing of drill- and routing data under Windows 98 Vista (recommend XP).

SOFTWARE:

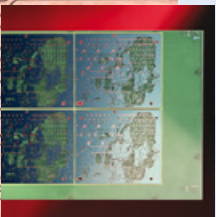
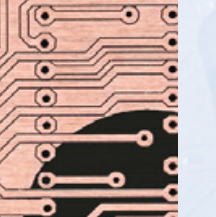
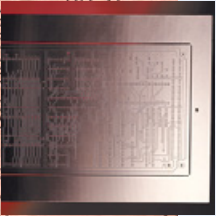
- Driver software for Excellon, Sieb&Meyer or HP/GL data for real-time machine control under Windows 98...Vista (recommend XP), with comfortable user interface, including tool statistics and plausibility control
- drill and route data simultaneously displayed

- 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: software selectable: 1 mil, 1/2 mil, 1/4 mil (= 6.35 micrometer)
- maximum working speed per axis: 130mm/s
- picture and target of optional USB camera will be shown on computer screen

For those Bungard CCD machines still operated under DOS (production date 1995 and later), we can supply controller upgrade + software ROUTEPRO 2008 or we can supply a similar (= light) software update package ROUTEPRO 2000 together with and additional small CPU box.

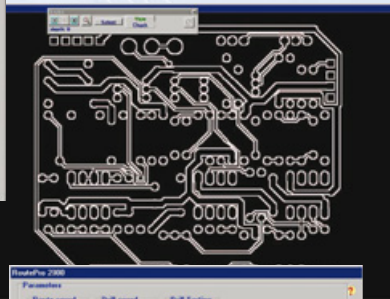
ADVANTAGES ROUTEPRO 2008 COMPARED TO ROUTEPRO 2000:

- Maximum working speed up to 8m/min
- Step resolution adjustable up to 6,35µm
- Saving of complete jobs is possible
- Loading of the tools via CNC machine is possible
- You can mark vectors and start routing from this vector till end of file
- The software recognizes our camera and produces a screen display with crosshair on the monitor.
- Machine can drive either in camera or drill/route mode
- Teach-in feature supports route files, too
- Additional software extensions are only available for RP 2008 (and NOT for RP 2000) such as: dispensing software or remote control software !



Route Tools	Tool	Dist	Depth	Flt	Flt	K Feed	Z Feed	Spindle	Coord	ATC	Tools	Feed
	mm	mm	mm	mm	mm/min	mm/min	mm/min	mm/min	(1 PCB)	Pos	Tab	mm/min
11	0.25	0.5	1	1800	250	40000	40000	40000	40000	3	Yes	1
12	0.5	2.0	1	480	250	40000	40000	40000	40000	2	Yes	2
13	0	0.5	1	1800	250	30000	30000	30000	30000	3	Yes	3
14	0	0.5	1	1800	250	30000	30000	30000	30000	4	Yes	4
15	0	0.5	1	1800	250	30000	30000	30000	30000	5	Yes	5
16	0	0.5	1	1800	250	30000	30000	30000	30000	6	Yes	6
17	0	0.5	1	1800	250	30000	30000	30000	30000	7	Yes	7
18	0	0.5	1	1800	250	30000	30000	30000	30000	8	Yes	8
19	0	0.5	1	1800	250	30000	30000	30000	30000	9	Yes	9
110	0	0.5	1	1800	250	30000	30000	30000	30000	10	Yes	10
111	0	0.5	1	1800	250	30000	30000	30000	30000	11	Yes	11
112	0	0.5	1	1800	250	30000	30000	30000	30000	12	Yes	12
113	0	0.5	1	1800	250	30000	30000	30000	30000	13	Yes	13

Default Route Tools	Dist	Depth	Flt	K Feed	Z Feed	Spindle	Coord	ATC
mm	mm	mm	mm	mm/min	mm/min	mm/min	(1 PCB)	Pos
0.3	0.1	1	1800	1000	40000	40000	40000	40000
0.25	0.2	1	1800	1000	40000	40000	40000	40000
0.3	0.1	1	1800	1000	40000	40000	40000	40000
1.0	1.0	1	1800	1000	40000	40000	40000	40000
0.5	2.0	1	480	1000	40000	40000	40000	40000
0.5	0.5	1	1800	250	30000	30000	30000	30000

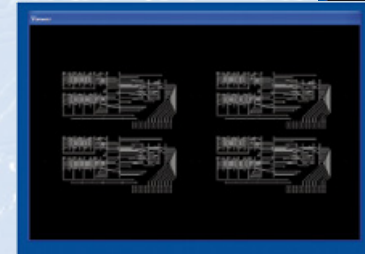


Route control	Drill control	Drill Setting
0.1 mil	0.1 mil	None
1.0 mil	1.0 mil	0.500
0.025 mm	0.025 mm	0.500
0.010 mm	0.010 mm	Special

