

# **PCBDesigner**

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**COLLABORATORS**

	<i>TITLE :</i> PCBDesigner		
<i>ACTION</i>	<i>NAME</i>	<i>DATE</i>	<i>SIGNATURE</i>
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**REVISION HISTORY**

NUMBER	DATE	DESCRIPTION	NAME

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# Chapter 1

## PCBDesigner

### 1.1 Manual - main menu



PCBDesigner

Version 0.34 beta

Date 25.10.1997

Copyright (c) Krashan/Opium & sub  
BlaBla

Manual

Table of contents:

1. Copyrights and distribution
2. General informations
3. Detailed description
4. Hard & soft requirements, tech. stuff
5. Bugs and limitations
6. Future of the project
7. History
8. About BlaBla
- 9.

Other informations

WHAT'S NEW IN v0.34?

## 1.2 Copyrights and distribution

This software is subject to the Standard Amiga FD-Software Copyright Note.

This is >FREEMWARE<, as defined in paragraph 4>a<.

For more information please read AFD-COPYRIGHT (version 1.2 or higher).

Copyright  
Distribution  
Disclaimer  
Return service

## 1.3 General informations

PCBDesigner is a program for comfortable and quick designing of

printed circuit boards

. It is useful for electronic engineers and hobbyists. Here is a short list of features:

- fully vectorized scalable graphics,
- uses

MUI

for graphics user interface,

- system friendly - should work under CyberGfx (not tested yet),
- localization (Polish catalog and .cd .ct files included),
- acceptable speed even on a stock A1200.

There are of course only already implemented features. In future versions a lot of new possibilities will be added. PCBDesigner 0.34 has limited edit modes.

Track

width can vary from 1 to 9999

mils

.

Pads

are fixed for now,

they have 75

mils

diameter and 30

mils

hole. Program is intensively

developed, and I'm going to make it a good alternative to well known PC software.

---

## 1.4 Detailed description

Detailed description.

What can You do with PCBDesigner

Working with the program

Reference section

## 1.5 Hardware and software requirements

What do You need to run PCBDesigner

Program requires:

- Kickstart 3.0 or higher.
- system libraries: mathtrans, iffparse in LIBS: directory.
- 

MUI

3.0 or higher.

- 1 MB free RAM.
- You should have a harddisk (MUI).

For comfortable work:

- 68030/28 MHz or better CPU.
- 4 MB RAM (fast-RAM).
- Colour monitor working at 640x512 resolution or higher (no lace).
- locale.library for working in languages other than English.

Program was succesfully tested on:

- A 1200 / 2 MB
- A 1200 / Blizzard 1230-IV (68030/50) / 10 MB / no FPU
- A 1200 Infinitiv / 6 MB / FPU 68882/25
- A 1200 / Blizzard 1230-III (68030/50) / 10 MB / FPU 68882/50
- A 2000 / Blizzard 2060 / 21 MB / Picasso IV + Picasso 96 software

IMPORTANT!!!

PCBDesigner requires at least 12 kB of stack. Keep it in mind when running the program from shell (enter "stack 12288" command). When You change program's icon be sure that stack size is proper. See also

here

.

## 1.6 Bugs and errors

---

Known bugs.

This place is for You, betatesters!

## 1.7 Future

TO DO:

- remove bugs :-),
- multiple layers (I think 32 is enough),
- changing shape and dimensions of pads (SMD too),
- component libraries,
- track editing (changing width, layer etc.),
- saving and loading of projects,
- printing,
- EPS and HPGL export,
- autorouting,
- many, many more (but I don't plan a builtin screen blanker ;-).

## 1.8 History

### History

Version 0.12 (06.03.1997)

- first public presentation.

Version 0.14 (10.03.1997)

- FIXED: Guru 80000005 when run on screen with 1:2 aspect ratio.
- ADDED: Edit field scrollbars.
- ADDED: "AboutMUI" window.
- ADDED: Polish documentation.

Version 0.15 (17.03.1997)

- ADDED: Magnify (9 levels).

Version 0.16 (18.03.1997)

- ADDED: Magnify is now user adjustable.
- FIXED: Fix point during magnification is now the centre of edit field.

Version 0.22 (02.05.1997)

- ADDED: Placing tracks.
- ADDED: Snap grid (not adjustable).
- FIXED: Chip-RAM allocation for gfx-operations is checked now.
- ADDED: "About" window, and menu item.
- ADDED: For now PCBDesigner is a  
                  BLABLA  
                  PRODUCT.
- ADDED: toolbar.

