# P C B L A Y O U T D O C U M E N T A T I O N

DK-Audio A/S - PT5201

P/N : 4008 117 08012

Document Number : 4008 117 08012.PCB

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Date of Issue : 2002.12.02

Prepared by : GHDsign Aps

Distributed to :

Approved by

HW engineering : Gunner Bækgaard

Quality Assurance :

# R E V I S I O N  R E C O R D

| Revision | Date | Authorization of change | Pages affected | Brief description of change |
|---|---|---|---|---|
| 1 | 2002.09.20 | | All | Original issue of document. |
| 2 | 2002.12.02 | | All | Small changes to circuit. |

# 1 INTRODUCTION

## 1.1 Scope

This document and the files provided with it, contains all data and specifications necessary for ordering and producing the printed circuit board for:

PT5201

Revision 2 - DK-Audio A/S P/N 4008 117 08012

## 1.2 Audience and Prerequisites

This document is directed to technical personnel involved in development, production and maintenance of:

PT5201

Revision 2 - DK-Audio A/S P/N 4008 117 08012

## 1.3 Organization of document

Chapter 1 - is this introduction.

Chapter 2 - presents PCB specifications.

Chapter 3 - presents the drilling and milling information.

Chapter 4 - presents the gerber data.

# 2 PCB SPECIFICATIONS

## 2.1 Quality

The PCBs must be produced in accordance with this document. Topics not covered or only partly covered by this document must be produced in accordance with:

Danish PERFAG 3C

and

UL 94-V0 flammability compliance.

The PCB manufacturers logo, Week/Year code for PCB production, and the UL flammability rating MUST be indicated on the PCB. If the code and rating are only to be placed in specified boxes, it will be specified in clear text on the relevant films. Then no other manufacturer additions on any of the films are allowed. Otherwise it is determined by the manufacturer where to put code and rating. See chapter 2.9 for possible restrictions.

Prior to delivery of multi-layer PCB, a 100% electrical test must be performed.

## 2.2 Incoming Inspection Level

AQL = 0.65 (Major failures)
AQL = 1.00 (Minor failures)

## 2.3 PCB

Multilayer Plated-Through PCB

| | |
|---|---|
| Number of copper lays | : 6 |
| Nominal thickness | : 1.6mm |
| Tolerance of thickness | : 10% |
| Laminate | : please refer to section 2.4 |
| Copper thickness | : please refer to section 2.4 |
| Blind/buried vias | : None. |
| Minimum track width | : 5mil |
| Minimum clearance | : 5mil |
| Minimum annular ring | : 8mil |
| Impedance-controlled tracks | : Yes - on layer 1 , 5 and 6 |

All measures are final.

Protective coating : minimum 0.05µm chemical immersion gold and 3-8µm nickel.

PCB size approximately : 375.0 mm x 177.6 mm

The PCB is intended for Surface Mounted Technology

## 2.4 PCB Build-Up

| Layer | Material | Thickness |
|---|---|---|
| 1 ---------- | Cu | 35um |
| XXXXXXXXXXXXXXXXXXX | FR4 | 185um |
| 2 ---------- | Cu | 35um |
| XXXXXXXXXXXXXXXXXXX | FR4 | 356um |
| 3 ---------- | Cu | 35um |
| XXXXXXXXXXXXXXXXXXX | FR4 | 356um |
| 4 ---------- | Cu | 35um |
| XXXXXXXXXXXXXXXXXXX | FR4 | 356um |
| 5 ---------- | Cu | 35um |
| XXXXXXXXXXXXXXXXXXX | FR4 | 185um |
| 6 ---------- | Cu | 35um |
| Total thickness | | 1.65mm |

## 2.5 Holes

Holes, layer 1 through 6:

Plated :

num: 2 size: 15.8mill = 0.4mm
num: 4350 size: 15.8mill = 0.4mm TOL= +0/-0.2mm
num: 16 size: 31.5mill = 0.8mm
num: 6 size: 35.4mill = 0.9mm
num: 49 size: 39.4mill = 1mm
num: 4 size: 47.2mill = 1.2mm
num: 6 size: 63mill = 1.6mm
num: 7 size: 66.9mill = 1.7mm
num: 12 size: 78.7mill = 2mm
num: 10 size: 126mill = 3.2mm

Non plated :

num: 96 size: 31.5mill = 0.8mm
num: 2 size: 59.1mill = 1.5mm
num: 14 size: 61mill = 1.55mm TOL= +/-0.075mm
num: 2 size: 63mill = 1.6mm
num: 4 size: 118.1mill = 3mm

Tooling holes : 4

It is IMPORTANT, that the tooling holes are drilled in the first drilling process together with the drilling of the plated holes, if any.

## 2.6 Gold Plated Contacts

None.

## 2.7 Notation Mask

Number of masks : 1

Mask type : Determined by PCB manufacturer in accordance with Danish PERFAG 3C.

Mask color : Contrast to Solder Mask.

## 2.8 Solder Mask

Number of masks : 2

Mask type : Determined by PCB manufacturer in accordance with Danish PERFAG 3C.

Mask color : Green.

## 2.9 Additional Remarks

Any changes in solder mask is prohibited without prior authorization in writing from customer. Via holes without openings in the solder mask are by definition tented. Introduction of openings in mask or changes to the size of existing openings is considered a change and therefore prohibited.

Please contact customer if minor modifications are advisable or imply essential cost savings.

IMPEDANCE CONTROLLED TRACKS NOTE:

Gerber files named Z0_XX_PO.PCB describes layers containing impedance controlled tracks.

FOR SPECIFIC IMPEDANCES See Gerber files section:
"G04 Embedded aperture table ***"
Go to lines containing " LzXX-*", where XX is the characteristic impedance, to find D-Code definition for a specific impedance.

E.g.:
"G04 Assign aperture for track shape Lz50-outer ***
%ADD16C,0.005900*%"

Note: In this case D16 is the D-code specification refered to later in the Gerber file.

# 3 DRILLING & MILLING INFORMATION

## 3.1 Drill Data Format

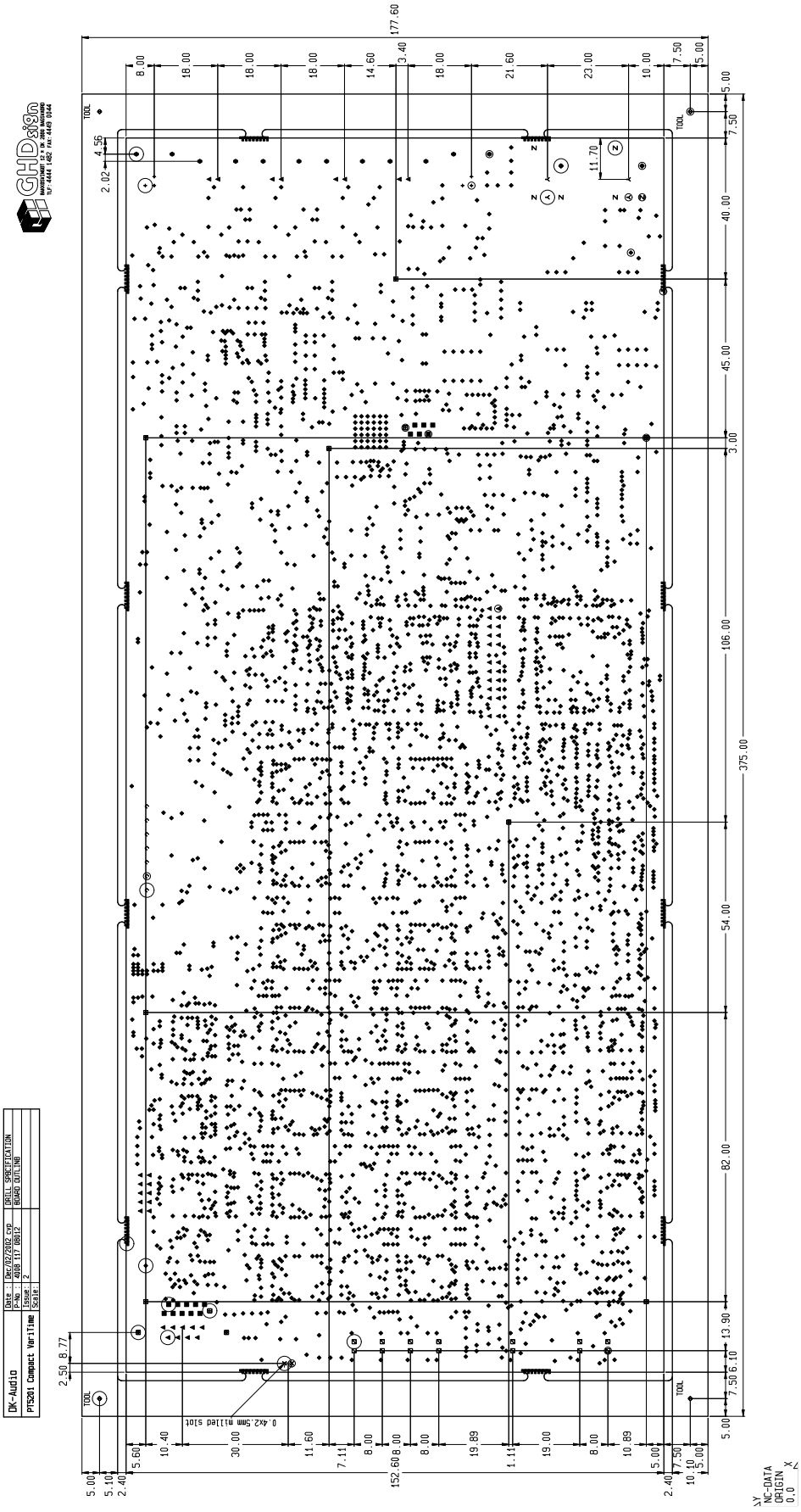
Format of file DRILL.MM

```
start of tape             = <32*396>%<13><10>
start of block            = none
end of block              = <13><10>
end of tool               = none
end of plated             = M30<13><10><32*396>%<13><10>
end of non plated         = none
end of tape               = M30<13><10><32*396><13><10>
start of tool change      = <13><10>T
end of tool change        = none

header                    = n
supress zeroes            = n
supress equal digits      = n
data code                 = ascii noparity
digits before             = 3
digits after              = 3
data unit                 = mm
autotoolchange            = y
continuous tool numbering = n
```

