# CadPack
## Import from Protel 3

### User's Guide

**Version** 1
**Code :** 81190719.170

**SPEA SpA**
16, Via Torino
10088 Volpiano - Italy
Tel.: + 39 011 9825 400
Fax: + 39 011 9825 405
E-mail: info@spea.com
Web: www.spea.com

This manual can be updated in accordance with the evolution of the system and associated software.
It may contain preliminary contents or it may not be entirely updated with the latest versions used in the system.

Any remarks on errors and imperfections, or suggestions, can be addressed to:

**SPEA SpA**
Ufficio Documentazione
16, Via Torino
10088 Volpiano – Italy
Tel.: +39 011 9825400
Fax: +39 011 9825405
Email: info@spea.com
Web: www.spea.com

# Contents

# Introduction

CAD files are the base for the automatic generation of test program for InCircuit of any technology.
Both bed of nails and flying probe testers, requires the circuit information available on CAD format, in order to generate in a short time and without errors the ICT test program.
The “Import from Protel 3” CAD import driver allow to import the data present in the Protel 3 CAD file and convert them in the SPEA Board data format.

| The information of this document are referred to: | |
|---|---|
| **Software tool name:** | Leonardo |
| **Minimum requirements software release:** | 2.20 or later |
| **Hardware requirements:** | Licence on SPEA dongle |

***Conventions, symbols and abbreviations***

In the document, the  symbol is used to highlight information or notes useful to the reader.

# Revisions

| Version | Data | Remarks |
|---|---|---|
| 1 | 28/01/2011 | First version |

# 1. Protel 3 file data

With the “PROTEL 3 CAD files” words we refer to the output information generated by the PROTEL 3 CAD-CAE programs for the electrical diagrams design and PCB development, used to develop a test application (test program and adapter design).

Information stored in the “PROTEL 3 CAD files” concern an electronic board and can be used by an appropriate program to generate a test program and its test adapter design (Bed of Nails or list of movement for Flying Probes).

Information can be grouped in 4 different categories and typically concern the printed circuit:

| **Part List** |
| --- |
| It is the list of all used devices, it must contain: devices drawing reference, part numbers, value, tolerances, device type, etc. |
| **Net List** |
| It is also called wiring list, containing device interconnection data; basically it is a presentation of the electrical diagram. |
| **Coordinate and access list** |
| It is the list containing the devices coordinates, concerning their barycentre and pins. |
| **Wiring and Routing list** |
| It is the list containing the path of the Net tracks in the PCB. |

For the import of the information above mentioned, SPEA has developed the specific program for the translation, stored in a specified format, to its common data bank called “Board Data”.
The name of this type of program is “CAD import driver”.

For the required information, see the list in the following paragraphs.

## 1.1 Part List

The Part List is an ASCII text file, containing the list of all the parts used to assemble the board; sometimes it can be called **Bill of Material** (BOM).

In the Part List all information concerning the mounted and not mounted parts must be present.
For every part the following information must be defined:

| Information | Description |
|---|---|
| **Drawing Reference** | Reference designator (e.g. U10, R105, D23, etc.). |
| **Part Number** | Device code (e.g. 132549.012, C4QW08, 001-58-AA, etc.). |
| **Value** | Device value (e.g. 10KΩ, 10µF, 1mH, etc.). |
| **Tolerance** | Positive and negative device tolerances (e.g. 1%, 5%, etc.). |
| **Mounting side** | The legal values for this item can be:<br>- **Top** (Component side)<br>- **Bottom** (Soldering side)<br>- **Not mounted Top**<br>- **Not mounted Bottom** |
| **Rotation** [1] | Device mounting rotation angle (e.g. 0°, 180°, etc.). |
| **Dimensions** [1] | Device dimensions. |
| **Case code** [1] | Device package (case) code. |

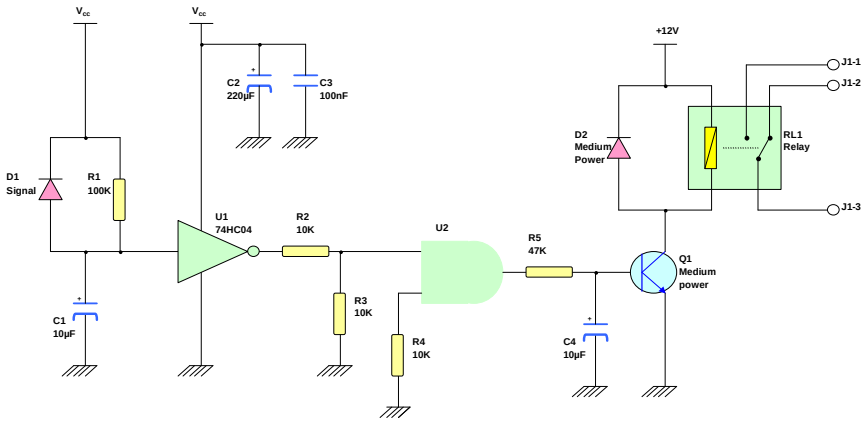
[1] **Optional data (not yet managed)**

## 1.2 Net List

The Net List is an ASCII text file containing the device interconnection data; it is also called wiring list. This list must contain the interconnection between devices, including pad and via.
Basically, it is the representation of the electrical diagrams.

For every net the following information must be defined:

| Information | Description |
|---|---|
| **Net name** | Net identifier (e.g. +5V, RESET, A01, etc.). |
| **Drawing reference** | Reference designator of the device connected to the net (e.g. U10, R105, D23, etc.). |
| **Pin name** | Name of the device pin connected to the net (e.g. 1, 15, Anode, K, Negative, etc.). |
| **Pin access side** | Access side for the device pin, legal values are:<br>- **Top** (Device side access).<br>- **Bottom** (Soldering side access).<br>- **Not accessible**<br>- **All** (both top and bottom side access) |



## 1.3 Coordinates and access list

The Coordinates and access list is an ASCII text file containing the devices coordinates concerning their barycentre and pins. Below, the required information:

| Information | Description |
|---|---|
| **Drawing Reference** | Reference designator of the device connected to the net (e.g. U10, R105, D23, etc.). |
| **Pin name** | Name of the device pin connected to the net (e.g. 1, 15, Anode, K, Negative, etc.). |
| **Pin X position** | Pin X-coordinate. |
| **Pin Y position** | Pin Y-coordinate. |
| **X barycentre** [1] | Device X barycentre. |
| **Y barycentre** [1] | Device Y barycentre. |

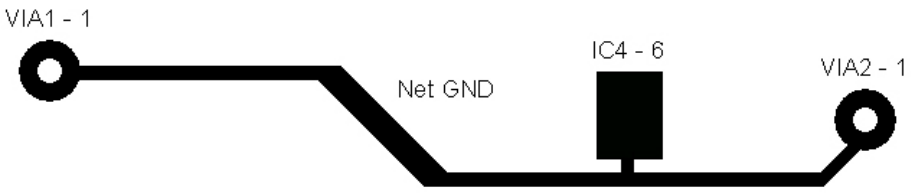
## 1.4 Wiring and Routing list

The Wiring and Routing list is an ASCII text file that contains all the coordinates of the Net tracks on the PCB and the link with the Net List. So the path of each net on the PCB is described in this file.

