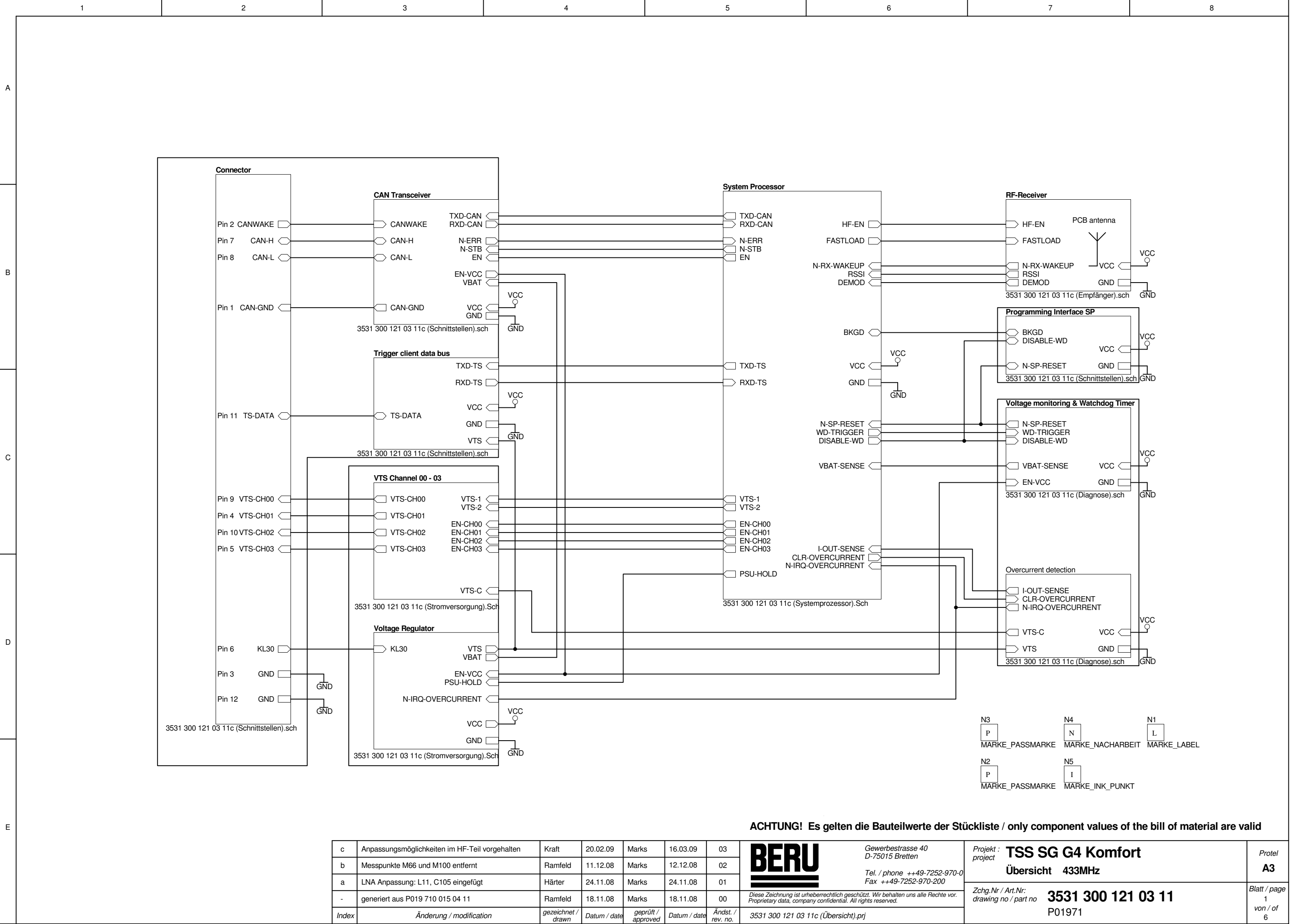




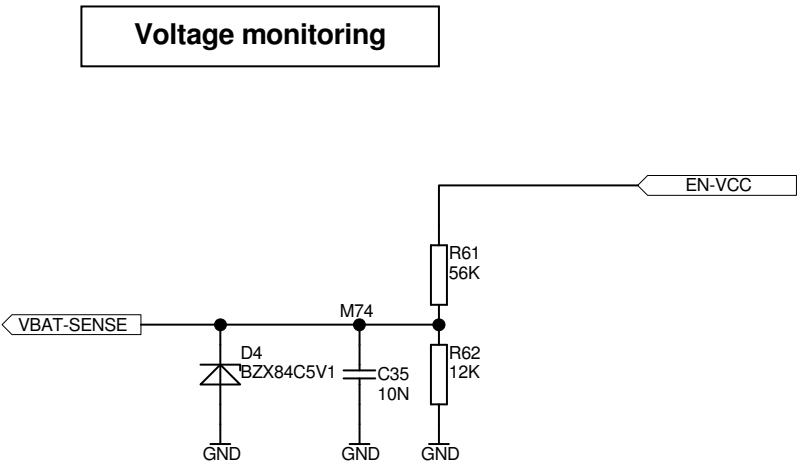
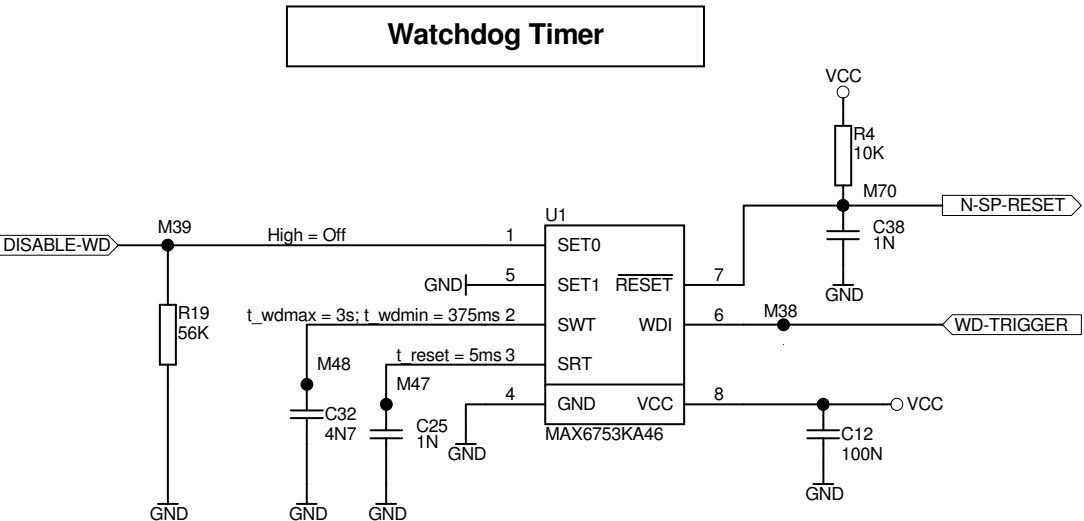
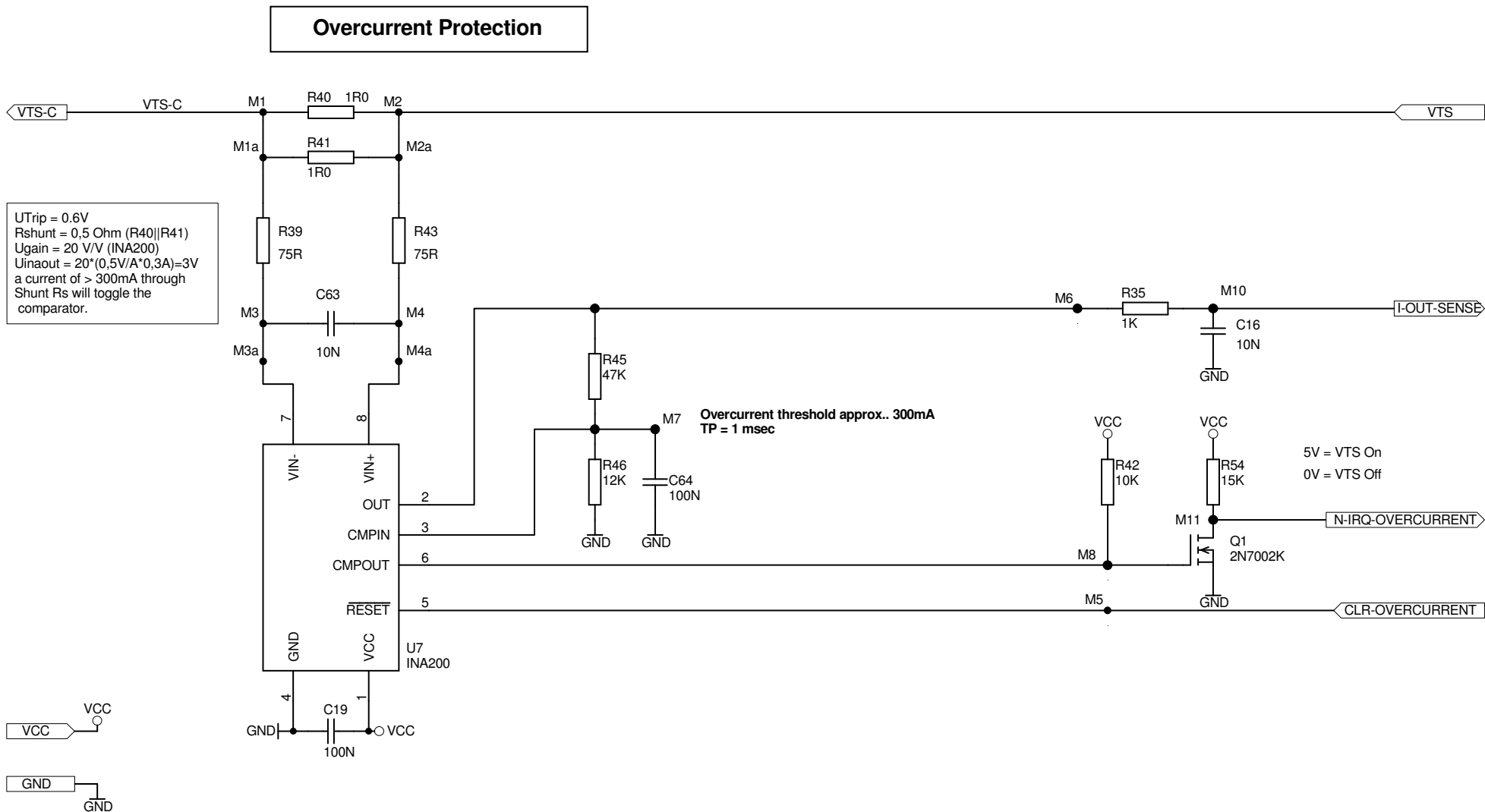
A