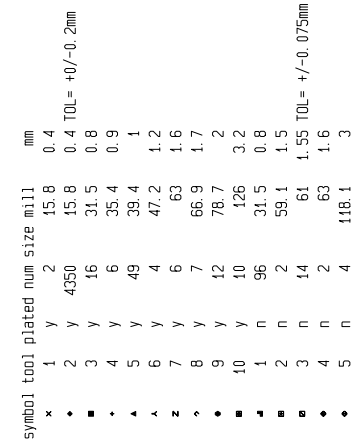
Format of file DRILL.INC

```
start of tape             = <32*396>%<13><10>
start of block            = none
end of block              = <13><10>
end of tool               = none
end of plated             = M30<13><10><32*396>%<13><10>
end of non plated         = none
end of tape               = M30<13><10><32*396><13><10>
start of tool change      = <13><10>T
end of tool change        = none

header                    = n
supress zeroes            = n
supress equal digits      = n
data code                 = ascii noparity
digits before             = 2
digits after              = 4
data unit                 = inch
autotoolchange            = y
continuous tool numbering = n
```

### 3.2.1 Drill Drawing Layer 1 through 6 - Scale 0.55



3.2.1.1 Drill Label Layer 1 through 6 - Scale 0.55



# 4 GERBER DATA

## 4.1 Gerber Data Format

The gerber files comply with the Extended Gerber Format specification, RS-274X.

## 4.2 Gerber Files

This chapter presents the gerber files accompanying this document.

1) File name : CU_01_PO.GER
   Electric copper layout for top side.
   Plotted positively in the document.

2) File name : CU_02_NE.GER
   Electric copper layout for innerlay 1
   Plotted negatively in the document.

3) File name : CU_03_NE.GER
   Electric copper layout for innerlay 2
   Plotted negatively in the document.

4) File name : CU_04_NE.GER
   Electric copper layout for innerlay 3
   Plotted negatively in the document.

5) File name : CU_05_PO.GER
   Electric copper layout for innerlay 4
   Plotted positively in the document.

6) File name : CU_06_PO.GER
   Electric copper layout for bottom side.
   Plotted positively in the document.

7) File name : SM_01_NE.GER
   Solder mask layout for top side.
   Plotted negatively in the document.

8) File name : SM_06_NE.GER
   Solder mask layout for bottom side.
   Plotted negatively in the document.

9) File name : NO_01_PO.GER
   Component notation layout for top side.
   Plotted positively in the document.

10) File name : TM_01_PO.GER
    Tin mask layout for top side.
    Plotted positively in the document.

11) File name : FI_01_PO.GER
    Fiducial marks for alignment for top side.
    Plotted positively in the document.

12) File name : DR_00_PO.GER
    Drill drawing, common for top and bottom side.
    Plotted positively in the document.

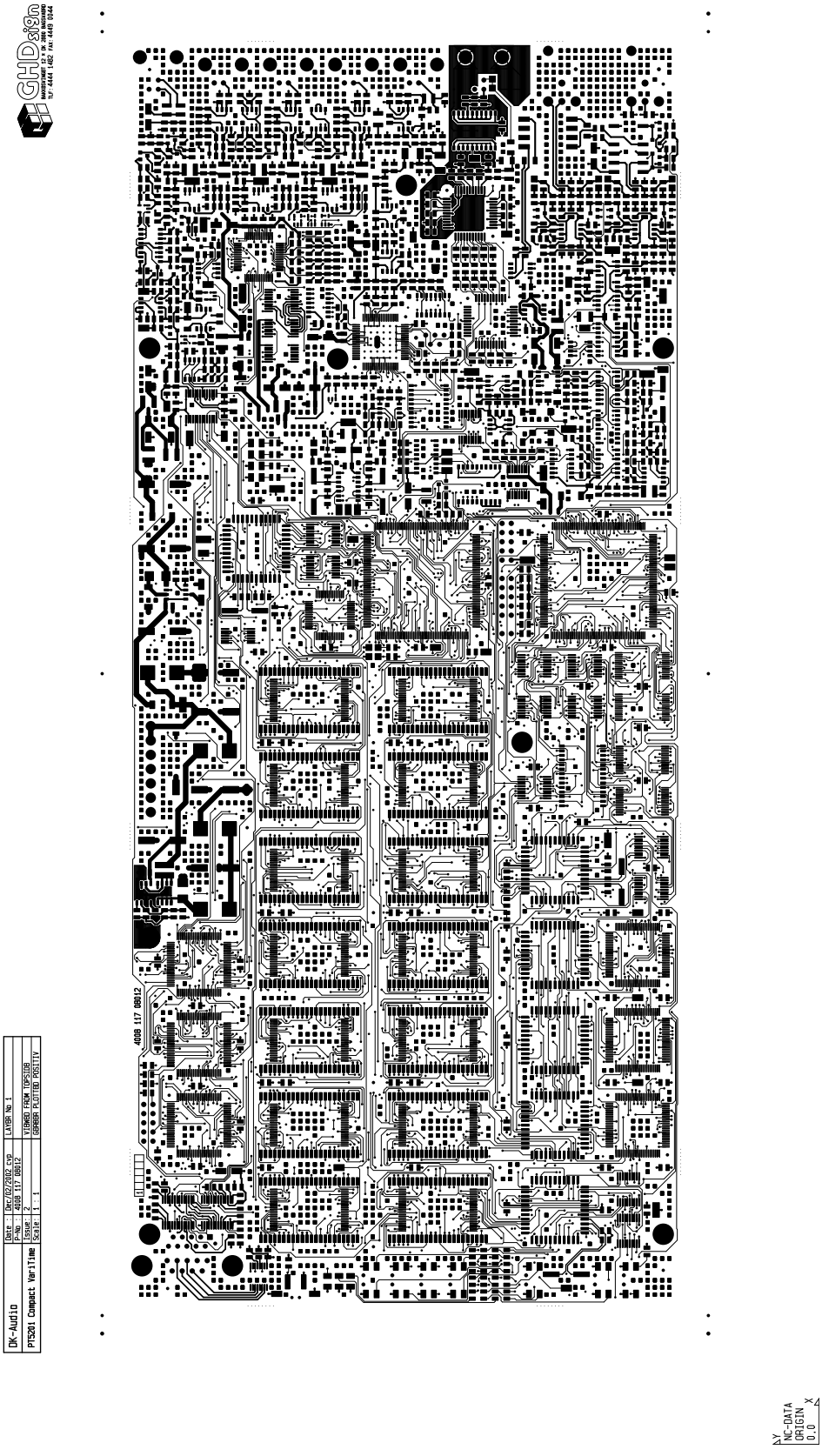
13) File name : AS_01_PO.GER
    Assembly drawing for top side.
    Plotted positively in the document.