For every net the following information must be defined:

| Information | Description |
|---|---|
| **Net name** | Net identifier (e.g. +5V, RESET, A01, etc.). |
| **X Start** | Track segment start X-coordinate. |
| **Y Start** | Track segment start Y-coordinate. |
| **X End** | Track segment end X-coordinate. |
| **Y End** | Track segment end Y-coordinate. |
| **Width** | Net segment thickness. |
| **Layer** | Layer the segment belongs to. |

Example:




[1] **Optional data**

# 2. Protel 3 file generalities

## 2.1 Protel 3 file name

The Protel file have the extension **.PCB**
They are ASCII text files and contain information concerning the board, device and their connections.

## 2.2 Protel 3 file conversion from Unix to MS-DOS

When the diagram entry has been performed and checked on the Protel 3 CAD workstation, the Protel 3 file should be made available for the SPEA system.

The SPEA system is based on a PC platform operating in a Windows® environment, this means that the CAD import driver can manage ASCII Text file in MS-DOS format.

In order to perform the conversion, please refer to appendix A – **Note about the Protel 3 ASCII text file format**.

# 3. Protel 3 file format

This is a partial extract of an example of the Protel 3 output ASCII text file:

**Demo.PCB**

```
|RECORD=Board|FILENAME=D:\protel3\Serial_tp\\Backup of Serial_tp.pcb|KIND=Protel_Advanced_PCB|VERSION=3.00|DATE=22-Sep-
2000|TIME=11:20:23|ORIGINX=0mil|ORIGINY=0mil|BIGVISIBLEGRIDSIZE=10000000.000|VISIBLEGRIDSIZE=1000000.000|ELECTRICALGRIDRANGE=8mil|ELECTRICA
LGRIDENABLED=TRUE|SNAPGRIDSIZE=100000.000000|SNAPGRIDSIZEX=100000.000000|SNAPGRIDSIZEY=100000.000000|TRACKGRIDSIZE=200000.000000|VIAGRIDSIZ
E=200000.000000|COMPONENTGRIDSIZE=200000.000000|COMPONENTGRIDSIZEX=200000.000000|COMPONENTGRIDSIZEY=200000.000000|CURRENTWORKINGLAYER=BOTTO
M|DOTGRID=FALSE|DISPLAYUNIT=1|PLANE1NETNAME=(No Net)|PLANE2NETNAME=(No Net)|PLANE3NETNAME=(No Net)|PLANE4NETNAME=(No Net)|PLANE5NETNAME=(No
Net)|PLANE6NETNAME=(No Net)|PLANE7NETNAME=(No Net)|PLANE8NETNAME=(No Net)|PLANE9NETNAME=(No Net)|PLANE10NETNAME=(No Net)|PLANE11NETNAME=(No
Net)|PLANE12NETNAME=(No Net)|PLANE13NETNAME=(No Net)|PLANE14NETNAME=(No Net)|PLANE15NETNAME=(No Net)|PLANE16NETNAME=(No Net)
|RECORD=Board|TOPTYPE=3|TOPCONST=3.500|TOPHEIGHT=0.4mil|TOPMATERIAL=Solder
Resist|BOTTOMTYPE=3|BOTTOMCONST=3.500|BOTTOMHEIGHT=0.4mil|BOTTOMMATERIAL=Solder
Resist|LAYERSTACKSTYLE=0|SHOWTOPDIELECTRIC=FALSE|SHOWBOTTOMDIELECTRIC=FALSE|LAYER1NAME=TopLayer|LAYER1PREV=0|LAYER1NEXT=32|LAYER1MECHENABLE
D=FALSE|LAYER1COPTHICK=1.4mil|LAYER1DIELTYPE=1|LAYER1DIELCONST=4.800|LAYER1DIELHEIGHT=12.6mil|LAYER1DIELMATERIAL=FR-
4|LAYER2NAME=MidLayer1|LAYER2PREV=0|LAYER2NEXT=0|LAYER2MECHENABLED=FALSE|LAYER2COPTHICK=1.4mil|LAYER2DIELTYPE=0|LAYER2DIELCONST=4.800|LAYER
2DIELHEIGHT=12.6mil|LAYER2DIELMATERIAL=FR-
4|LAYER3NAME=MidLayer2|LAYER3PREV=0|LAYER3NEXT=0|LAYER3MECHENABLED=FALSE|LAYER3COPTHICK=1.4mil|LAYER3DIELTYPE=0|LAYER3DIELCONST=4.800|LAYER
3DIELHEIGHT=12.6mil|LAYER3DIELMATERIAL=FR-
4|LAYER4NAME=MidLayer3|LAYER4PREV=0|LAYER4NEXT=0|LAYER4MECHENABLED=FALSE|LAYER4COPTHICK=1.4mil|LAYER4DIELTYPE=0|LAYER4DIELCONST=4.800|LAYER
4DIELHEIGHT=12.6mil|LAYER4DIELMATERIAL=FR-
4|LAYER5NAME=MidLayer4|LAYER5PREV=0|LAYER5NEXT=0|LAYER5MECHENABLED=FALSE|LAYER5COPTHICK=1.4mil|LAYER5DIELTYPE=0|LAYER5DIELCONST=4.800|LAYER
5DIELHEIGHT=12.6mil|LAYER5DIELMATERIAL=FR-4
|RECORD=Board|LAYER6NAME=MidLayer5|LAYER6PREV=0|LAYER6NEXT=0|LAYER6MECHENABLED=FALSE|LAYER6COPTHICK=1.4mil|LAYER6DIELTYPE=0|LAYER6DIELCONST
=4.800|LAYER6DIELHEIGHT=12.6mil|LAYER6DIELMATERIAL=FR-
4|LAYER7NAME=MidLayer6|LAYER7PREV=0|LAYER7NEXT=0|LAYER7MECHENABLED=FALSE|LAYER7COPTHICK=1.4mil|LAYER7DIELTYPE=0|LAYER7DIELCONST=4.800|LAYER
7DIELHEIGHT=12.6mil|LAYER7DIELMATERIAL=FR-
4|LAYER8NAME=MidLayer7|LAYER8PREV=0|LAYER8NEXT=0|LAYER8MECHENABLED=FALSE|LAYER8COPTHICK=1.4mil|LAYER8DIELTYPE=0|LAYER8DIELCONST=4.800|LAYER
8DIELHEIGHT=12.6mil|LAYER8DIELMATERIAL=FR-
4|LAYER9NAME=MidLayer8|LAYER9PREV=0|LAYER9NEXT=0|LAYER9MECHENABLED=FALSE|LAYER9COPTHICK=1.4mil|LAYER9DIELTYPE=0|LAYER9DIELCONST=4.800|LAYER
9DIELHEIGHT=12.6mil|LAYER9DIELMATERIAL=FR-
4|LAYER10NAME=MidLayer9|LAYER10PREV=0|LAYER10NEXT=0|LAYER10MECHENABLED=FALSE|LAYER10COPTHICK=1.4mil|LAYER10DIELTYPE=0|LAYER10DIELCONST=4.80
0|LAYER10DIELHEIGHT=12.6mil|LAYER10DIELMATERIAL=FR-4