B

C

D

E

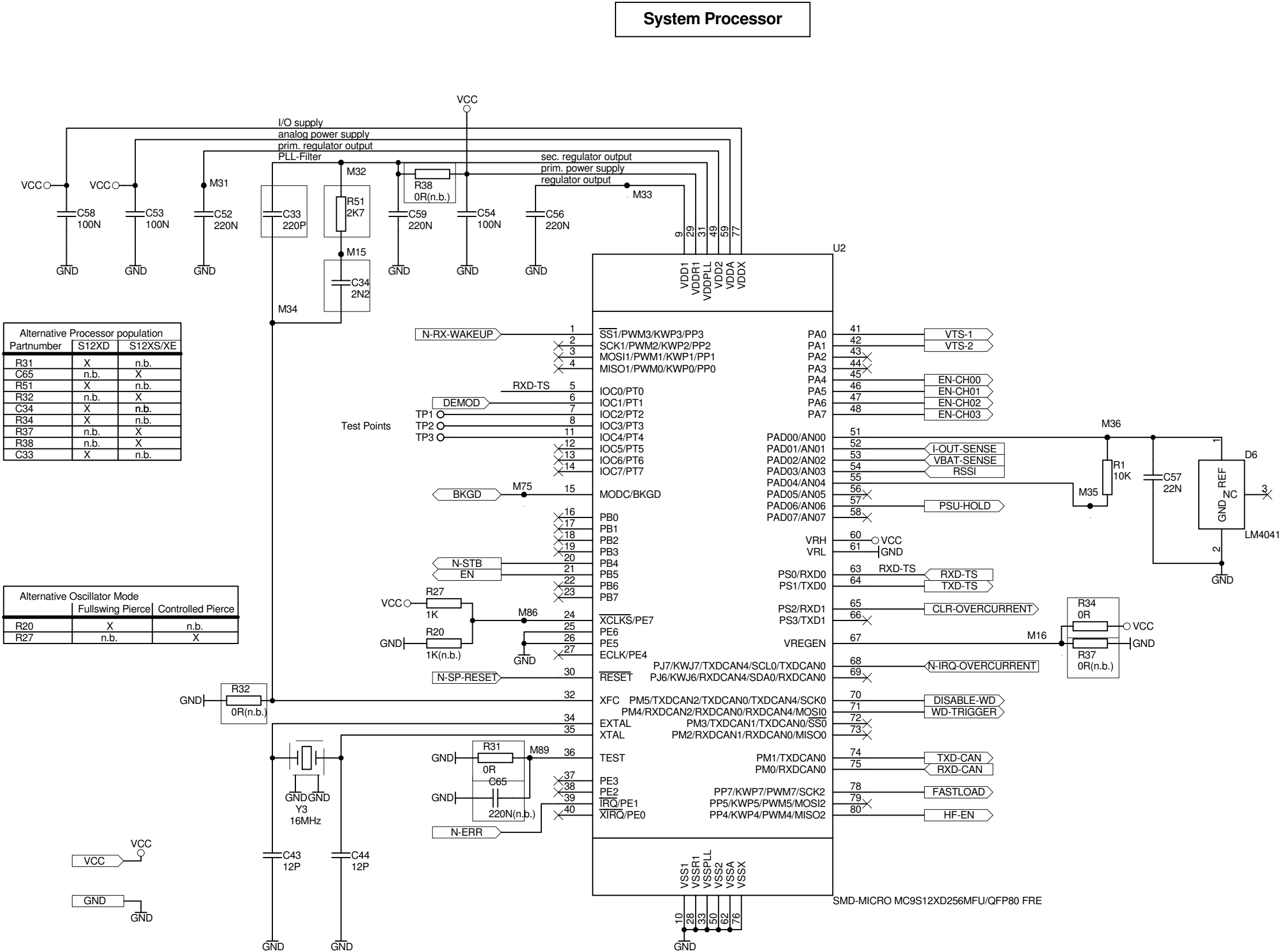


**ACHTUNG! Es gelten die Bauteilwerte der Stückliste / only component values of the bill of material are valid**

|       |                                                |                       |              |                       |              |                      |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                      |                                                                                                 |
|-------|------------------------------------------------|-----------------------|--------------|-----------------------|--------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| c     | Anpassungsmöglichkeiten im HF-Teil vorgehalten | Kraft                 | 20.02.09     | Marks                 | 16.03.09     | 03                   | <div><div><div>BERU</div></div><div><div>Gewerbestrasse 40<br/>D-75015 Bretten</div><div>Tel. / phone ++49-7252-970-0<br/>Fax ++49-7252-970-200</div></div></div> <div><div>Diese Zeichnung ist urheberrechtlich geschützt. Wir behalten uns alle Rechte vor.<br/>Proprietary data, company confidential. All rights reserved.</div><div>3531 300 121 03 11c (Diagnose).Sch</div></div> | <div><div>Projekt :<br/>project</div><div>TSS SG G4 Komfort<br/>Diagnose 433MHz</div></div> <div><div>Zchg.Nr / Art.Nr:<br/>drawing no / part no</div><div>3531 300 121 03 11<br/>P01971</div></div> | <div><div>Protel<br/>A3</div></div> <div><div>Blatt / page<br/>2<br/>von / of<br/>6</div></div> |
| b     | Messpunkte M66 und M100 entfernt               | Ramfeld               | 11.12.08     | Marks                 | 12.12.08     | 02                   |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                      |                                                                                                 |
| a     | LNA Anpassung: L11, C105 eingefügt             | Härter                | 24.11.08     | Marks                 | 24.11.08     | 01                   |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                      |                                                                                                 |
| -     | generiert aus P019 710 015 04 11               | Ramfeld               | 18.11.08     | Marks                 | 18.11.08     | 00                   |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                      |                                                                                                 |
| Index | Änderung / modification                        | gezeichnet /<br>drawn | Datum / date | geprüft /<br>approved | Datum / date | Ändst. /<br>rev. no. |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                      |                                                                                                 |

A  
B  
C  
D  
E

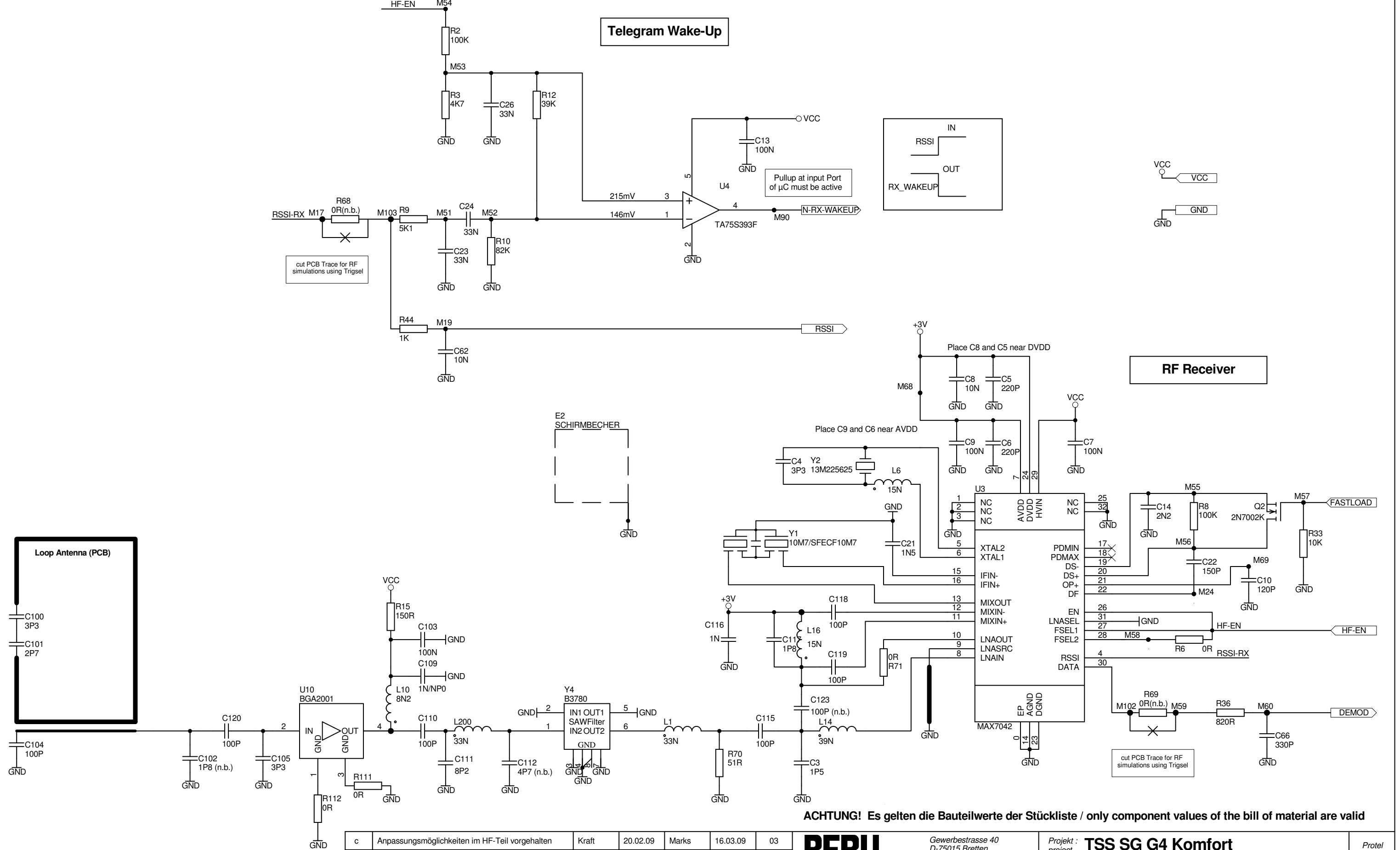
12345678



ACHTUNG! Es gelten die Bauteilwerte der Stückliste / only component values of the bill of material are valid