14) File name : Z0_01_PO.GER
    Impedance controlled tracks for top side.
    Plotted positively in the document.

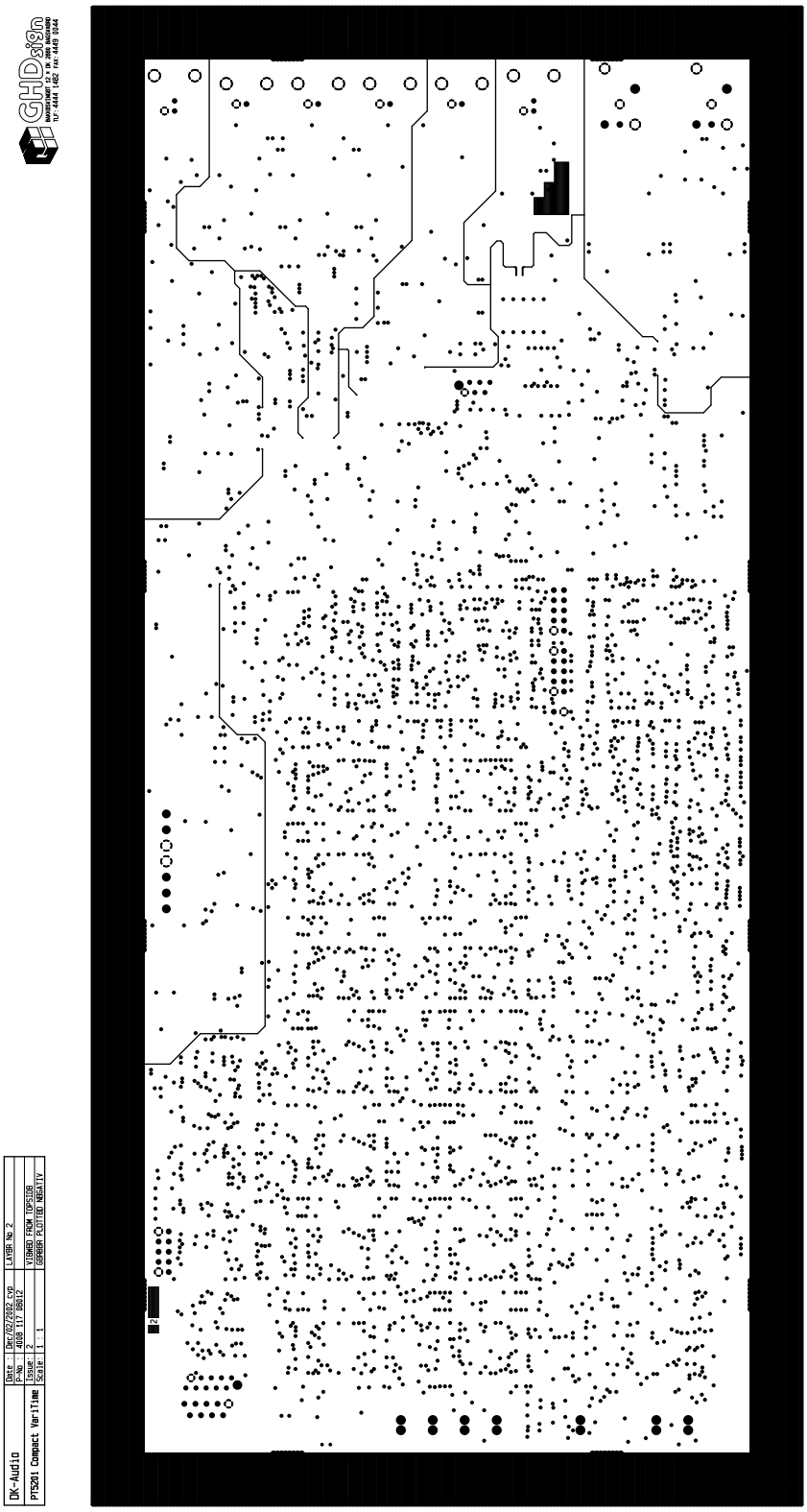
15) File name : Z0_05_PO.GER
    Impedance controlled tracks for innerlay 4
    Plotted positively in the document.

16) File name : Z0_06_PO.GER
    Impedance controlled tracks for bottom side.
    Plotted positively in the document.

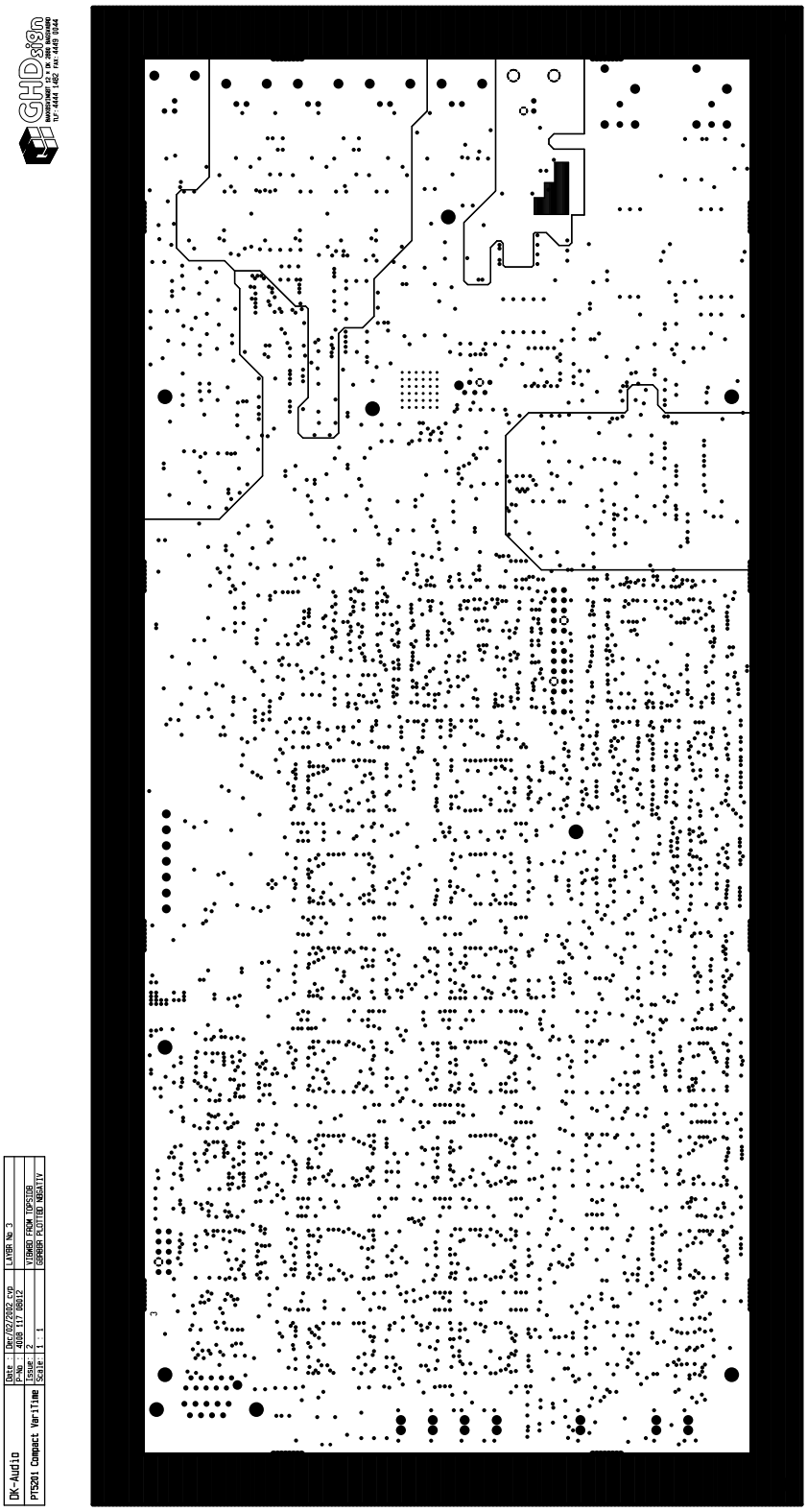
## 4.2.1 Layout Drawing - File: CU_01_PO.GER - Scale 0.55