|RECORD=Net|ID=0|SELECTION=FALSE|NAME=NetU1_21|VISIBLE=TRUE|COLOR=8421376
|RECORD=Net|ID=1|SELECTION=FALSE|NAME=NetU1_49|VISIBLE=TRUE|COLOR=8421376
|RECORD=Net|ID=2|SELECTION=FALSE|NAME=NetU1_55|VISIBLE=TRUE|COLOR=8421376
...
|RECORD=Component|ID=0|SELECTION=FALSE|LAYER=TOP|LOCKED=TRUE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|PRIMITIVELOCK=TRUE|X=10800mil|Y=2200mil|P
ATTERN=ECN-
IBMXT|NAMEON=TRUE|COMMENTON=FALSE|GROUPNUM=0|COUNT=0|ROTATION=0.000|HEIGHT=0mil|NAMEAUTOPOSITION=0|COMMENTAUTOPOSITION=0|UNIONINDEX=0
|RECORD=Component|ID=1|SELECTION=FALSE|LAYER=TOP|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|PRIMITIVELOCK=TRUE|X=9480mil|Y=6100mil|P
ATTERN=RAD0.2|NAMEON=TRUE|COMMENTON=FALSE|GROUPNUM=0|COUNT=0|ROTATION=180.000|HEIGHT=0mil|NAMEAUTOPOSITION=0|COMMENTAUTOPOSITION=0|UNIONIND
EX=0
```

```
|RECORD=Component|ID=2|SELECTION=FALSE|LAYER=TOP|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|PRIMITIVELOCK=TRUE|X=9980mil|Y=3820mil|P
ATTERN=AXIAL0.4|NAMEON=TRUE|COMMENTON=TRUE|GROUPNUM=0|COUNT=0|ROTATION=180.000|HEIGHT=0mil|NAMEAUTOPOSITION=0|COMMENTAUTOPOSITION=0|UNIONIN
DEX=0
...
|RECORD=Arc|COMPONENT=6|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|LOCATION.X=8900mil|LOCATION.Y=42
20mil|RADIUS=100mil|STARTANGLE=180.000|ENDANGLE=360.000|WIDTH=10mil|SUBPOLYINDEX=0
|RECORD=Arc|COMPONENT=6|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|LOCATION.X=8900mil|LOCATION.Y=44
20mil|RADIUS=100mil|STARTANGLE=0.000|ENDANGLE=180.000|WIDTH=10mil|SUBPOLYINDEX=0
|RECORD=Arc|COMPONENT=8|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|LOCATION.X=10830mil|LOCATION.Y=4
270mil|RADIUS=25mil|STARTANGLE=90.000|ENDANGLE=270.000|WIDTH=10mil|SUBPOLYINDEX=0
|RECORD=Arc|COMPONENT=9|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|LOCATION.X=9730mil|LOCATION.Y=47
70mil|RADIUS=25mil|STARTANGLE=90.000|ENDANGLE=270.000|WIDTH=10mil|SUBPOLYINDEX=0
...

|RECORD=Pad|NET=12|COMPONENT=0|SELECTION=FALSE|LAYER=TOP|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|NAME=A31|X=7800mil|Y=2200mil|TOP
XSIZE=50mil|MIDXSIZE=0mil|BOTXSIZE=0mil|TOPYSIZE=300mil|MIDYSIZE=0mil|BOTYSIZE=0mil|SHAPE=ROUND|HOLESIZE=0mil|ROTATION=0.000|PLATED=TRUE|DA
ISYCHAIN=Load|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=1|CSEV=1|CPCV=1|CPRV=1|CCS=NoConnect|CPL=0|CCW=10mil|CEN=4|CAG=10mil|CPE=-
150mil|CSE=4mil|CPC=20mil|CPR=20mil
|RECORD=Pad|NET=13|COMPONENT=0|SELECTION=FALSE|LAYER=TOP|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|NAME=A30|X=7900mil|Y=2200mil|TOP
XSIZE=50mil|MIDXSIZE=0mil|BOTXSIZE=0mil|TOPYSIZE=300mil|MIDYSIZE=0mil|BOTYSIZE=0mil|SHAPE=ROUND|HOLESIZE=0mil|ROTATION=0.000|PLATED=TRUE|DA
ISYCHAIN=Load|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=1|CSEV=1|CPCV=1|CPRV=1|CCS=NoConnect|CPL=0|CCW=10mil|CEN=4|CAG=10mil|CPE=-
150mil|CSE=4mil|CPC=20mil|CPR=20mil
|RECORD=Pad|NET=14|COMPONENT=0|SELECTION=FALSE|LAYER=TOP|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|NAME=A29|X=8000mil|Y=2200mil|TOP
XSIZE
=50mil|MIDXSIZE=0mil|BOTXSIZE=0mil|TOPYSIZE=300mil|MIDYSIZE=0mil|BOTYSIZE=0mil|SHAPE=ROUND|HOLESIZE=0mil|ROTATION=0.000|PLATED=TRUE|DAISYCH
AIN=Load|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=1|CSEV=1|CPCV=1|CPRV=1|CCS=NoConnect|CPL=0|CCW=10mil|CEN=4|CAG=10mil|CPE=-
150mil|CSE=4mil|CPC=20mil|CPR=20mil
|RECORD=Pad|NET=109|COMPONENT=0|SELECTION=FALSE|LAYER=TOP|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|NAME=A28|X=8100mil|Y=2200mil|TO
PXSIZE=50mil|MIDXSIZE=0mil|BOTXSIZE=0mil|TOPYSIZE=300mil|MIDYSIZE=0mil|BOTYSIZE=0mil|SHAPE=ROUND|HOLESIZE=0mil|ROTATION=0.000|PLATED=TRUE|D
AISYCHAIN=Load|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=1|CSEV=1|CPCV=1|CPRV=1|CCS=NoConnect|CPL=0|CCW=10mil|CEN=4|CAG=10mil|CPE=-
150mil|CSE=4mil|CPC=20mil|CPR=20mil
|RECORD=Pad|NET=108|COMPONENT=0|SELECTION=FALSE|LAYER=TOP|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|NAME=A27|X=8200mil|Y=2200mil|TO
PXSIZE=50mil|MIDXSIZE=0mil|BOTXSIZE=0mil|TOPYSIZE=300mil|MIDYSIZE=0mil|BOTYSIZE=0mil|SHAPE=ROUND|HOLESIZE=0mil|ROTATION=0.000|PLATED=TRUE|D
AISYCHAIN=Load|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=1|CSEV=1|CPCV=1|CPRV=1|CCS=NoConnect|CPL=0|CCW=10mil|CEN=4|CAG=10mil|CPE=-
150mil|CSE=4mil|CPC=20mil|CPR=20mil
|RECORD=Pad|NET=107|COMPONENT=0|SELECTION=FALSE|LAYER=TOP|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|NAME=A26|X=8300mil|Y=2200mil|TO