|       |                                                |                       |              |                       |              |                      |                                                                                                                                                                                                                                                                                                                                                                             |                                                                             |                                    |
|-------|------------------------------------------------|-----------------------|--------------|-----------------------|--------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------|
| c     | Anpassungsmöglichkeiten im HF-Teil vorgehalten | Kraft                 | 20.02.09     | Marks                 | 16.03.09     | 03                   | <div><div>BERU</div><div>Gewerbestrasse 40<br/>D-75015 Bretten</div><div>Tel. / phone ++49-7252-970-0<br/>Fax ++49-7252-970-200</div><div><small>Diese Zeichnung ist urheberrechtlich geschützt. Wir behalten uns alle Rechte vor.<br/>Proprietary data, company confidential. All rights reserved.</small></div><div>3531 300 121 03 11c (Systemprozessor).Sch</div></div> | Projekt : <b>TSS SG G4 Komfort</b><br>project <b>Systemprozessor 433MHz</b> | Protel <b>A3</b>                   |
| b     | Messpunkte M66 und M100 entfernt               | Ramfeld               | 11.12.08     | Marks                 | 12.12.08     | 02                   |                                                                                                                                                                                                                                                                                                                                                                             |                                                                             |                                    |
| a     | LNA Anpassung: L11, C105 eingefügt             | Härter                | 24.11.08     | Marks                 | 24.11.08     | 01                   |                                                                                                                                                                                                                                                                                                                                                                             |                                                                             |                                    |
| -     | generiert aus P019 710 015 04 11               | Ramfeld               | 18.11.08     | Marks                 | 18.11.08     | 00                   |                                                                                                                                                                                                                                                                                                                                                                             | Zchg.Nr / Art.Nr:<br>drawing no / part no <b>3531 300 121 03 11</b>         | Blatt / page<br>3<br>von / of<br>6 |
| Index | Änderung / modification                        | gezeichnet /<br>drawn | Datum / date | geprüft /<br>approved | Datum / date | Ändst. /<br>rev. no. |                                                                                                                                                                                                                                                                                                                                                                             | P01971                                                                      |                                    |

A  
B  
C  
D  
E



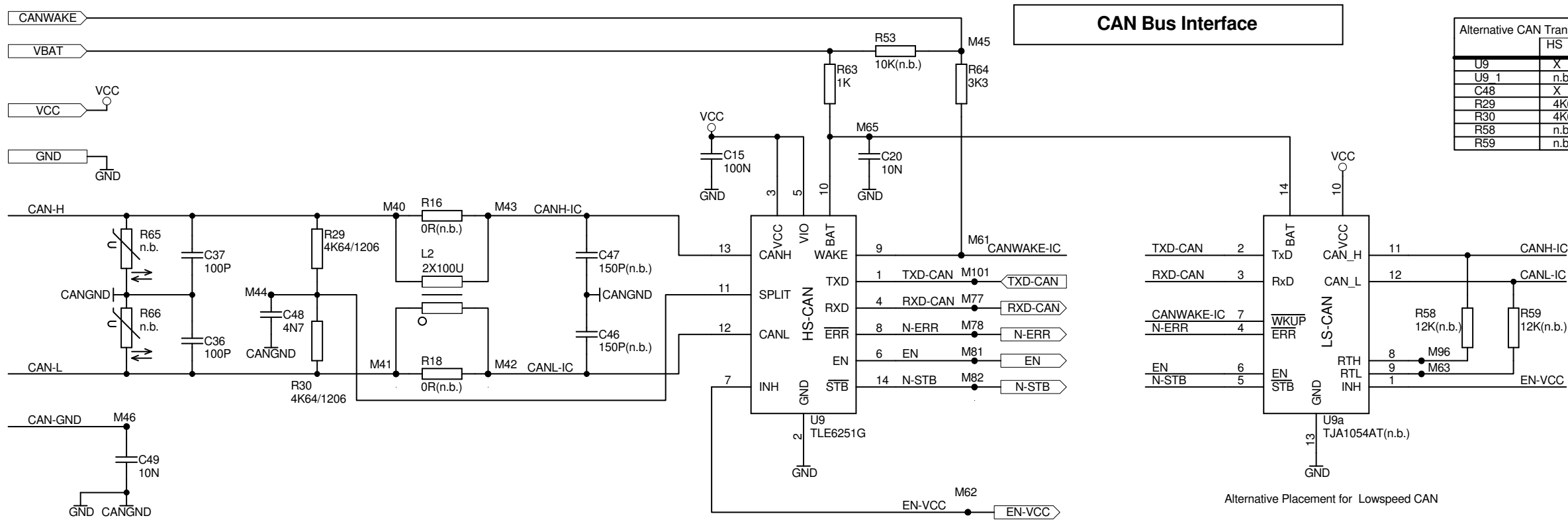
A

B

C

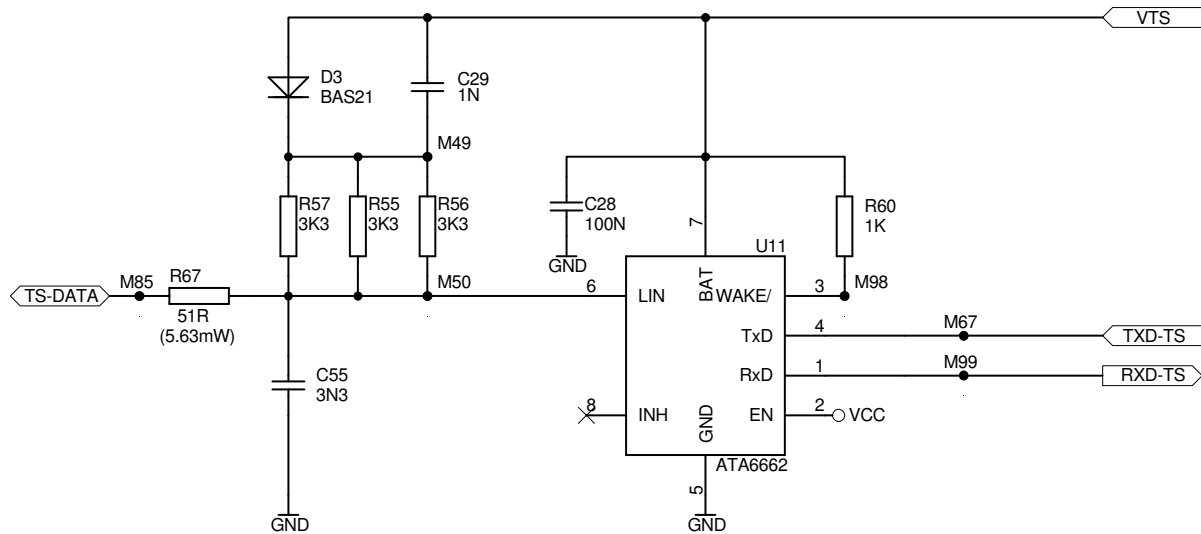
D

E

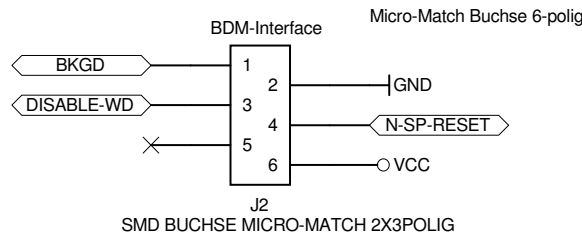


| Alternative CAN Transceiver population |      |      |
|----------------------------------------|------|------|
|                                        | HS   | LS   |
| U9                                     | X    | n.b. |
| U9_1                                   | n.b. | X    |
| C48                                    | X    | n.b. |
| R29                                    | 4K64 | n.b. |
| R30                                    | 4K64 | n.b. |
| R58                                    | n.b. | 12K  |
| R59                                    | n.b. | 12K  |