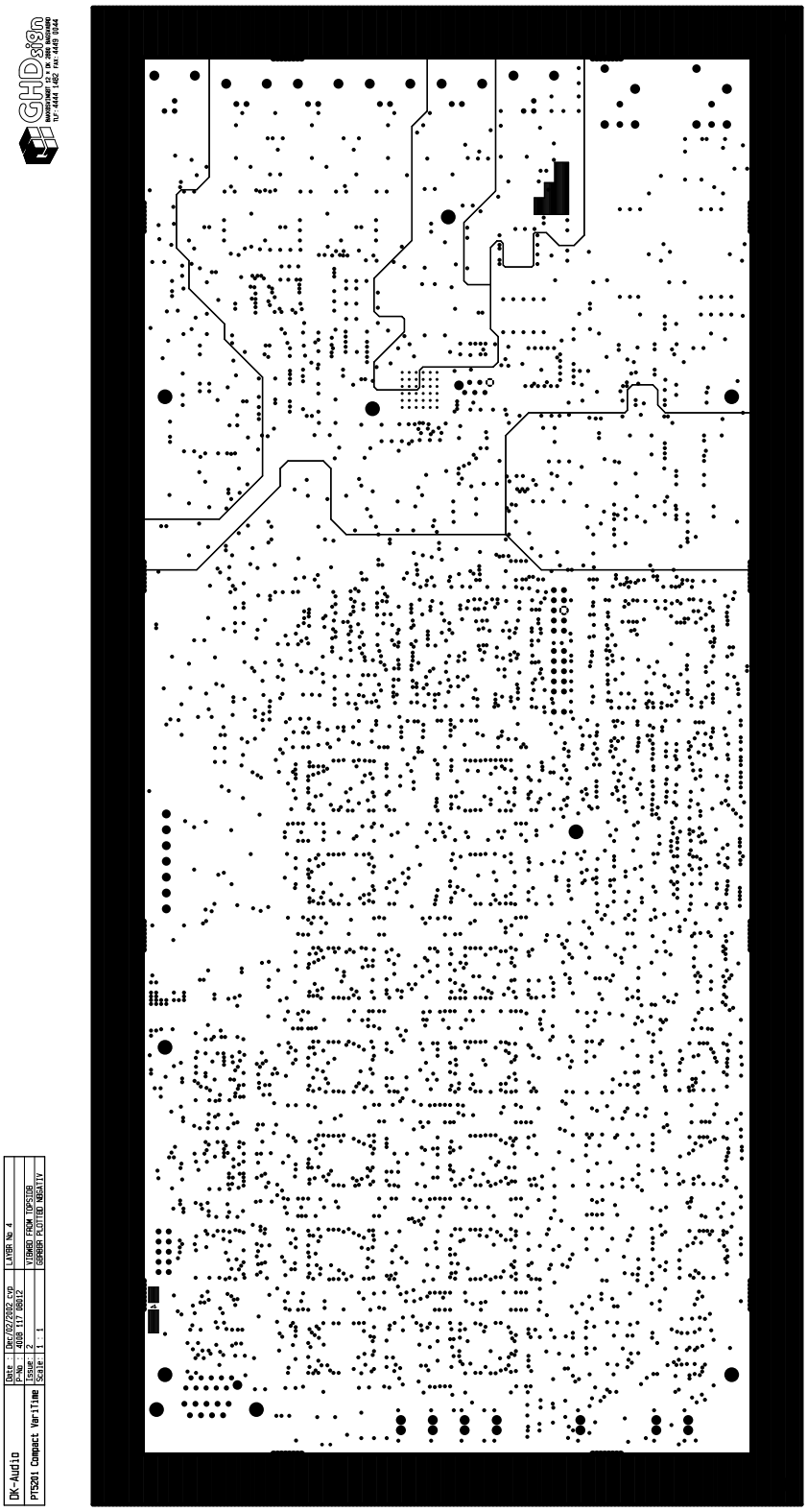
## 4.2.2 Layout Drawing - File: CU_02_NE.GER - Scale 0.55



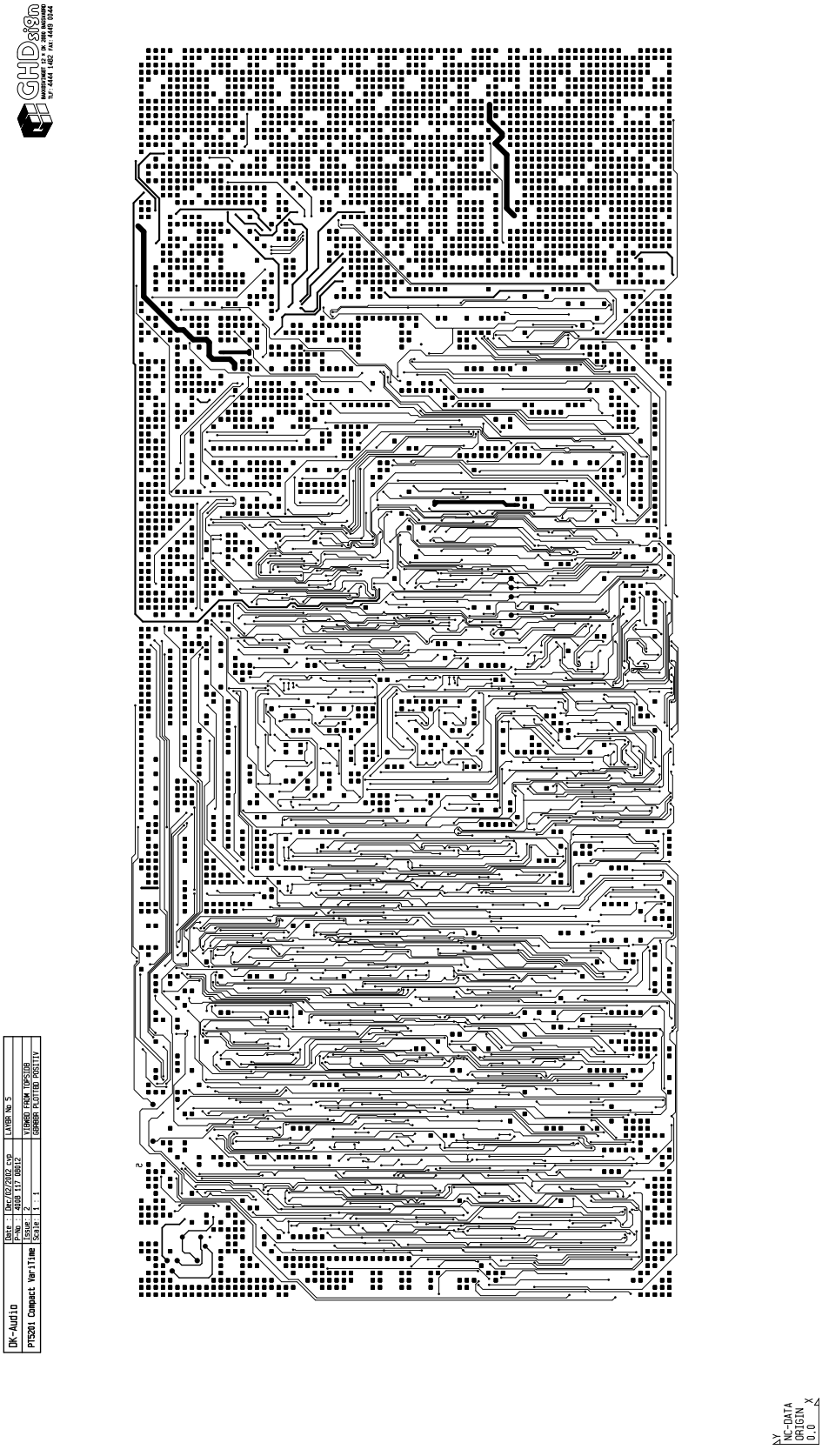
## 4.2.3 Layout Drawing - File: CU_03_NE.GER - Scale 0.55