Version 0.23 (08.05.1997)

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- FIXED: COMPLEMENT RastPort draw mode was not swithed off after placing track with lenght of 0. This bug changed colors of gadgets. Reported by Krzysztof Kurdzieko.

Version 0.24 (05.06.1997)

- CHANGED: drawing routines, added "rough clipping" for very long tracks.
- ADDED: pads placing
- ADDED: "pads" icon on toolbar
- ADDED: visible draft outline of placed object

Version 0.25 (22.06.1997)

- ADDED: snap grid is user adjustable now.
- CHANGED: documentation (after observations of Lemur/BlaBla).

Version 0.26 (29.06.1997)

- ADDED: user adjustable visible grid.
- FIXED: bug related to MUI backgrounds in edit field, and picture in "About" window. Reported by Szczepan/subBlaBla.
- ADDED: documentation translated to English.
- FIXED: Triple refreshing after changing grid settings.
- FIXED: "About" window is to big for 200 lines screen (232 is enough). In this case program has been falling in endless loop. Now it only does system beep. Maybe I should draw smaller "about" picture?

Version 0.30 (03.08.1997)

- ADDED: moving objects.
- ADDED: selecting objects for group manipulation.
- ADDED: user adjustable grid colour and selected objects colour.
- ADDED: "rubber band" edit mode for tracks.
- ADDED: deleting objects.

Version 0.31 (12.09.1997)

- ADDED: saving and loading preferences.
- ADDED: bubble help for toolbar icons.
- FIXED: CTRL-C signal handling when subwindows are opened.
- FIXED: drawing routines (case when a circle radius is shorter than 1 pixel). This bug caused Enforcer & Mungwall hits (!). Reported by ScoTT/BlaBla.
- ADDED: Calling MUI Preferences from menu.
- CHANGED: 'About' window now only appears at start of program on default public screen. There is a new 'about' requester called from menu.
- CHANGED: Keyboard shortcuts for text buttons ('Use', 'Cancel' ect.) are now locale dependent.
- FIXED: Font in text button was incorrect. Missing MUIA\_Font attribute in gadgets definitions.
- FIXED: Bad grid snapping when coordinates are lower than zero. Bug reported by Adam Chudziak.

Version 0.32 (12.10.1997)

- ADDED: Keyboard shortcuts can be now defined by user.
-



Version 0.33 (25.10.1997)

- ADDED: Variable track width from 1 to 9999 mils (I hope it's enough:-).
- CHANGED: Graphics engine - new special function for drawing ellipses. This function requires NO chip-ram, and is used always for big ellipses (diameter > 512 pixels). Can be used for small ellipses in low chip-mem situations.

Version 0.34 (25.10.1997)

- FIXED: Grid parameters changing works now. Bug reported by Krzysztof Konopko.
- FIXED: Install script: missing Installer version checking. Bug reported by Krzysztof Konopko.

## 1.9 What is BlaBla?

BlaBla is a Polish biggest system programmers group. We make the system friendly programs. We guarantee that our programs will run on almost every machine (Amiga of course), including future ones. All our programs are running in multitasking, and all of them are PD, Freeware, or Shareware.

Our organisation has a few members (we "absorb" only good programmers), an own e-mail address and own BBS. Our newest productions you can find in our PD library called "Polware". Our texts, articles you can also find in our disk-mag "Izviestia" (sorry, in Polish!).

BlaBla memberlist (X'97):

Kordi/DuckRed & BlaBla	(Kordian Adamczyk)
Kysy/AM & 2xBla	(Krzysztof Habowski)
LeMUr/bla\$^2\$	(Lukasz Prokulski)
Karol/SubBlaBla	(Karol Bryd)
Scott/Inferno & BlaBla	(Marcin Ochocki)
Thufor/BlahBlah	(Dariusz J.Garbowski)
Tomash/Art-B & BBla	(Tomasz Korolczuk)
Warhawk/SubBlaBla	(Przemyslaw Jez)
Krashan/BlaBla	(Grzegorz Kraszewski)
Kaczus/subBlaBla	(Tomasz Kaczanowski)
Futrzak/subBlaBla	(Krzysztof Wolski)
X-Pert/subBlaBla	(Piotr Wyderski)
Bruner/subBlaBla	(Piotr Hoppe)
Mr.DoDo/subBlaBla	(Krzysztof Dolinski)
Melon/subBlaBla	(Grzegorz Chmiel)
Siumot/subBlaBla	(Tomasz Bielinski)
Szczepan/subBlaBla	(Marcin Juszkiewicz)
Valar/subBlaBla	(Daniel Owsianski)

BlaBla group is well-known in Poland, and programs signed with "BlaBla" are for sure very good. We made many productions, we help many young programmers, we write articles to Polish edition of Amiga Magazine, we try to do all, for our beloved computer - Amiga!