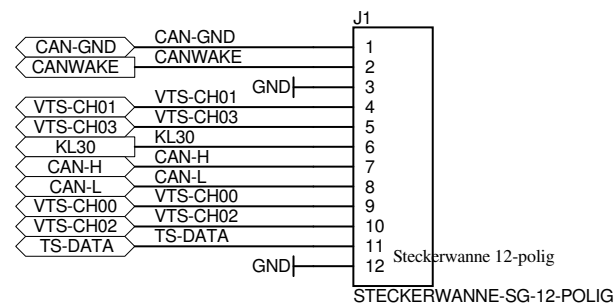
### Trigger Client Data Bus



### Programming Interface



### Connector assembly



ACHTUNG! Es gelten die Bauteilwerte der Stückliste / only component values of the bill of material are valid

|       |                                                |                    |              |                    |              |                   |
|-------|------------------------------------------------|--------------------|--------------|--------------------|--------------|-------------------|
| c     | Anpassungsmöglichkeiten im HF-Teil vorgehalten | Kraft              | 20.02.09     | Marks              | 16.03.09     | 03                |
| b     | Messpunkte M66 und M100 entfernt               | Ramfeld            | 11.12.08     | Marks              | 12.12.08     | 02                |
| a     | LNA Anpassung: L11, C105 eingefügt             | Härter             | 24.11.08     | Marks              | 24.11.08     | 01                |
| -     | generiert aus P019 710 015 04 11               | Ramfeld            | 18.11.08     | Marks              | 18.11.08     | 00                |
| Index | Änderung / modification                        | gezeichnet / drawn | Datum / date | geprüft / approved | Datum / date | Ändst. / rev. no. |



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3531 300 121 03 11c (Schnittstellen)-Sch