PXSIZE=50mil|MIDXSIZE=0mil|BOTXSIZE=0mil|TOPYSIZE=300mil|MIDYSIZE=0mil|BOTYSIZE=0mil|SHAPE=ROUND|HOLESIZE=0mil|ROTATION=0.000|PLATED=TRUE|D
AISYCHAIN=Load|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=1|CSEV=1|CPCV=1|CPRV=1|CCS=NoConnect|CPL=0|CCW=10mil|CEN=4|CAG=10mil|CPE=-
150mil|CSE=4mil|CPC=20mil|CPR=20mil
|RECORD=Pad|NET=106|COMPONENT=0|SELECTION=FALSE|LAYER=TOP|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|NAME=A25|X=8400mil|Y=2200mil|TO
PXSIZE=50mil|MIDXSIZE=0mil|BOTXSIZE=0mil|TOPYSIZE=300mil|MIDYSIZE=0mil|BOTYSIZE=0mil|SHAPE=ROUND|HOLESIZE=0mil|ROTATION=0.000|PLATED=TRUE|D
AISYCHAIN=Load|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=1|CSEV=1|CPCV=1|CPRV=1|CCS=NoConnect|CPL=0|CCW=10mil|CEN=4|CAG=10mil|CPE=-
150mil|CSE=4mil|CPC=20mil|CPR=20mil
|RECORD=Pad|NET=105|COMPONENT=0|SELECTION=FALSE|LAYER=TOP|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|NAME=A24|X=8500mil|Y=2200mil|TO
PXSIZE=50mil|MIDXSIZE=0mil|BOTXSIZE=0mil|TOPYSIZE=300mil|MIDYSIZE=0mil|BOTYSIZE=0mil|SHAPE=ROUND|HOLESIZE=0mil|ROTATION=0.000|PLATED=TRUE|D
AISYCHAIN=Load|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=1|CSEV=1|CPCV=1|CPRV=1|CCS=NoConnect|CPL=0|CCW=10mil|CEN=4|CAG=10mil|CPE=-
150mil|CSE=4mil|CPC=20mil|CPR=20mil
|RECORD=Pad|NET=104|COMPONENT=0|SELECTION=FALSE|LAYER=TOP|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|NAME=A23|X=8600mil|Y=2200mil|TO
PXSIZE=50mil|MIDXSIZE=0mil|BOTXSIZE=0mil|TOPYSIZE=300mil|MIDYSIZE=0mil|BOTYSIZE=0mil|SHAPE=ROUND|HOLESIZE=0mil|ROTATION=0.000|PLATED=TRUE|D
AISYCHAIN=Load|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=1|CSEV=1|CPCV=1|CPRV=1|CCS=NoConnect|CPL=0|CCW=10mil|CEN=4|CAG=10mil|CPE=-
150mil|CSE=4mil|CPC=20mil|CPR=20mil
```

```
|RECORD=Pad|NET=103|COMPONENT=0|SELECTION=FALSE|LAYER=TOP|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|NAME=A22|X=8700mil|Y=2200mil|TO
PXSIZE=50mil|MIDXSIZE=0mil|BOTXSIZE=0mil|TOPYSIZE=300mil|MIDYSIZE=0mil|BOTYSIZE=0mil|SHAPE=ROUND|HOLESIZE=0mil|ROTATION=0.000|PLATED=TRUE|D
AISYCHAIN=Load|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=1|CSEV=1|CPCV=1|CPRV=1|CCS=NoConnect|CPL=0|CCW=10mil|CEN=4|CAG=10mil|CPE=-
150mil|CSE=4mil|CPC=20mil|CPR=20mil
|RECORD=Pad|NET=102|COMPONENT=0|SELECTION=FALSE|LAYER=TOP|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|NAME=A21|X=8800mil|Y=2200mil|TO
PXSIZE=50mil|MIDXSIZE=0mil|BOTXSIZE=0mil|TOPYSIZE=300mil|MIDYSIZE=0mil|BOTYSIZE=0mil|SHAPE=ROUND|HOLESIZE=0mil|ROTATION=0.000|PLATED=TRUE|D
AISYCHAIN=Load|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=1|CSEV=1|CPCV=1|CPRV=1|CCS=NoConnect|CPL=0|CCW=10mil|CEN=4|CAG=10mil|CPE=-
150mil|CSE=4mil|CPC=20mil|CPR=20mil
|RECORD=Pad|NET=23|COMPONENT=3|SELECTION=FALSE|LAYER=MULTILAYER|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|NAME=1|X=10520mil|Y=3840m
il|XSIZE=62mil|YSIZE=62mil|SHAPE=ROUND|HOLESIZE=32mil|ROTATION=0.000|PLATED=TRUE|DAISYCHAIN=Load|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=1|
CSEV=1|CPCV=1|CPRV=1|CCS=Relief|CPL=0|CCW=10mil|CEN=4|CAG=10mil|CPE=0mil|CSE=4mil|CPC=20mil|CPR=20mil
|RECORD=Pad|NET=119|COMPONENT=3|SELECTION=FALSE|LAYER=MULTILAYER|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|NAME=2|X=10720mil|Y=3840
mil|XSIZE=62mil|YSIZE=62mil|SHAPE=ROUND|HOLESIZE=32mil|ROTATION=0.000|PLATED=TRUE|DAISYCHAIN=Load|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=1
|CSEV=1|CPCV=1|CPRV=1|CCS=Relief|CPL=0|CCW=10mil|CEN=4|CAG=10mil|CPE=0mil|CSE=4mil|CPC=20mil|CPR=20mil
|RECORD=Pad|NET=92|COMPONENT=1|SELECTION=FALSE|LAYER=MULTILAYER|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|NAME=1|X=9480mil|Y=6100mi
l|XSIZE=62mil|YSIZE=62mil|SHAPE=ROUND|HOLESIZE=32mil|ROTATION=180.000|PLATED=TRUE|DAISYCHAIN=Load|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=1
|CSEV=1|CPCV=1|CPRV=1|CCS=Relief|CPL=0|CCW=10mil|CEN=4|CAG=10mil|CPE=0mil|CSE=4mil|CPC=10mil|CPR=20mil
|RECORD=Pad|NET=119|COMPONENT=1|SELECTION=FALSE|LAYER=MULTILAYER|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|NAME=2|X=9280mil|Y=6100m
il|XSIZE=62mil|YSIZE=62mil|SHAPE=ROUND|HOLESIZE=32mil|ROTATION=180.000|PLATED=TRUE|DAISYCHAIN=Load|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=
1|CSEV=1|CPCV=1|CPRV=1|CCS=Relief|CPL=0|CCW=10mil|CEN=4|CAG=10mil|CPE=0mil|CSE=4mil|CPC=10mil|CPR=20mil
|RECORD=Pad|NET=25|COMPONENT=2|SELECTION=FALSE|LAYER=MULTILAYER|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|NAME=1|X=9980mil|Y=3820mi