## 1.10 Other informations

Greetings, thanks ect.

Thanks for betatesters:

BlaBla group  
Adam Chudziak  
Krzysztof Konopko  
Krzysztof Kurdziewo  
Bogdan Langrzik  
Flemming Steffensen

Hot greets to friends:

all the BlaBla group  
Pepson/Taski  
Kubik/Skulls  
Krzysztof Konopko  
Lopez/ST5  
Adam Chudziak  
Krzysztof Kurdziewo  
Bogdan Langrzik

Suggestions, bugreports, donations :-), and other stuff are welcome:

Grzegorz Kraszewski (Krashan/BlaBla)  
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POLAND

or:

krashan@cksr.ac.bialystok.pl vaild to end of July 1998.

## 1.11 MUI

This application uses

MUI - MagicUserInterface

(c) Copyright 1993/94 by Stefan Stuntz

MUI is a system to generate and maintain graphical user interfaces. With the aid of a preferences program, the user of an application has the ability to customize the outfit according to his personal taste.

MUI is distributed as shareware. To obtain a complete package containing lots of examples and more information about registration please look for a file called "muiXXusr.lha" (XX means the latest version number) on your local bulletin boards or on public domain disks.

If you want to register directly, feel free to send

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DM 30.- or US\$ 20.-

to

Stefan Stuntz  
Eduard-Spranger-Straße 7  
80935 München  
GERMANY

## 1.12 About PCBDesigner

About PCBDesigner

PCBDesigner enables You to design  
printed circuit boards  
(single layer in  
this version, 32 layers in the future). Largest board size is 40x40 inches  
(1.016x1.016 meters). Tracks, pads and other objects are shown in WYSIWYG  
mode.

You can run the program from icon or from Shell. PCBDesigner doesn't  
recognize any icon tooltypes, or Shell parameters (so far).

Basic program functions are accessed by gadgets placed in main window. Other  
functions are placed in pull-down menu. The most important element of window  
is a big edit area. You can see designed project in it. Scrollbars can be  
used to move edit area over the project. Gadget in right down corner is used  
to change magnify of the edit area. Step of magnifying is user adjustable.  
Magnify can vary from 0.08 to 3 pixels per  
mils  
.

## 1.13 Useful informations

Useful informations

Here You can read about

Working with objects on PCB

Fitting PCBDesigner with Your Amiga  
You can find here answers for  
frequently asked questions  
, and  
tips  
.

## 1.14 advises

Tips

! Vertical and horizontal tracks are drawn faster than others.

! Toolbar icons placed in /Images directory are standard IFF brushes. So You can draw new icons (e.g. for 640x256 screen, or bigger for 1024x768). But You have to preserve special MUI palette, and notes contained in "Image Design" file in MUI archive. If You draw a nice set of icons send it to me

I'll include it in PCBDesigner distribution.

## 1.15 Reference

Reference section

Here is a detailed description of PCBDesigner toolbar, menus, keys and gadgets.

Toolbar

Menus

Keyboard

Gadgets

## 1.16 Toolbar

Toolbar icons (from left)

Place track

Place pad

Grids settings

## 1.17 Toolbar icon - place track

1. Place track.

After clicking on this icon You can place tracks on the PCB. Currently only

---

one layer is available. When You move the pointer on edit area, You'll can see a circle. Its diameter is equal to track width. Click LMB once to start track drawing. Now You can see an outline of the track following the pointer. Click LMB again to place a section of track. You can place as many sections, as You want. To end the track doubleclick LMB placing last section, or press

SPACE

on the keyboard. The difference is that doubleclicking allows You to start next track immediately, but using SPACE switches 'place track' mode off. This icon has also a keyboard shortcut

.