Projekt : **TSS SG G4 Komfort**  
project **Schnittstellen 433MHz**

Zchg.Nr / Art.Nr: **3531 300 121 03 11**  
drawing no / part no **P01971**

Protel  
**A3**

Blatt / page  
5  
von / of  
6

A

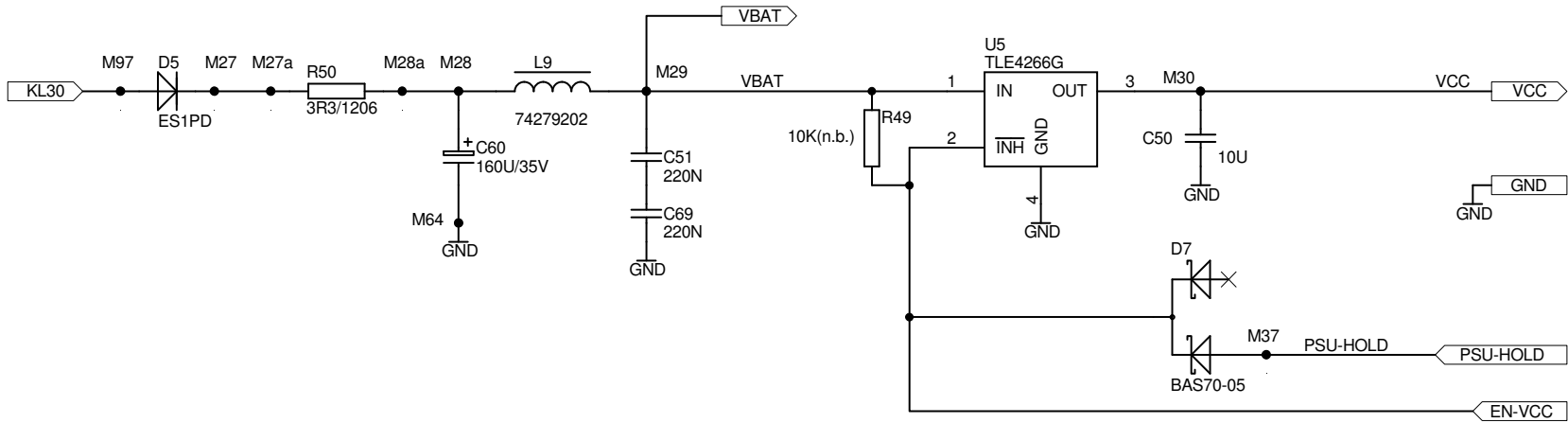
B

C

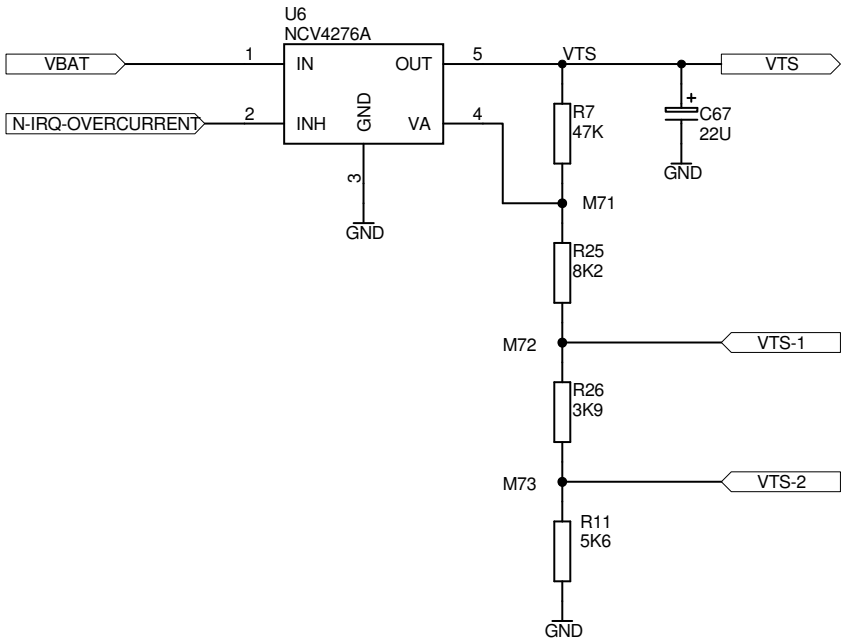
D

E

Voltage Regulator



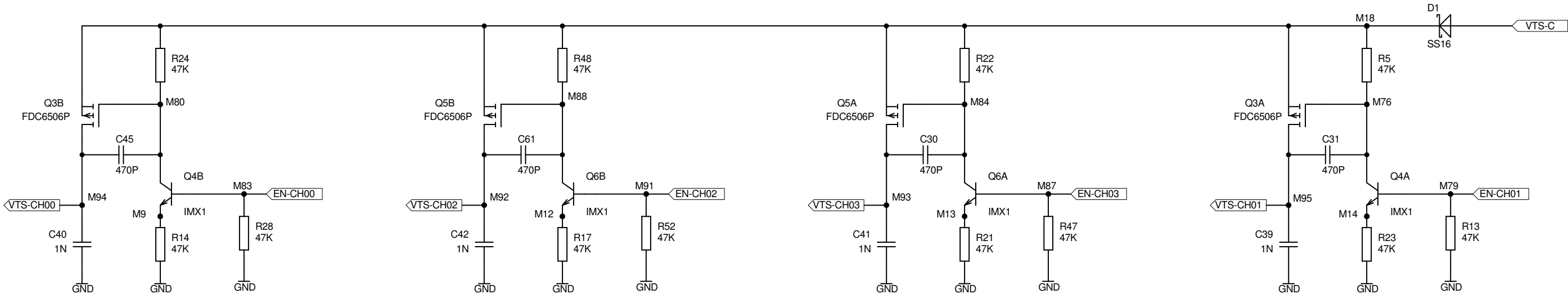
Trigger client regulator stage



$$VTS = \frac{R7 + (R24 + R26 + R11)}{(R24 + R26 + R11)} \times 2,5V$$

| VTS-1 | VTS-2 | VTS max. depending on VBAT |
|-------|-------|----------------------------|
| Hi Z  | Hi Z  | 9V                         |
| Hi Z  | 0V    | 12V                        |
| 0V    | Hi Z  | 16V                        |
| 0V    | 0V    | 16V                        |

Trigger Client Switching Stage



ACHTUNG! Es gelten die Bauteilwerte der Stückliste / only component values of the bill of material are valid

|       |                                                |                    |              |                    |              |                   |
|-------|------------------------------------------------|--------------------|--------------|--------------------|--------------|-------------------|