Speed (mm/min)	Stamp Step	Stroke
XY Max 4000	XY 0	25.000
XY Min 2500	Z 4	Free
XY Ramp 1500		

Z Max	X	Y	Table Size	Step Size XY
4000	0	0	0.0254	0.0254
Z Min 2000	Y 0	0		
Z Ramp 1000	Z 0	0		

Board size	PCBs in Y direction	Y spacing	PCBs in X direction	X spacing
430	1		1	
425	Max. 5		Max. 5	
	Drilled PCB size	X 60.22	Y 50.22	



EXTENSION TO THE CCD:

Software RemoteControl

Remote controls opens a port in the offset menu of the RoutePro Software and so enables a skilled Delphi programmer to remote control the x, y, and z-axis of the Bungard CCD.

Software DispPro

Make your CCD to a high speed dispensers. We provide the dongle-protected software DispPro, a switch output for the CCD to control a dispenser and, if desired, a suitable Dispensing machine. The software is easy to use analog to our proven software RoutePro. In contrast, no rounds per minute but dosing times, no spindle delays but dosing delays may be set. Else you can use your drill file for dot dispensing and your milling file for line dispensing.



**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.

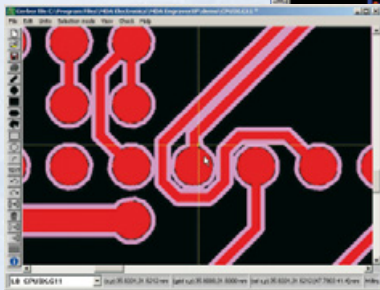
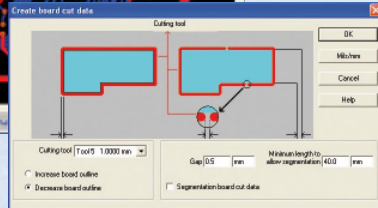
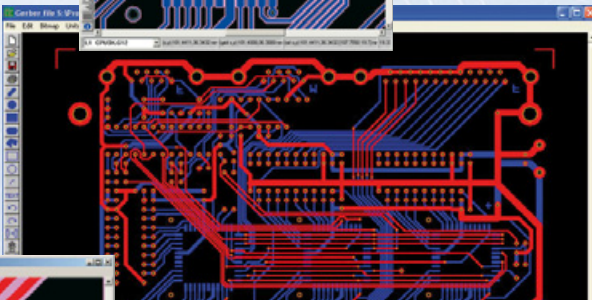
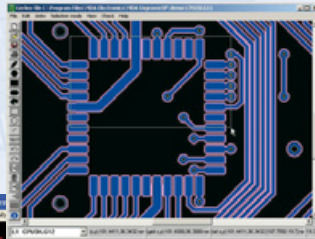
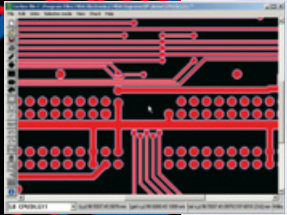
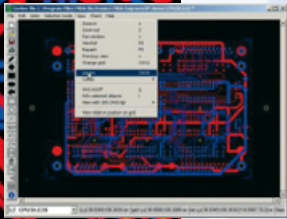
The questions:

- How do you check and correct the drill-, route- 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 Postscript 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.
- optional up-grade to ISOCAM PRO enables to load .bmp and .dxf files



ISOCAM® STANDARD PRO

Gerber input / output (standard/extended)	YES	YES
HPGL input / output	YES	YES
Excellon output for milling data	NO	YES
DXF input / output	NO	YES
Bitmap input /output	NO	YES
Drill input / output	YES	YES
G-code output	YES	YES
ARC optimize	NO	YES
Scaling	NO	YES
Scale / auto-rotate bitmap	NO	YES
Auto detect drill holes in bitmap	NO	YES
Save Job file	YES	YES
Create milling data	YES	YES
Create milling data using two tools	YES	YES
Create milling data for selected object	NO	YES
Undo/Redo	YES	YES
Max. number of layers	32	64
Units: Mils / mm / Inch / HPGL	YES	YES
Design rules checker	YES	YES
Show milling direction	NO	YES
Change milling direction	NO	YES
Change starting point of milling chain	NO	YES
Select whole milling chain	NO	YES
Create solder mask	NO	YES
Snap to nearest endpoint	YES	YES
Auto synchronize layers	YES	YES
Add fixing holes	YES	YES
Create rub outs	YES	YES
Create board cuts	YES	YES
Mirror-function	YES	YES
Powerfill zoom function	YES	YES
Add objects	YES	YES
Select complete net	NO	YES