## 1.18 Toolbar icon - place pad

2. Place pad.

Using this icon You can place soldering pads on the PCB. In this version only one kind of pads is available. They are rounded (75

mils

diameter) with

30

mils

hole. When the pointer is on the edit area You can see an outline ↔

of

the pad. Click the LBM to place it. To leave 'place pad' mode select other mode in toolbar, click 'place pad' icon again or press

SPACE

on keyboard.

This icon has also a

keyboard shortcut

.

## 1.19 Toolbar icon - adjust grids

3. Adjust grids.

Click this icon to pop up a grid settings window. You can choose snap and visible grid value from pop-up list or type it into string gadgets. Grid can vary from 1 to 9999

mils

. With checkmark You can toggle visible grid on and

off. 'Use' button confirms new settings. To cancel press toolbar icon again.

This icon has also a

keyboard shortcut

.

## 1.20 menus

### Menus

Project

About:

Displays "About program" window.

About MUI:

Standard "About MUI" window.

Quit:

Quits the program.

Preferences

Display:

Shows "Display preferences" window. Here You can decide, how PCB will be displayed on the screen.

> Scroll with arrows - adjusts scrolling distance, when scrollbars arrows are used.

> Magnify step - controls magnify button. Displayed value is a magnify factor for single clicking on magnify button.

> Drawing modes - controls graphics representation of PCB objects. Possible modes are:

- \* single lines - tracks are drawn as lines, pads aren't visible,
- \* wireframe - only outlines of objects are drawn,
- \* filled figures - all objects are filled.

Layers:

Here You can adjust colors of layers. Currently You can adjust colour of grid and colour of selected objects outline. Standard MUI colour requesters are used. Click on gadget showing current color to change it.

Keyboard:

Opens window with  
    keyboard shortcuts  
    settings.

Save as defaults:

Saves prefs to configuration file in ENVARC: directory. Saved values are:

- all settings from 'Display prefs' window.
- all settings from 'Layers prefs' window.
- all settings from 'Keyboard shortcuts' window.
- grid settings.

Default settings are loaded when program is started.

---

## 1.21 faq

Typical problems with PCBDesigner

1. Program hangs up frequently, especially when MUIPreferences are used.

Too small stack is probably the reason. PCBDesigner needs 12 kB of stack. If You are running the program from icon, check the stack size by 'Icon/Information' in Workbench menu. If You run it from shell enter 'stack 12288' command first. Be careful using program launchers like ToolsDaemon, StartMenu, TinyMeter etc. For PCBDesigner use 'run as WB program' option (stack size will be taken from icon), or enter proper stack size.

2. When I draw tracks quickly program leaves 'place track' mode unexpectedly.

Two following LMB clicks are interpreted as one doubleclick. Decrease system doubleclick time by Input program in Prefs directory, or draw tracks a little slower...

## 1.22 Configuration

Fitting PCBDesigner to Your Amiga

PCBDesigner is written for comfortable use on every Amiga, which meet hard & soft

requirements

. No matter is it A500 or A4000 with PPC. But You should configure some options. First important thing is user interface. You can change it using MUI Preferences program. I advise You to use an registered version of MUI.

Screen selection

As for every MUI program You can select screen for PCBDesigner. It can be Workbench or separate screen. Select screen with square pixels if You can. PCBDesigner works even on 320x200 screen, but forget about it. 640x200 (or better 256) is acceptable, but not comfortable. Screen should have at least 16 colours, or 8 if You don't use too many layers, and don't use MagicWB, or similar palette (some colors are too close). On the other hand using 256 or 128 colours on AGA machines causes PCBDesigner to work slower. Owners of gfx-boards can of course use 256 or more colours, but true color mode really isn't necessary with this program...

Doubleclick time

Doubleclick is used in PCBDesigner to terminate

'place track'

mode. When

You place sections of a track quickly You can get in

trouble

. PCBDesigner

uses OS doubleclick routines, so use Input program in Prefs dir.

## Scrolling

When You scroll edit area every visible object is redrawn. It can take up a moment. So scroll distance was made configurable to the user. You can adjust it choosing

Preferences/Display  
menu item.

## Object drawing

In the same menu item You can select method of object drawing. The simplest and the fastest is 'single line'. But it's illegible. 'Wireframe' mode is the best for editing and for final drawing on slower machines. Starting from A1200+FAST You can choose 'solid figures' for final drawing.