| c     | Anpassungsmöglichkeiten im HF-Teil vorgehalten | Kraft              | 20.02.09     | Marks              | 16.03.09     | 03                |
| b     | Messpunkte M66 und M100 entfernt               | Ramfeld            | 11.12.08     | Marks              | 12.12.08     | 02                |
| a     | LNA Anpassung: L11, C105 eingefügt             | Härter             | 24.11.08     | Marks              | 24.11.08     | 01                |
| -     | generiert aus P019 710 015 04 11               | Ramfeld            | 18.11.08     | Marks              | 18.11.08     | 00                |
| Index | Änderung / modification                        | gezeichnet / drawn | Datum / date | geprüft / approved | Datum / date | Ändst. / rev. no. |



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3531 300 121 03 11c (Stromversorgung).Sch

Projekt : **TSS SG G4 Komfort**  
project **Stromversorgung 433MHz**

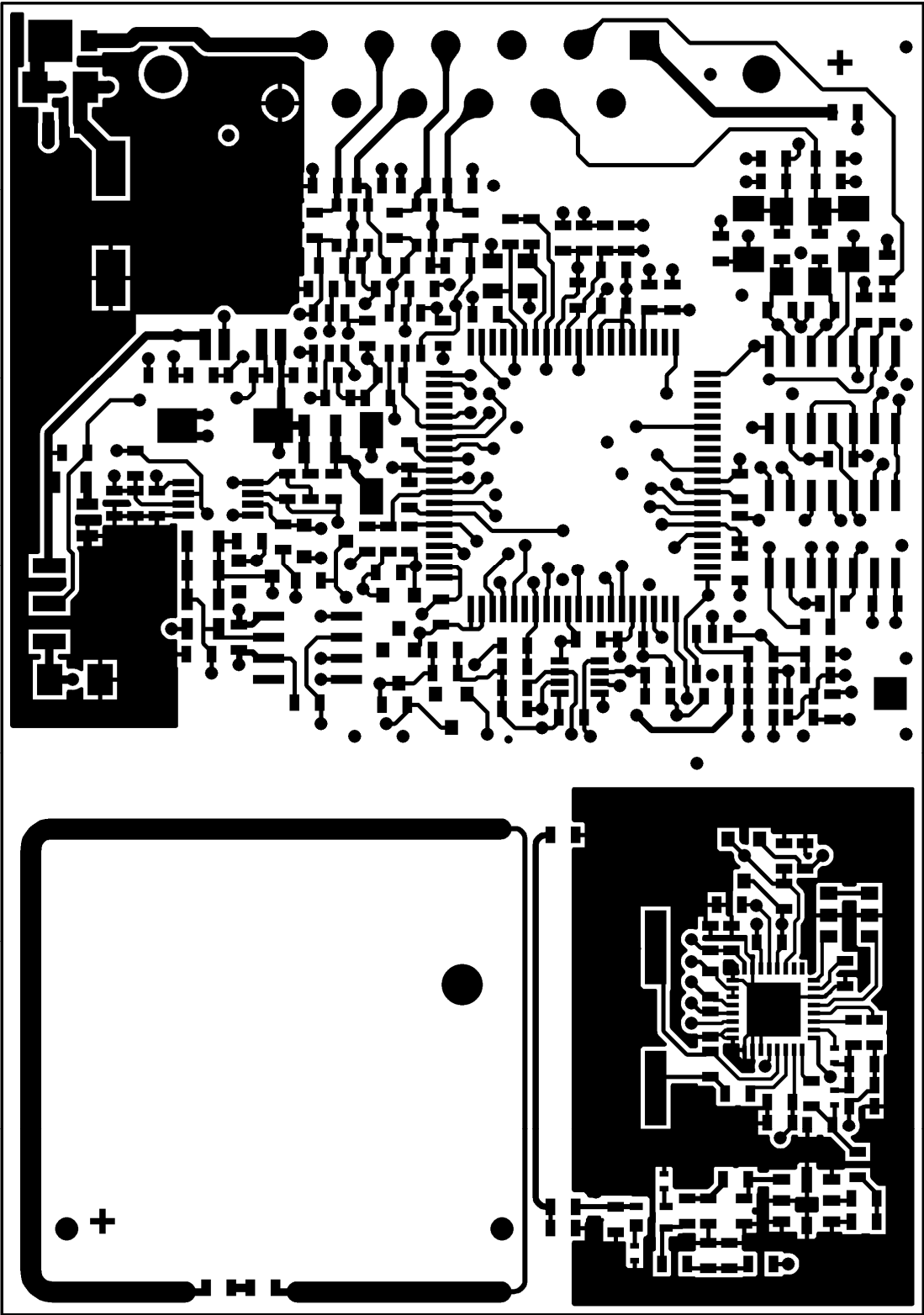
Zchg.Nr / Art.Nr: **3531 300 121 03 11**  
drawing no / part no **P01971**