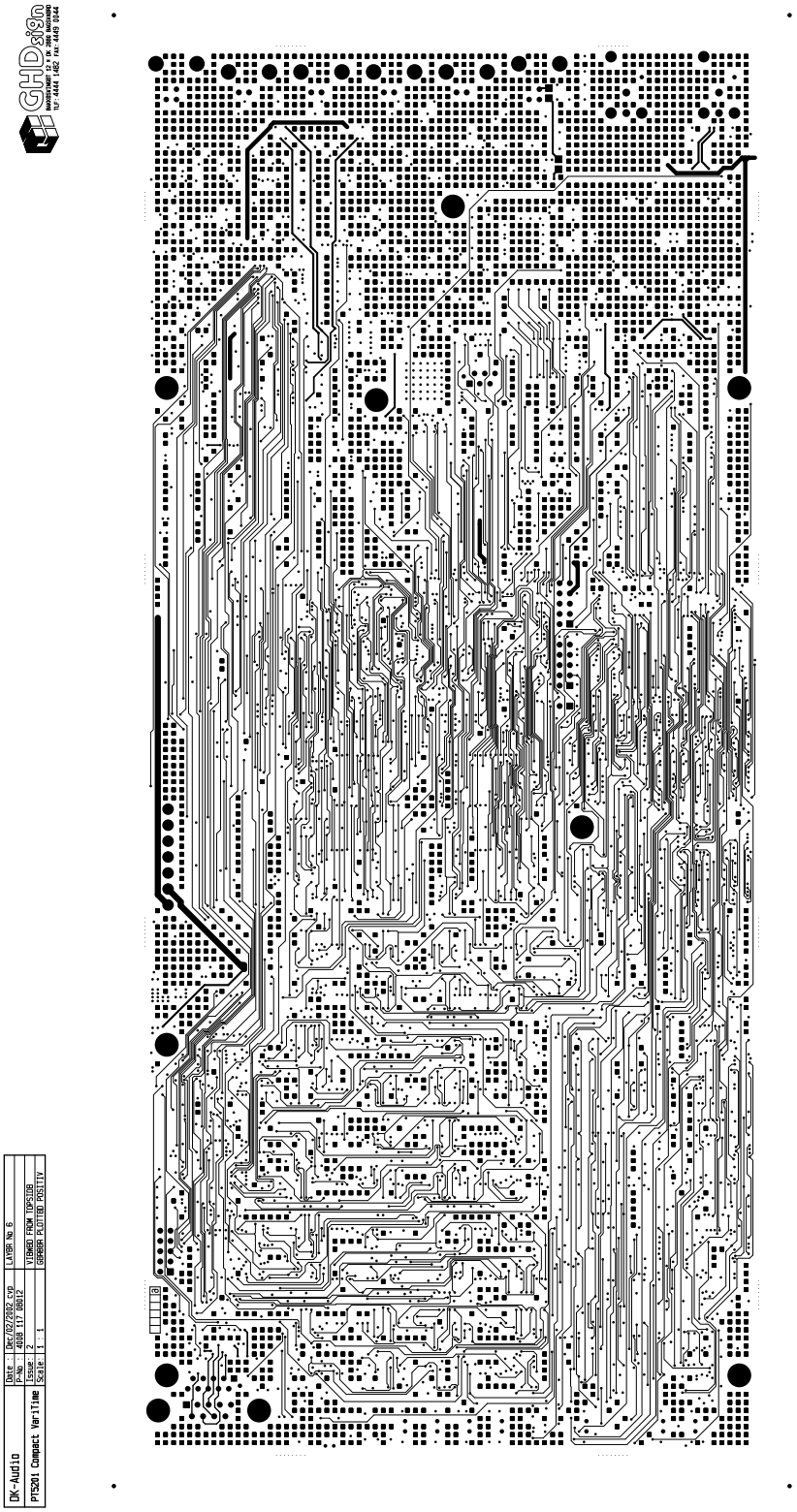
## 4.2.4 Layout Drawing - File: CU_04_NE.GER - Scale 0.55



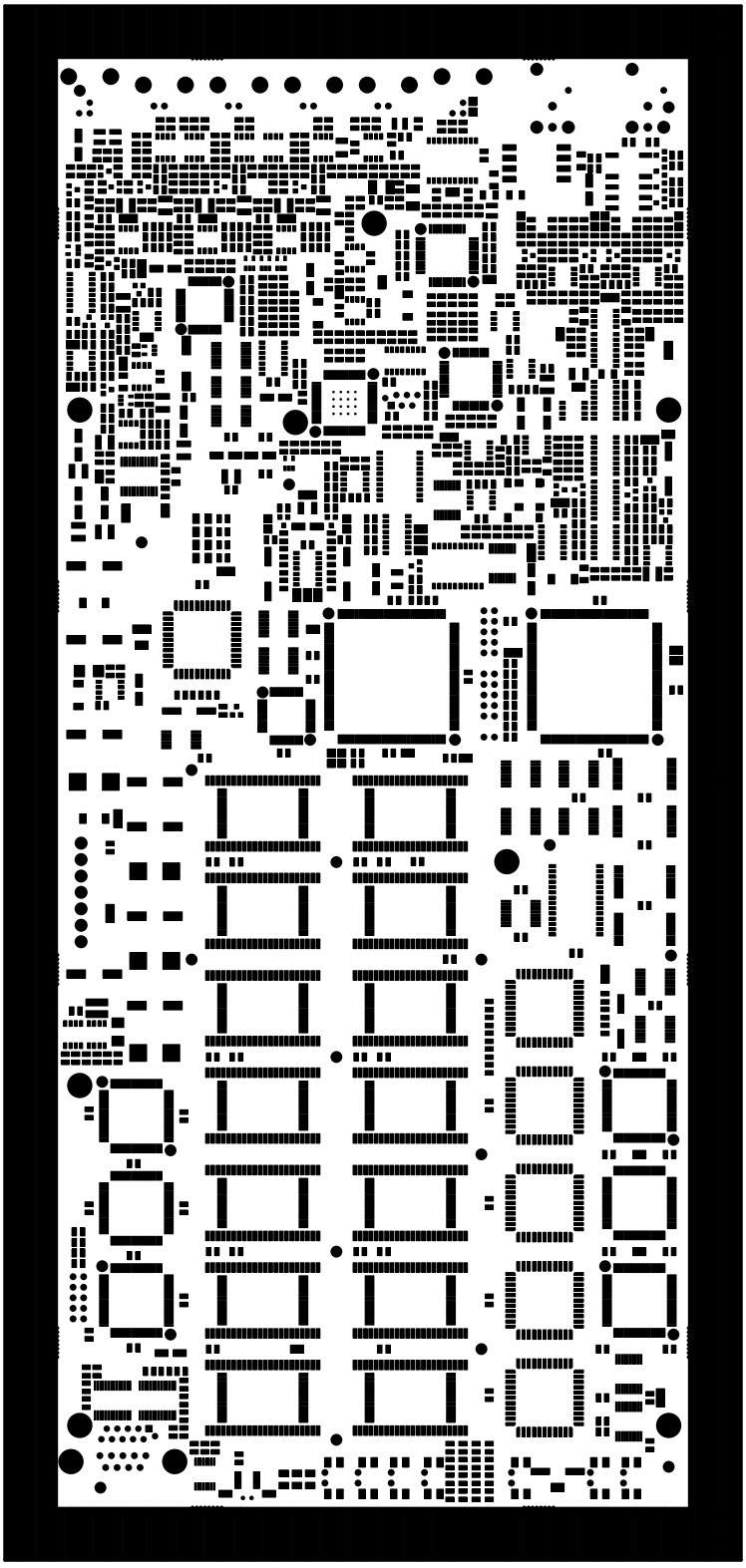
## 4.2.5 Layout Drawing - File: CU_05_PO.GER - Scale 0.55