l|XSIZE=62mil|YSIZE=62mil|SHAPE=ROUND|HOLESIZE=32mil|ROTATION=180.000|PLATED=TRUE|DAISYCHAIN=Load|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=1
|CSEV=1|CPCV=1|CPRV=1|CCS=Relief|CPL=0|CCW=10mil|CEN=4|CAG=10mil|CPE=0mil|CSE=4mil|CPC=10mil|CPR=20mil
|RECORD=Pad|NET=24|COMPONENT=2|SELECTION=FALSE|LAYER=MULTILAYER|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|NAME=2|X=9580mil|Y=3820mi
l|XSIZE=62mil|YSIZE=62mil|SHAPE=ROUND|HOLESIZE=32mil|ROTATION=180.000|PLATED=TRUE|DAISYCHAIN=Load|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=1
|CSEV=1|CPCV=1|CPRV=1|CCS=Relief|CPL=0|CCW=10mil|CEN=4|CAG=10mil|CPE=0mil|CSE=4mil|CPC=10mil|CPR=20mil
...

|RECORD=Via|NET=14|SELECTION=FALSE|LAYER=MULTILAYER|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X=8000mil|Y=2810mil|DIAMETER=40mil|HO
LESIZE=22mil|STARTLAYER=TOP|ENDLAYER=BOTTOM|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=0|CSEV=1|CPCV=1|CPRV=1|CCS=Relief|CPL=0|CCW=10mil|CEN=4
|CAG=10mil|CSE=4mil|CPC=20mil|CPR=20mil
|RECORD=Via|NET=111|SELECTION=FALSE|LAYER=MULTILAYER|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X=7900mil|Y=3320mil|DIAMETER=40mil|H
OLESIZE=22mil|STARTLAYER=TOP|ENDLAYER=BOTTOM|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=0|CSEV=1|CPCV=1|CPRV=1|CCS=Relief|CPL=0|CCW=10mil|CEN=
4|CAG=10mil|CSE=4mil|CPC=20mil|CPR=20mil
|RECORD=Via|NET=13|SELECTION=FALSE|LAYER=MULTILAYER|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X=7860mil|Y=3680mil|DIAMETER=40mil|HO
LESIZE=22mil|STARTLAYER=TOP|ENDLAYER=BOTTOM|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=0|CSEV=1|CPCV=1|CPRV=1|CCS=Relief|CPL=0|CCW=10mil|CEN=4
|CAG=10mil|CSE=4mil|CPC=20mil|CPR=20mil
...
|RECORD=Track|NET=3|SELECTION=FALSE|LAYER=BOTTOM|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=9520mil|Y1=3000mil|X2=9640mil|Y2=3000
mil|WIDTH=10mil|SUBPOLYINDEX=0
|RECORD=Track|NET=3|SELECTION=FALSE|LAYER=BOTTOM|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=9680mil|Y1=3040mil|X2=10500mil|Y2=304
0mil|WIDTH=10mil|SUBPOLYINDEX=0
|RECORD=Track|NET=3|SELECTION=FALSE|LAYER=BOTTOM|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=10580mil|Y1=2960mil|X2=10740mil|Y2=29
60mil|WIDTH=10mil|SUBPOLYINDEX=0
|RECORD=Track|NET=3|SELECTION=FALSE|LAYER=BOTTOM|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=10813mil|Y1=3050mil|X2=10830mil|Y2=30
50mil|WIDTH=10mil|SUBPOLYINDEX=0
|RECORD=Track|NET=2|SELECTION=FALSE|LAYER=BOTTOM|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=9580mil|Y1=2960mil|X2=9880mil|Y2=2960
mil|WIDTH=10mil|SUBPOLYINDEX=0
|RECORD=Track|NET=1|SELECTION=FALSE|LAYER=BOTTOM|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=9660mil|Y1=3260mil|X2=9880mil|Y2=3260
mil|WIDTH=10mil|SUBPOLYINDEX=0
|RECORD=Track|NET=3|SELECTION=FALSE|LAYER=BOTTOM|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=10760mil|Y1=2980mil|X2=10760mil|Y2=29
97mil|WIDTH=10mil|SUBPOLYINDEX=0
```

```
|RECORD=Track|NET=0|SELECTION=FALSE|LAYER=BOTTOM|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=9650mil|Y1=3120mil|X2=9670mil|Y2=3140
mil|WIDTH=10mil|SUBPOLYINDEX=0
|RECORD=Track|NET=2|SELECTION=FALSE|LAYER=BOTTOM|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=9880mil|Y1=2960mil|X2=9920mil|Y2=3000
mil|WIDTH=10mil|SUBPOLYINDEX=0
|RECORD=Track|NET=1|SELECTION=FALSE|LAYER=BOTTOM|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=9880mil|Y1=3260mil|X2=9920mil|Y2=3300
mil|WIDTH=10mil|SUBPOLYINDEX=0
|RECORD=Track|NET=3|SELECTION=FALSE|LAYER=BOTTOM|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=10740mil|Y1=2960mil|X2=10760mil|Y2=29
80mil|WIDTH=10mil|SUBPOLYINDEX=0
|RECORD=Track|NET=3|SELECTION=FALSE|LAYER=BOTTOM|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=10760mil|Y1=2997mil|X2=10813mil|Y2=30
50mil|WIDTH=10mil|SUBPOLYINDEX=0
|RECORD=Track|NET=0|SELECTION=FALSE|LAYER=BOTTOM|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=10520mil|Y1=3140mil|X2=10620mil|Y2=30
40mil|WIDTH=10mil|SUBPOLYINDEX=0
|RECORD=Track|COMPONENT=1|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=9555mil|Y1=6025mil|X2=9555m
il|Y2=6175mil|WIDTH=12mil|SUBPOLYINDEX=0
|RECORD=Track|COMPONENT=1|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=9205mil|Y1=6025mil|X2=9205m
il|Y2=6175mil|WIDTH=12mil|SUBPOLYINDEX=0