Protel  
**A3**

Blatt / page  
6  
von / of  
6

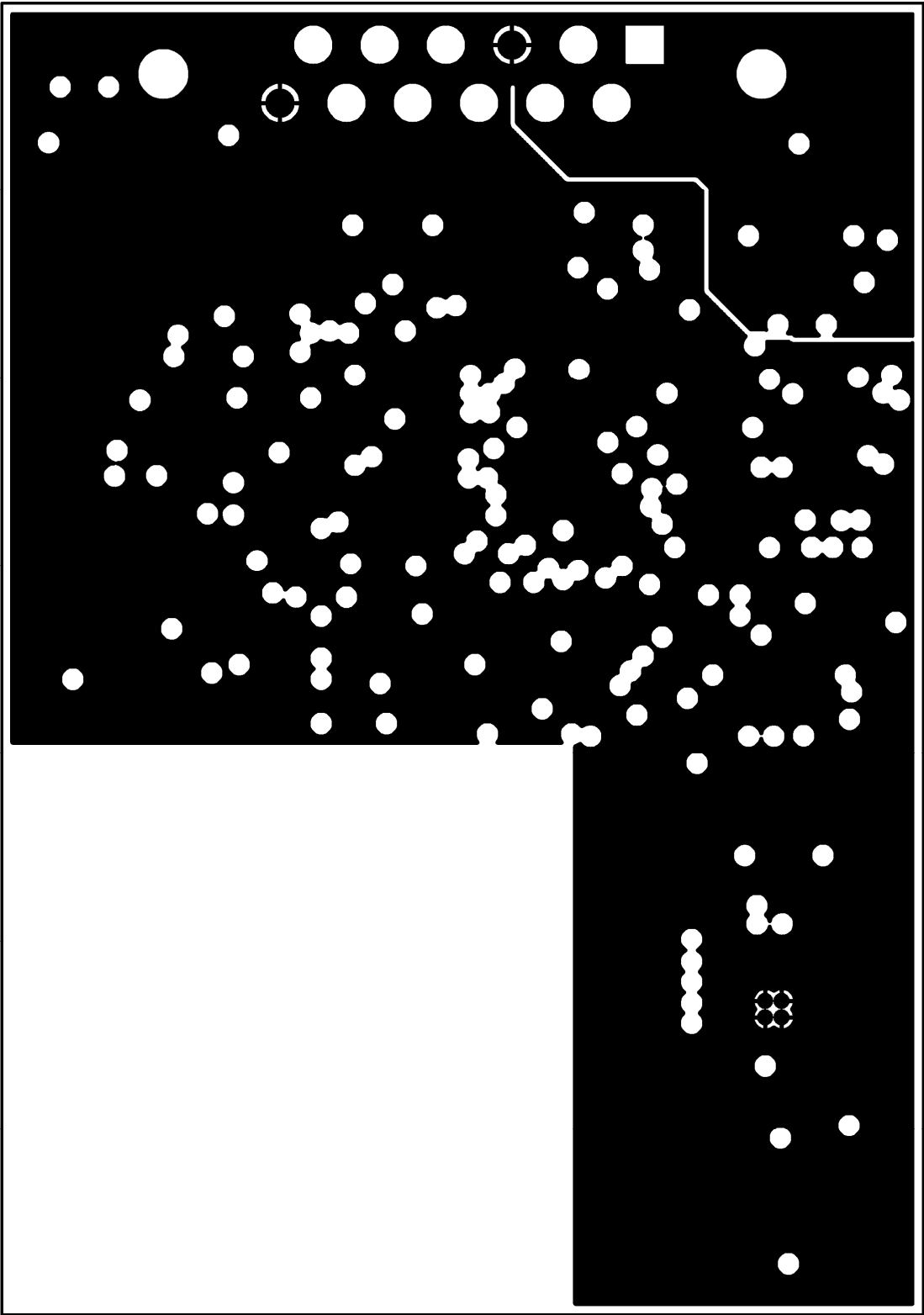


TOP Layer



|                           |                            |                                                                                                             |                                        |                    |            |
|---------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------|----------------------------------------|--------------------|------------|
| erstellt<br><i>drawn:</i> | geprüft<br><i>checked:</i> | Layout Komfortsteuergerät<br><i>layout Comfort ECU</i><br><br>PCB TSS LP SG G4<br><i>PCB TSS PCB ECU G4</i> | Dok.Nr./<br><i>drawing</i><br>no.:     | 3531 300 121 04 15 | Index<br>c |
| Datum/date:               | Datum/date:                |                                                                                                             | Für Sach-Nr./<br><i>belongs to pr:</i> | 1531 300 121 xx xx |            |
| Seemann                   | Härter                     |                                                                                                             | Seite/page 2 / 8                       |                    | DIN A4     |
| 24.03.09                  | 24.03.09                   |                                                                                                             |                                        |                    |            |