## 4.2.6 Layout Drawing - File: CU_06_PO.GER - Scale 0.55



## 4.2.7 Layout Drawing - File: SM_01_NE.GER - Scale 0.55

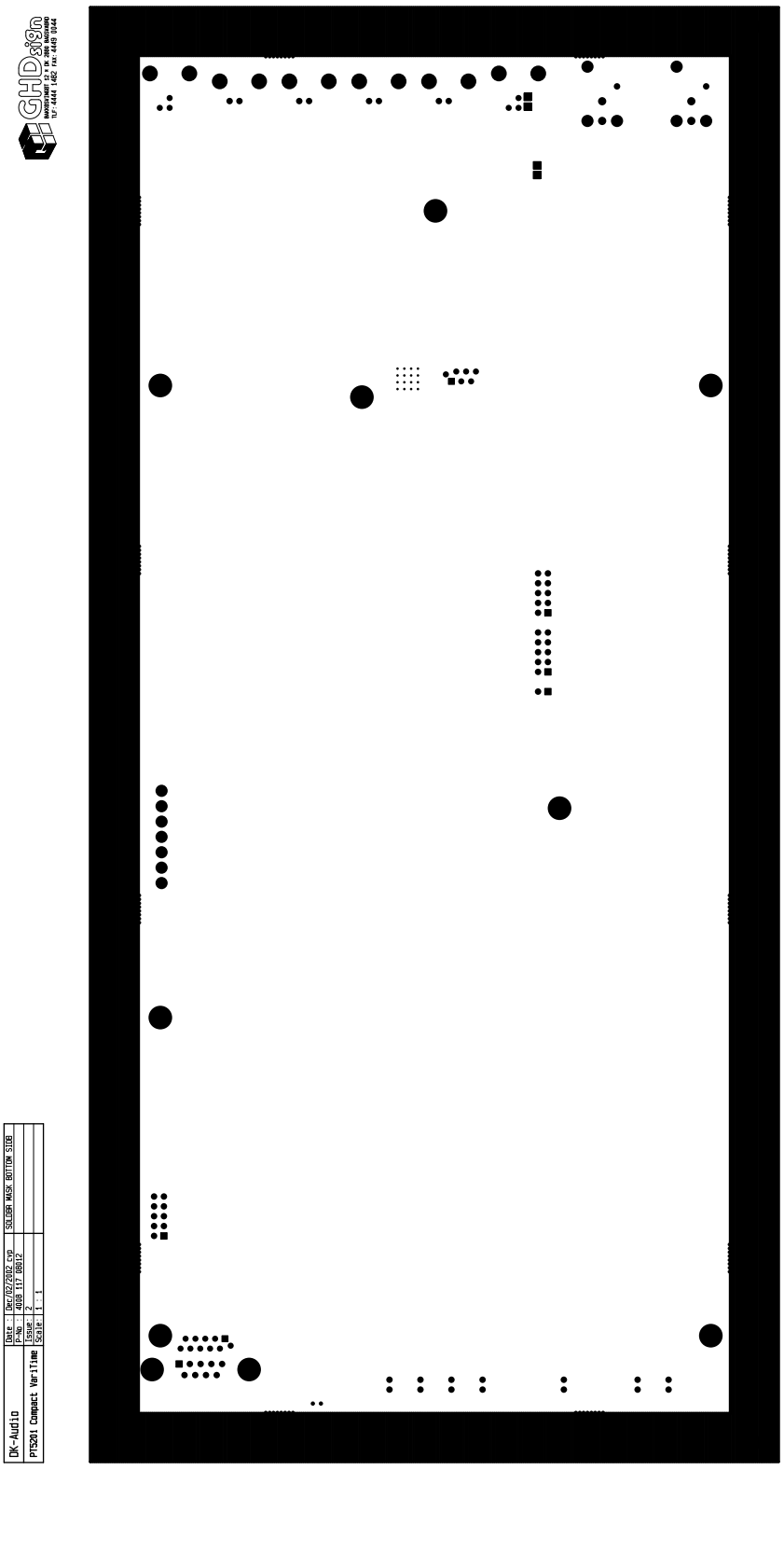


| | | |
|---|---|---|
| DK-Audio | Date | Dec/02/2002 cyp |
| | P-No | 4008 117 08012 |
| PTS201 Compact VariTime | Rev | 2 |
| | Scale | 1 : 1 |