|RECORD=Track|COMPONENT=1|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=9205mil|Y1=6025mil|X2=9555m
il|Y2=6025mil|WIDTH=12mil|SUBPOLYINDEX=0
|RECORD=Track|COMPONENT=1|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=9205mil|Y1=6175mil|X2=9555m
il|Y2=6175mil|WIDTH=12mil|SUBPOLYINDEX=0
|RECORD=Track|COMPONENT=2|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=9900mil|Y1=3780mil|X2=9900m
il|Y2=3860mil|WIDTH=12mil|SUBPOLYINDEX=0
|RECORD=Track|COMPONENT=2|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=9660mil|Y1=3780mil|X2=9660m
il|Y2=3860mil|WIDTH=12mil|SUBPOLYINDEX=0
|RECORD=Track|COMPONENT=2|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=9660mil|Y1=3780mil|X2=9900m
il|Y2=3780mil|WIDTH=12mil|SUBPOLYINDEX=0
|RECORD=Track|COMPONENT=2|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=9660mil|Y1=3860mil|X2=9900m
il|Y2=3860mil|WIDTH=12mil|SUBPOLYINDEX=0
|RECORD=Track|COMPONENT=2|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=9900mil|Y1=3820mil|X2=9940m
il|Y2=3820mil|WIDTH=12mil|SUBPOLYINDEX=0
|RECORD=Track|COMPONENT=2|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=9620mil|Y1=3820mil|X2=9660m
il|Y2=3820mil|WIDTH=12mil|SUBPOLYINDEX=0
|RECORD=Track|COMPONENT=3|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=10445mil|Y1=3765mil|X2=1044
5mil|Y2=3915mil|WIDTH=12mil|SUBPOLYINDEX=0
|RECORD=Track|COMPONENT=3|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=10795mil|Y1=3765mil|X2=1079
5mil|Y2=3915mil|WIDTH=12mil|SUBPOLYINDEX=0
|RECORD=Track|COMPONENT=3|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=10445mil|Y1=3915mil|X2=1079
5mil|Y2=3915mil|WIDTH=12mil|SUBPOLYINDEX=0
|RECORD=Track|COMPONENT=3|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=10445mil|Y1=3765mil|X2=1079
5mil|Y2=3765mil|WIDTH=12mil|SUBPOLYINDEX=0
..
|RECORD=Text|SELECTION=FALSE|LAYER=TOP|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X=16690mil|Y=1130mil|HEIGHT=90mil|FONT=SANSSERIF|R
OTATION=0.000|MIRROR=FALSE|TEXT=.GTL|WIDTH=9mil
|RECORD=Text|SELECTION=FALSE|LAYER=BOTTOM|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X=16690mil|Y=1130mil|HEIGHT=90mil|FONT=SANSSERI
F|ROTATION=0.000|MIRROR=FALSE|TEXT=.GBL|WIDTH=9mil
|RECORD=Text|SELECTION=FALSE|LAYER=BOTTOM|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X=7835mil|Y=5065mil|HEIGHT=75mil|FONT=SANSSERIF
|ROTATION=0.000|MIRROR=TRUE|TEXT=P/N 4PORTSI REV A|WIDTH=8mil
|RECORD=Text|COMPONENT=0|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X=9325mil|Y=2192.4mil|HEIGHT=48
mil|FONT=SANSSERIF|ROTATION=0.000|MIRROR=FALSE|TEXT=CON AT62B|WIDTH=7.2mil|COMMENT=True
|RECORD=Text|COMPONENT=0|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X=7920mil|Y=2400mil|HEIGHT=48mi
l|FONT=SANSSERIF|ROTATION=0.000|MIRROR=FALSE|TEXT=P1|WIDTH=7.2mil|DESIGNATOR=True
```

```
|RECORD=Text|COMPONENT=1|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X=9561mil|Y=5999mil|HEIGHT=60mi
l|FONT=DEFAULT|ROTATION=180.000|MIRROR=FALSE|TEXT=0.1uF|WIDTH=6mil|COMMENT=True
|RECORD=Text|COMPONENT=1|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X=9060mil|Y=6080mil|HEIGHT=60mi
l|FONT=DEFAULT|ROTATION=360.000|MIRROR=FALSE|TEXT=C9|WIDTH=6mil|DESIGNATOR=True
|RECORD=Text|COMPONENT=2|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X=9700mil|Y=3780mil|HEIGHT=60mi
l|FONT=DEFAULT|ROTATION=360.000|MIRROR=FALSE|TEXT=1K5|WIDTH=6mil|COMMENT=True
|RECORD=Text|COMPONENT=2|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X=9420mil|Y=3800mil|HEIGHT=60mi
l|FONT=DEFAULT|ROTATION=360.000|MIRROR=FALSE|TEXT=R2|WIDTH=6mil|DESIGNATOR=True
|RECORD=Text|COMPONENT=3|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X=10820mil|Y=3780mil|HEIGHT=60m
il|FONT=DEFAULT|ROTATION=0.000|MIRROR=FALSE|TEXT=20pF|WIDTH=6mil|COMMENT=True
|RECORD=Text|COMPONENT=3|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X=10820mil|Y=3860mil|HEIGHT=60m
il|FONT=DEFAULT|ROTATION=0.000|MIRROR=FALSE|TEXT=C13|WIDTH=6mil|DESIGNATOR=True
...
|RECORD=Fill|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=7050mil|Y1=5945mil|X2=7800mil|Y2=6145mil
|ROTATION=0.000
|RECORD=Fill|SELECTION=FALSE|LAYER=TOPOVERLAY|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=7070mil|Y1=5645mil|X2=7570mil|Y2=5845mil
|ROTATION=0.000
|RECORD=Fill|SELECTION=FALSE|LAYER=TOPSOLDER|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=7675mil|Y1=2000mil|X2=10925mil|Y2=2375mil
|ROTATION=0.000
...
```