## Keyboard shortcuts

PCBDesigner allows You to define keyboard shortcuts. You can work faster using keyboard instead of menus and icons. Shortcuts are user definable, so You can eg. set them the same as in program You are using at work on PC.

Here  
You'll find more about this.

## 1.23 Glossary

mils; a measure unit commonly used in PCB designing. It is equal to 1/1000 of inch (0.0254 mm).

pad; small area of cooper at the end of track. A pin of an electronic component is soldered here. Typical pad is round and have a hole in centre. Pads can be also oval, rectangular, octagonal etc. In SMD technology pads have no holes.

printed circuit board; is a board usually made of glass-epoxide or paper-phenol laminate. Cooper strips are placed on one or both sides of the board. These strips acts as electrical conections between electronic components. Components are soldered to strips at ends. These ends are shaped to fit component's pins, and are called soldering pads. Pads can have holes (in traditional technology) or not (Surface Mounted Devices - SMD).

track; a cooper strip on PCB, which makes an electrical connection between two pins of electronic components. Width of a track depends mainly on strength of electric current flowing in it.

## 1.24 What's new in this version?

New in 0.34 version

Basic edit possibilities have been added:

---



- Moving objects with drag&drop.
- "rubber band" editing for tracks (wires).
- selecting objects.
- deleting objects.
- variable track width from 1 to 9999 mils.

Also:

- Saving and loading default settings.
- Bubble help for toolbar icons.
- User definable keyboard shortcuts.
- Improved graphics engine (special low-chipmem ellipse drawing procedure).

## 1.25 Working with objects

### Objects in PCBDesigner

Everything placed on PCB project is an object. There are two kinds of objects in PCBDesigner (in this version):

- \* track - is composed of one rectangle and two circles at ends. It represents one section of physical track on PCB.
- \* pad - soldering pad on PCB. It can be composed of a few objects. These objects are on two special layers: pads layer and holes layer. Pads layer represents copper area of the pad. Holes layer represents hole. It allows making pads with any shape of copper and hole. However pad shape is hardcoded in this version. This hardcoded pad consists of two circles.

Placing objects

placing pads

placing tracks  
Selecting objects

To select an object just click on it with LMB. It will be drawn with outline in different colour. Another clicking deselects the object. When program determines which object has been clicked it searches object list starting from the deepest layer, even if clicked point is covered by object on "higher" layer. When You click on circle shared by two or more track sections on the same layer (e.g. bend point), all these sections will be selected.

Moving objects

To move an object press LMB on it. It will be outlined. Then still pressing LMB drag object to its new position and release LMB. When You want to move a track section don't press on ending circles.

Deleting objects

Select object (s) as described above. Then press  
Del  
on keyboard. All

selected objects will be deleted.

"Rubber band" track editing

\* moving bend point of track: press LMB on the point (circle) then drag it to a new position. Release LMB.

\*"breaking" track section into two: press LMB somewhere in the middle of the track section holding any 'Alt' key. Then drag two new sections. Release LMB.

## 1.26 Using keyboard

Standard menu shortcuts.

Some menu items have standard system shortcuts. These are:

A + Q

Quit

A + E

Save current settings as defaults

Where A is the 'right amiga' key.

Standard gadget shortcuts.

Some button gadgets (e.g. Save/Use/Cancel in settings window) have also shortcuts. Just press a key with a letter which is underlined in a gadget text.

Standard MUI keyboard actions.

It works in all windows (including pop-ups). You can manipulate all gadgets with keyboard. Key combinations are adjustable via MUI Preferences.

User definable shortcuts

Click

here

.

## 1.27 Keyboard shortcuts

User definable keyboard shortcuts

You can open keyboard configuration window from menu (Preferences/Keyboard). You can type keys (or key combinations) definitions into string gadgets. Keys are described in commodities.library convention, used eg. in commodities programs. If any key description is incorrect, error message will be displayed and cursor will be placed in a string with bad description.

---

## 1.28 Gadgets

Gadgets below the edit area:

Track width

Coordinates

## 1.29 Track width gadget

Track width gadget

You can change width of placed tracks with this gadget. Width can vary from 1 to 9999 mils. Type desired width in the string gadget or use popup to set one of predefined standard widths.

## 1.30 Coordinates gadget

Coordinates gadget

This little one shows current coordinates of the mouse pointer. It reflects snap grid settings. Of course it shows correct values only if the pointer is over the edit area.

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