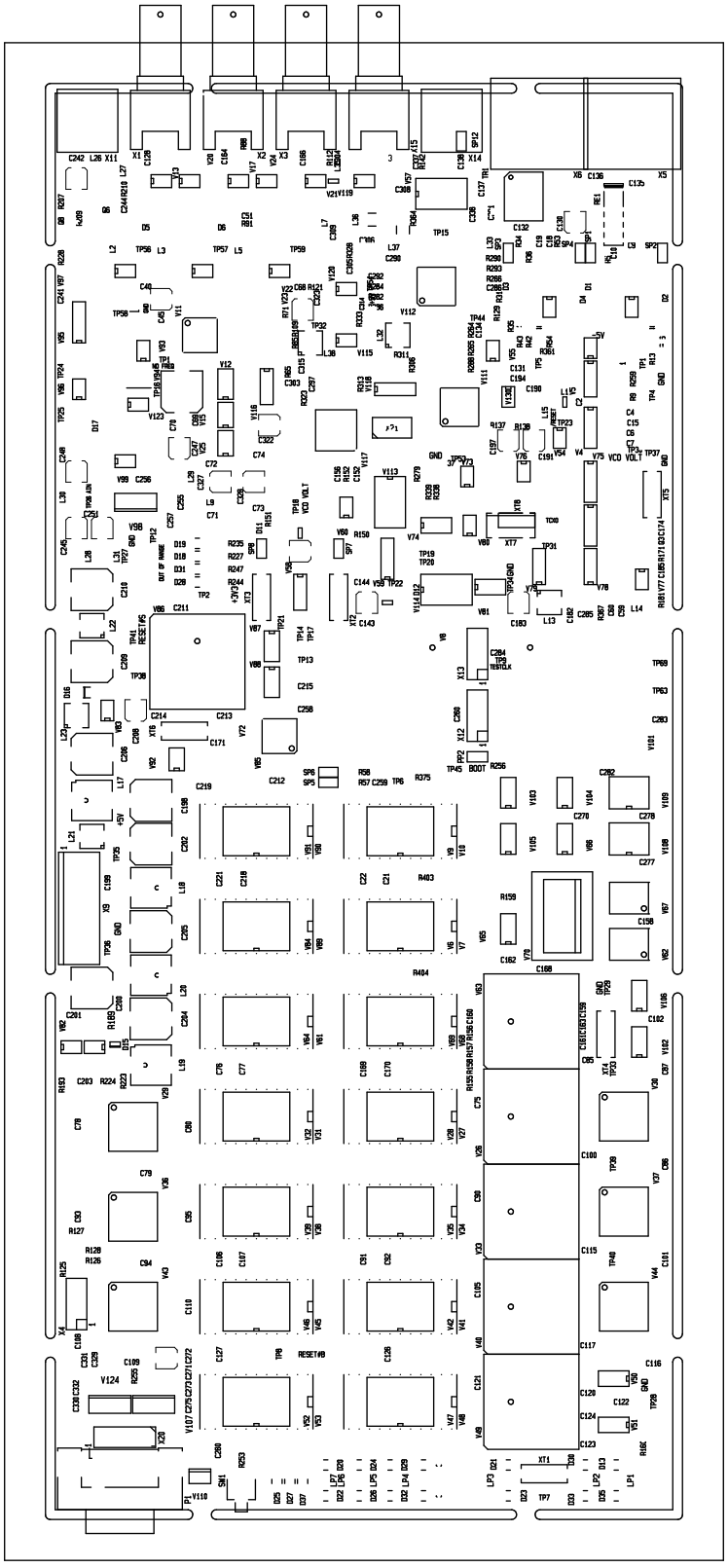
SOLDER MASK TOP SIDE

NC-DATA ORIGIN X 0.0 Y

## 4.2.8 Layout Drawing - File: SM_06_NE.GER - Scale 0.55

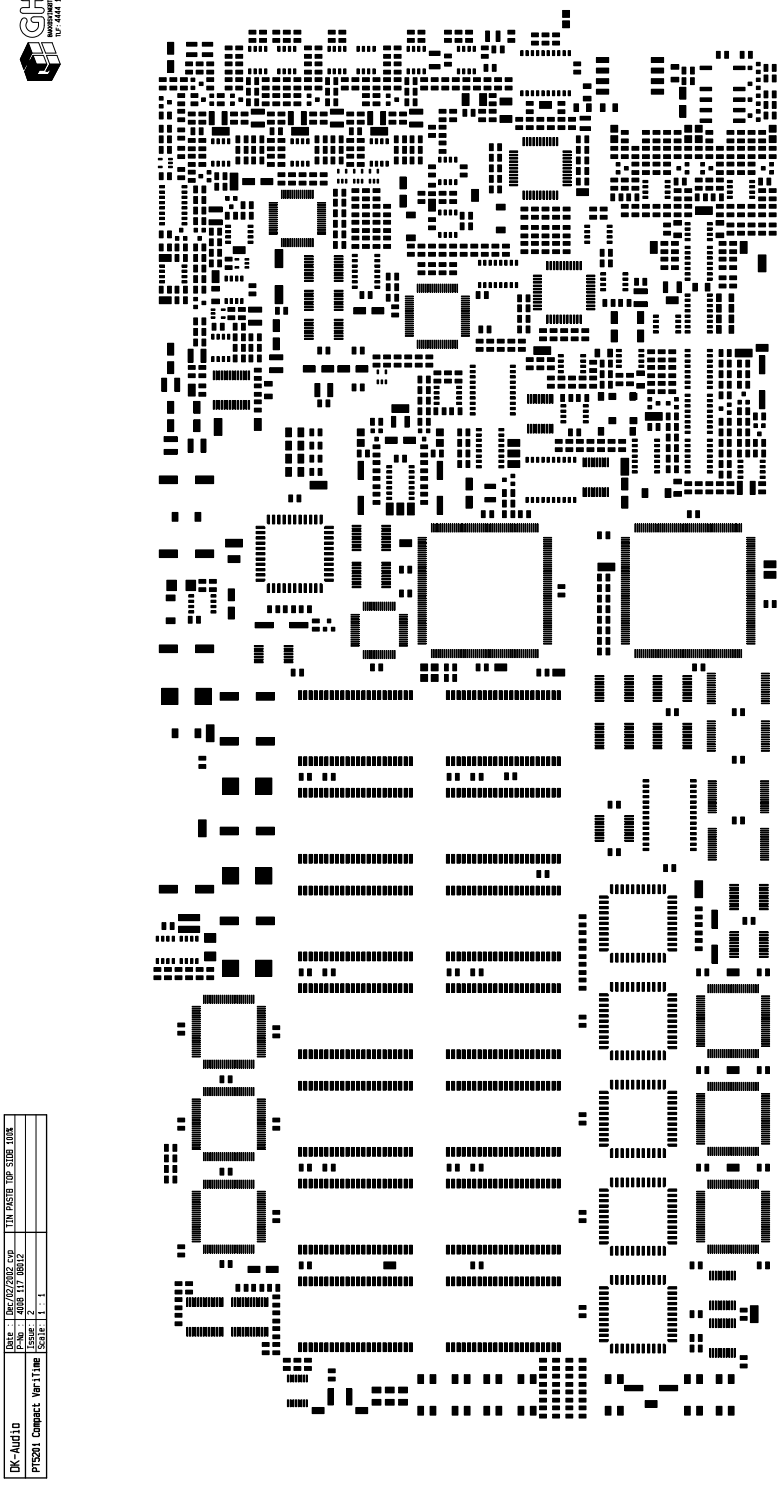


## 4.2.9 Layout Drawing - File: NO_01_PO.GER - Scale 0.55

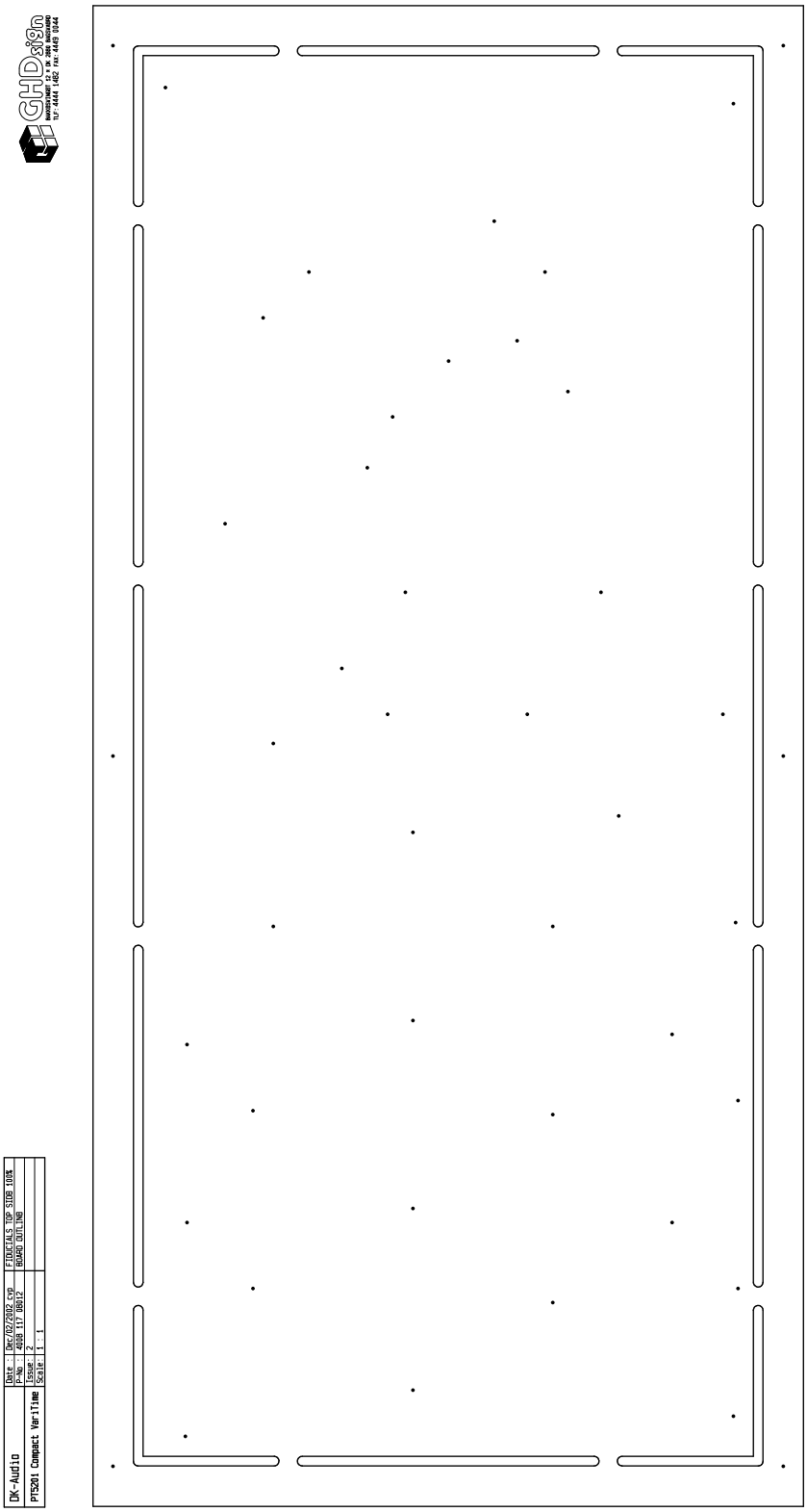


| | | | |
|---|---|---|---|
| DK-Audio | Date | Dec/02/2002 cyp | COMP MOTATION TOP SIDE |
| | P-No | 4008 117 08012 | BOARD OUTLINE |
| PTS201 Compact Var-Time | Issue | 2 : 1 | |
| | Scale | 1 : 1 | |