The Import from Protel 3 CAD driver is able to correctly identify and use the following labels (identifiers):

- RECORD=Net
- RECORD=Component
- RECORD=Pad
- RECORD=Via
- RECORD=Track

In the next paragraphs a short description for each label (identifier) is provided.

## 3.1 Record=Net

This record Net contains the net namet list present in the Protel 3 .PCB CAD file; data are separated by "|" (pipe) character.

Every single row of the Protel 3 **.PCB** file, in this section, contains the following information:

1. **Key**
2. **Net Id**
3. Not used
4. **Net Name**
5. Not used
6. Not used

The following example shows the syntax used for the **Net list** section in the .PCB file:

| 1 | 2 | 3 | 4 | 5 | 6 - n |
|---|---|---|---|---|---|
| **Key** | **Net I**d | Not used | **Net name** | Not used | Not used |
| RECORD=Net | ID=0 | SELECTION=FALSE | NAME=NetU1_21 | VISIBLE=TRUE | COLOR=8421376 |

```
...
|RECORD=Net|ID=0|SELECTION=FALSE|NAME=NetU1_21|VISIBLE=TRUE|COLOR=8421376
|RECORD=Net|ID=1|SELECTION=FALSE|NAME=NetU1_49|VISIBLE=TRUE|COLOR=8421376
|RECORD=Net|ID=2|SELECTION=FALSE|NAME=NetU1_55|VISIBLE=TRUE|COLOR=8421376
...
```

## 3.2 Record=Component

This section basically contains the part list and mounting data of each single device present in the Protel 3 **.PCB** CAD file; data are separated by "|" (pipe) character.

Every single row of the Protel **.PCB** file, in this section, contains the following information:

1. **Key**
2. **Component Id**
3. Not used
4. **Mounting side**
5. Not used
6. Not used
7. Not used
8. Not used
9. **X Barycenter**
10. **Y Barycenter**
11. Not used
12. Not used
13. Not used
14. Not used
15. Not used
16. Not used
17. Not used
18. **Rotate**

The following example shows the syntax used for the **Part list** section in the **.PCB** file:

| 1 | 2 | 3 | 4 | 5-8 | 9 | 10 | 11-16 | 17 | 18-... |
|---|---|---|---|---|---|---|---|---|---|
| **Drawing ref.** | Not used | Not used | Mount side | Not used | **X Batycenter** | **Y Batycenter** | Not used | **Rotate** | Not used |
| RECORD=Component | ID=0 | SELECTION =FALSE | LAYER= TOP | | X=10800mil | Y=2200mil | | ROTATION=0.000 | |

```
...
|RECORD=Component|ID=0|SELECTION=FALSE|LAYER=TOP|LOCKED=TRUE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|PRIMITIVELOCK=TRUE|X=10800mil|
Y=2200mil|PATTERN=ECN-
IBMXT|NAMEON=TRUE|COMMENTON=FALSE|GROUPNUM=0|COUNT=0|ROTATION=0.000|HEIGHT=0mil|NAMEAUTOPOSITION=0|COMMENTAUTOPOSITION=0|UNIONIN
DEX=0
|RECORD=Component|ID=1|SELECTION=FALSE|LAYER=TOP|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|PRIMITIVELOCK=TRUE|X=9480mil|
Y=6100mil|PATTERN=RAD0.2|NAMEON=TRUE|COMMENTON=FALSE|GROUPNUM=0|COUNT=0|ROTATION=180.000|HEIGHT=0mil|NAMEAUTOPOSITION=0|COMMENTA
UTOPOSITION=0|UNIONINDEX=0
|RECORD=Component|ID=2|SELECTION=FALSE|LAYER=TOP|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|PRIMITIVELOCK=TRUE|X=9980mil|
Y=3820mil|PATTERN=AXIAL0.4|NAMEON=TRUE|COMMENTON=TRUE|GROUPNUM=0|COUNT=0|ROTATION=180.000|HEIGHT=0mil|NAMEAUTOPOSITION=0|COMMENT
AUTOPOSITION=0|UNIONINDEX=0
...
```

## 3.3 Record=Pad

This section basically contains the pad list data of each single pin present in the Protel 3 **.PCB** CAD file; data are separated by "|" (pipe) character.

Every single row of the Protel **.PCB** file, in this section, contains the following information:

1. **Key**
2. **Net Id**
3. **Component Id**
4. Not used
5. **Mounting side**
6. Not used
7. Not used
8. Not used
9. Not used
10. **X Center**
11. **Y Center**
12. Not used
13. Not used
14. Not used
15. Not used
16. Not used
17. Not used
18. **Shape**
19. **Shape Dimension**
20. Not used

The following example shows the syntax used for the **Pad list** section in the **.PCB** file:

| 1 | 2 | 3 | 4 | 5-8 | 6-9 | 10 | 11 | 12-17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Key** | **Net Id** | **Component Id** | Not used | **Mount side** | Not used | X Center | Y Center | Not used | **Shape** | **Shape Dimension** | Not used |
| RECORD=Pad | NET=12 | COMPONENT=0 | SELECTION=FALSE | LAYER=TOP | | X=7800mil | Y=2200mil | | SHAPE=ROUND | HOLESIZE=0mil | |

```
...
|RECORD=Pad|NET=12|COMPONENT=0|SELECTION=FALSE|LAYER=TOP|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|NAME=A31|X=7800mil|Y=
2200mil|TOPXSIZE=50mil|MIDXSIZE=0mil|BOTXSIZE=0mil|TOPYSIZE=300mil|MIDYSIZE=0mil|BOTYSIZE=0mil|SHAPE=ROUND|HOLESIZE=0mil|ROTATIO
N=0.000|PLATED=TRUE|DAISYCHAIN=Load|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=1|CSEV=1|CPCV=1|CPRV=1|CCS=NoConnect|CPL=0|CCW=10mil
|CEN=4|CAG=10mil|CPE=-150mil|CSE=4mil|CPC=20mil|CPR=20mil
|RECORD=Pad|NET=13|COMPONENT=0|SELECTION=FALSE|LAYER=TOP|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|NAME=A30|X=7900mil|Y=
2200mil|TOPXSIZE=50mil|MIDXSIZE=0mil|BOTXSIZE=0mil|TOPYSIZE=300mil|MIDYSIZE=0mil|BOTYSIZE=0mil|SHAPE=ROUND|HOLESIZE=0mil|ROTATIO
N=0.000|PLATED=TRUE|DAISYCHAIN=Load|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=1|CSEV=1|CPCV=1|CPRV=1|CCS=NoConnect|CPL=0|CCW=10mil
|CEN=4|CAG=10mil|CPE=-150mil|CSE=4mil|CPC=20mil|CPR=20mil
...
```

## 3.4 Record=Via

This section basically contains the via list data of each single via present in the Protel 3 **.PCB** CAD file; data are separated by "|" (pipe).