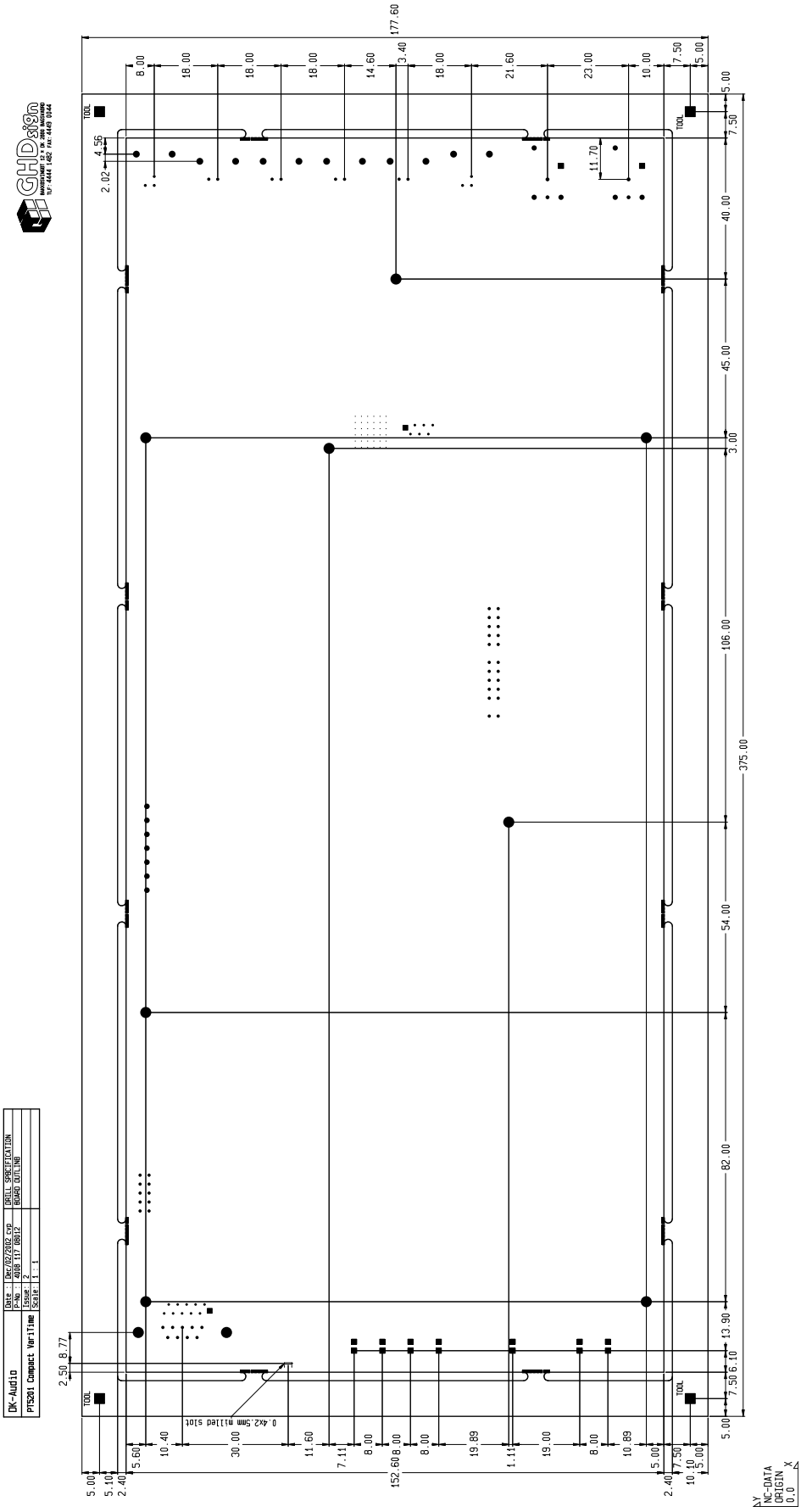
4.2.10 Layout Drawing - File: TM_01_PO.GER - Scale 0.55



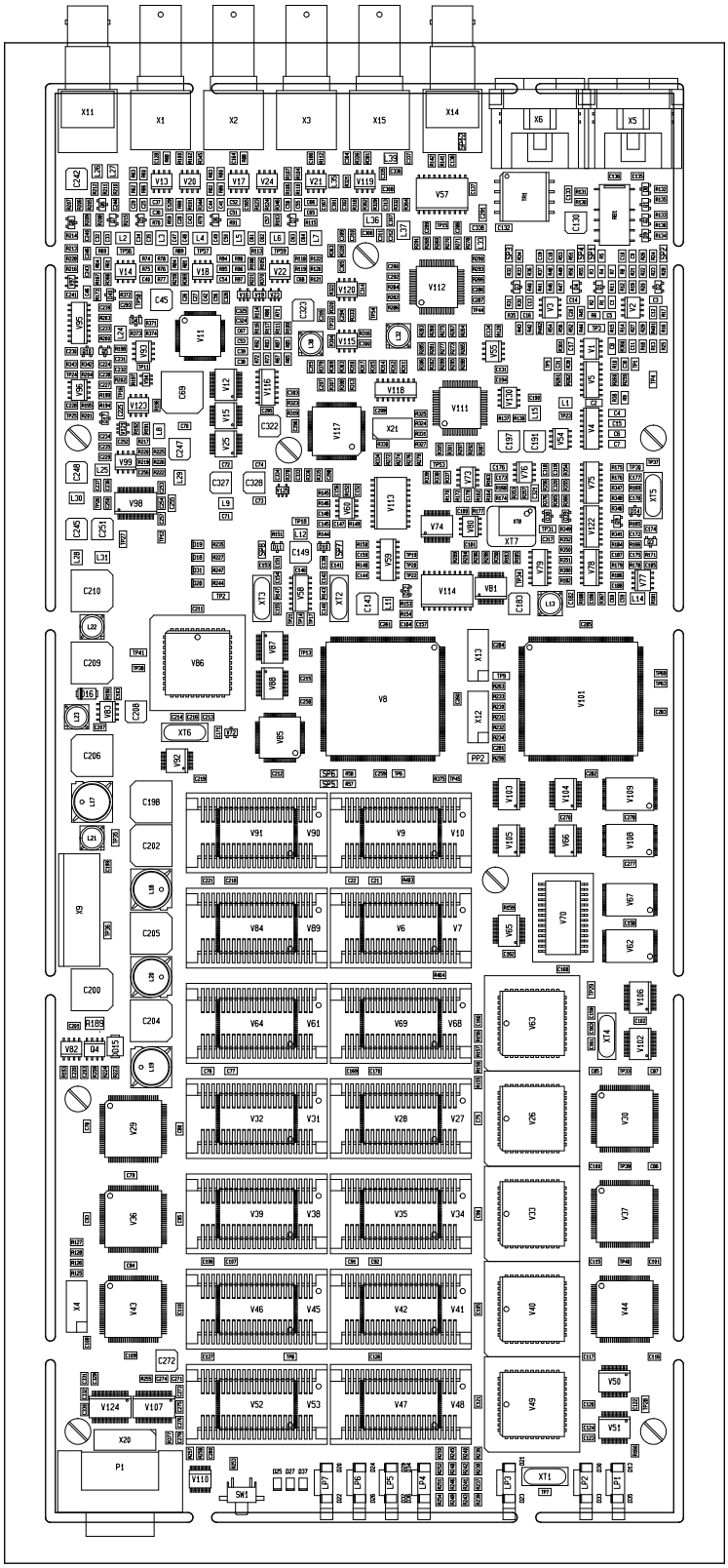
## 4.2.11 Layout Drawing - File: FI_01_PO.GER - Scale 0.55



## 4.2.12 Layout Drawing - File: DR_00_PO.GER - Scale 0.55



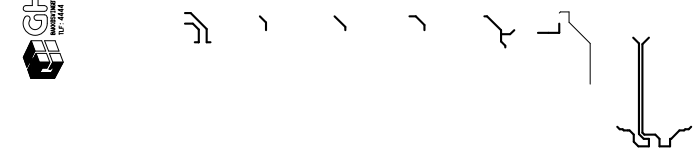
## 4.2.13 Layout Drawing - File: AS_01_PO.GER - Scale 0.55



| | | |
|---|---|---|
| DK-Audio | Date | dec/02/2002 cyp |
| | P-No | 4008 117 08012 |
| PTS201 Compact VariTime | Version | 2 |
| | Scale | 1 : 1 |

ASSEMBLY TOP SIDE
BOARD OUTLINE

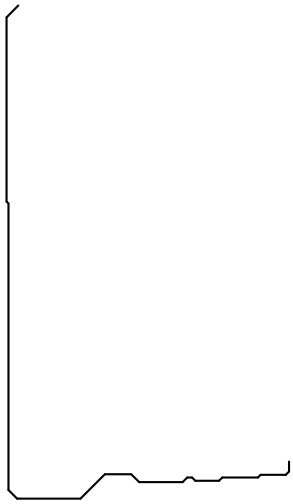
## 4.2.14 Layout Drawing - File: Z0_01_PO.GER - Scale 0.55



| | | |
|---|---|---|
| DK-Audio | Date | Dec/02/2002 cyp |
| | P-No | 4008 117 08012 |
| | Rev | 2.1 |
| PTS201 Compact VariTime | Scale | 1 : 1 |
| | | Imp. tracks 50 Ohm |

NC-DATA ORIGIN 0.0

## 4.2.15 Layout Drawing - File: Z0_05_PO.GER - Scale 0.55



| | | |
|---|---|---|
| DK-Audio | Date | Dec/02/2002 cyp |
| | P-No | 4008 117 08012 |
| | Rev | 2 |
| PTS201 Compact VariTime | Scale | 1 : 1 |
| | | Imp. tracks 75 Ohm |

NC-DATA ORIGIN 0.0

## 4.2.16 Layout Drawing - File: Z0_06_PO.GER - Scale 0.55