Every single row of the Protel **.PCB** file, in this section, contains the following information:

1. **Key**
2. **Net Id**
3. Not used
4. Not used
5. Not used
6. Not used
7. Not used
8. Not used
9. **X Center**
10. **Y Center**
11. **Diamenter**
12. **Hole size**
13. **Start Layer**
14. **End Layer**
15. Not used

The following example shows the syntax used for the **Via list** section in the **.PCB** file:

| 1 | 2 | 3-8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|
| **Key** | **Net Id** | Not used | **X Center** | **Y Center** | **Diameter** | **Hole size** | **Start Layer** | **End Layer** | Not used |
| RECORD=Via | NET=14 | | X=7800mil | Y=2200mil | DIAMETER=40mil | HOLESIZE=22mil | STARTLAYER=TOP | ENDLAYER=BOTTOM | |

```
...
|RECORD=Via|NET=14|SELECTION=FALSE|LAYER=MULTILAYER|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X=8000mil|Y=2810mil|DIAMET
ER=40mil|HOLESIZE=22mil|STARTLAYER=TOP|ENDLAYER=BOTTOM|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=0|CSEV=1|CPCV=1|CPRV=1|CCS=Relief
|CPL=0|CCW=10mil|CEN=4|CAG=10mil|CSE=4mil|CPC=20mil|CPR=20mil
|RECORD=Via|NET=13|SELECTION=FALSE|LAYER=MULTILAYER|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X=7860mil|Y=3680mil|DIAMET
ER=40mil|HOLESIZE=22mil|STARTLAYER=TOP|ENDLAYER=BOTTOM|CCSV=1|CPLV=1|CCWV=1|CENV=1|CAGV=1|CPEV=0|CSEV=1|CPCV=1|CPRV=1|CCS=Relief
|CPL=0|CCW=10mil|CEN=4|CAG=10mil|CSE=4mil|CPC=20mil|CPR=20mil
...
```

## 3.5 Record=Track

This section basically contains the track list data of each single net present in the Protel 3 **.PCB** CAD file; data are separated by "|" (pipe).

Every single row of the Protel **.PCB** file, in this section, contains the following information:

1. **Key**
2. **Net Id**
3. Not used
4. **Layer**
5. Not used
6. Not used
7. Not used
8. **X Start**
9. **Y Start**
10. **X End**
11. **Y End**
12. **Width**
13. Not used

The following example shows the syntax used for the **Track list** section in the **.PCB** file:

| 1 | 2 | 3 | 4 | 5-7 | 8 | 9 | 10 | 11 | 12 | 15-… |
|---|---|---|---|---|---|---|---|---|---|---|
| **Key** | **Net Id** | Not used | **Layer** | Not used | **X start** | **Y start** | **X end** | **Y end** | **Width** | Not used |
| RECORD=Via | NET=14 | | LAYER= BOTTOM | | X1= 9520mil | Y1= 30000mil | X2= 9420mil | Y2= 3000mil | WIDTH= 10mil | |

```
...
|
|RECORD=Track|NET=3|SELECTION=FALSE|LAYER=BOTTOM|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=9520mil|Y1=3000mil|X2=9640
mil|Y2=3000mil|WIDTH=10mil|SUBPOLYINDEX=0
|RECORD=Track|NET=3|SELECTION=FALSE|LAYER=BOTTOM|LOCKED=FALSE|POLYGONOUTLINE=FALSE|USERROUTED=TRUE|X1=9680mil|Y1=3040mil|X2=1050
0mil|Y2=3040mil|WIDTH=10mil|SUBPOLYINDEX=0
...
```

# 4. Import setting

## 4.1 Pin function assignment

This assignment table must be filled, in order to correctly execute the CAD file import.

In order to correctly test some polarized devices such as diodes, bipolar transistors, etc., it is basic to identify correctly the pin function (i.e. anode, base, etc.) of each pin.

The fields contained in the table, are described below:

| Field | Description |
|---|---|
| **Device Type** | Identifies the type of device (example: Resistors, Capacitors, Digital Devices, Diodes etc.). |
| **Pin Function** | Function concerning the Pin. |
| **Pin Name** | Pin reference. |
| **Cad Pin** | Pin reference in Cad file. |

## 4.2 Drawing ref. initials/device type assignment

The Protel file typically contains all information about the devices, such as value, tolerances and type; which are fundamental from the point of view of the test program generation.

The fields contained in the table are described below:

| Field | Description |
|---|---|
| **Drawing Reference** | Initial letter identifying the **Device Type**. |
| **Device Type** | Identifies the type of device (example: Resistors, Capacitors, Digital Devices, Diodes etc.). |
| **Default Tol+, Tol-** | Value and tolerance of the device only if required (as for resistors). |

I t could happen that in the CAD file they are missing. For each drawing reference initial, the displayed table enables to define the following data default values:

Device type

Default positive tolerance

Default negative tolerance

This means that if, for any reason, the CAD file does not contain the information mentioned above, the default values will be used.

# A. Note about the Protel 3 ASCII text file format

The Protel 3 CAD-CAE typically runs under Unix operating system and generates its neutral ASCII output file in Unix format.

The Unix ASCII text files use he "$0a_{hex}$"ASCII character as end of line identifier.
The Windows® (MS-DOS) operating system uses the "$0d_{hex}$" and "$0a_{hex}$" ASCII characters as end of line identifiers for ASCII text files.
This means that output ASCII text files may require an ASCII format conversion (from Unix to Windows® format).

This operation can be performed using "WordPad", a standard text file editor.
Open the Protel 3 ASCII file with this editor and save it, this operation will automatically perform the conversion from ASCII Unix format to ASCII Windows® format.