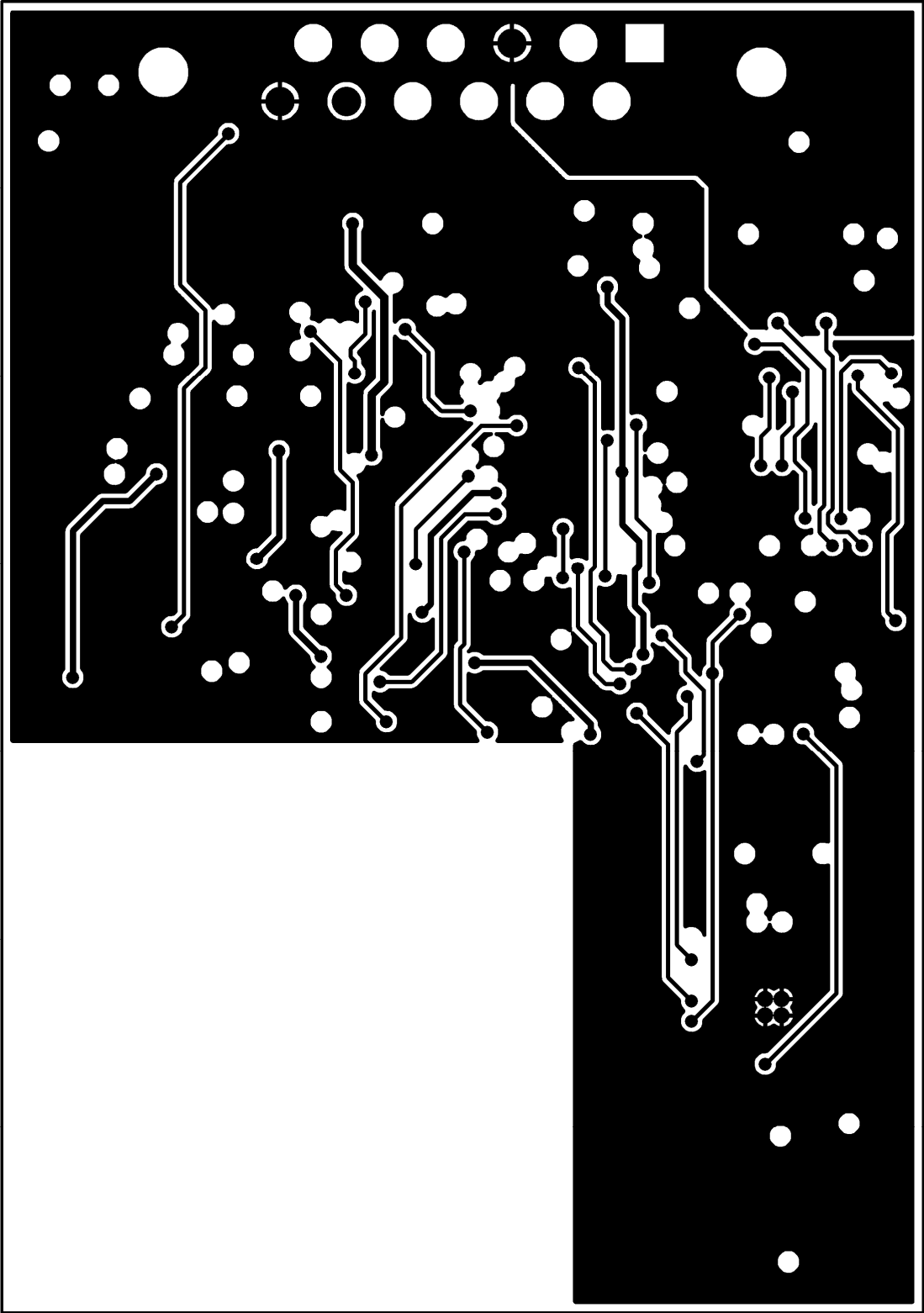
MID Layer 1



|                           |                            |                                                               |                                        |                           |                   |
|---------------------------|----------------------------|---------------------------------------------------------------|----------------------------------------|---------------------------|-------------------|
| erstellt<br><i>drawn:</i> | geprüft<br><i>checked:</i> | <b>Layout Komfortsteuergerät</b><br><i>layout Comfort ECU</i> | Dok.Nr./<br><i>drawing</i><br>no.:     | <b>3531 300 121 04 15</b> | Index<br><b>c</b> |
| Datum/ <i>date:</i>       | Datum/ <i>date:</i>        |                                                               |                                        |                           |                   |
| Seemann                   | Härter                     | <b>PCB TSS LP SG G4</b>                                       | Für Sach-Nr./<br><i>belongs to pn:</i> | 1531 300 121 xx xx        |                   |
| 24.03.09                  | 24.03.09                   | <b>PCB TSS PCB ECU G4</b>                                     |                                        | Seite/ <i>page</i> 3 / 8  |                   |

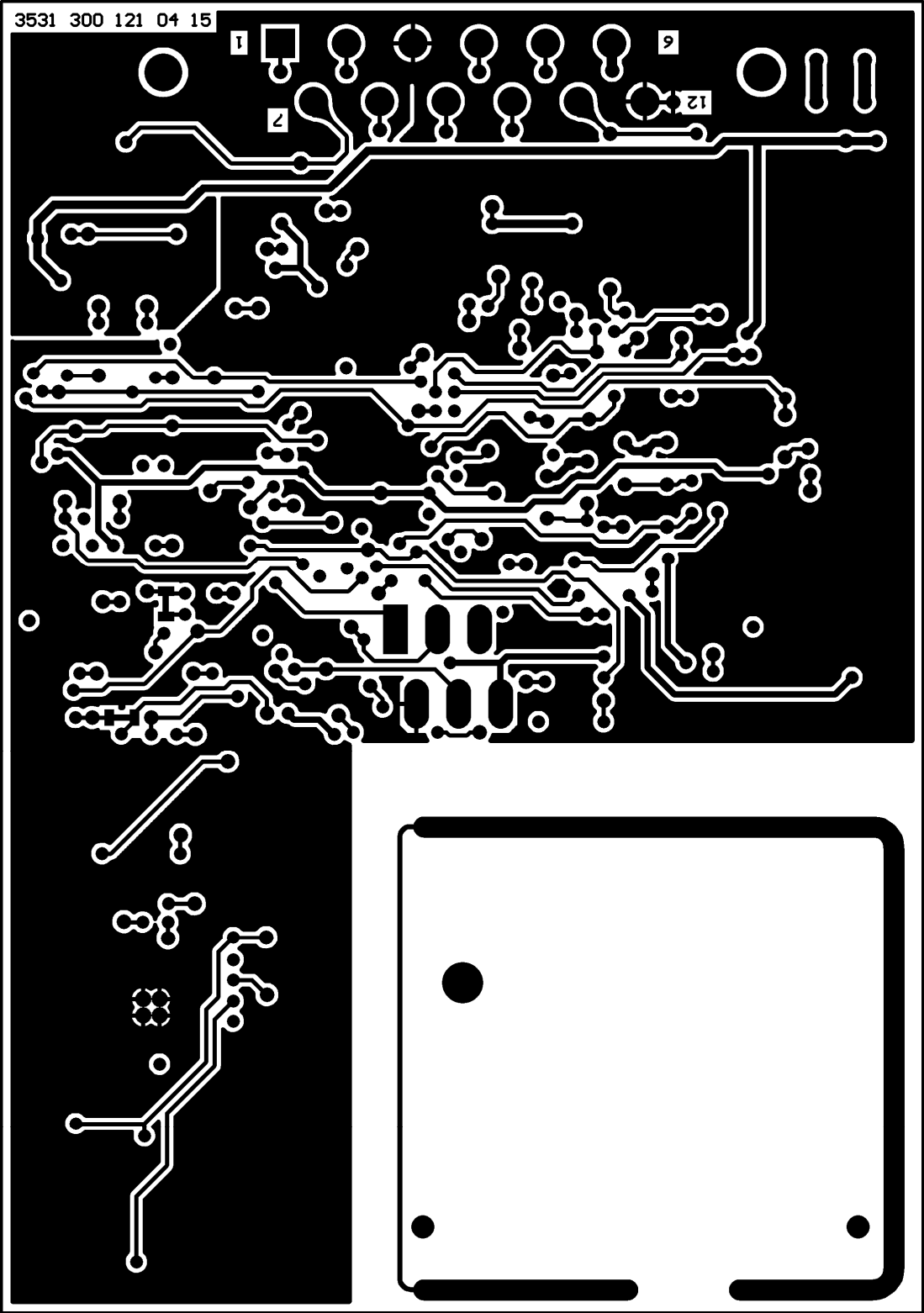


MID Layer 2



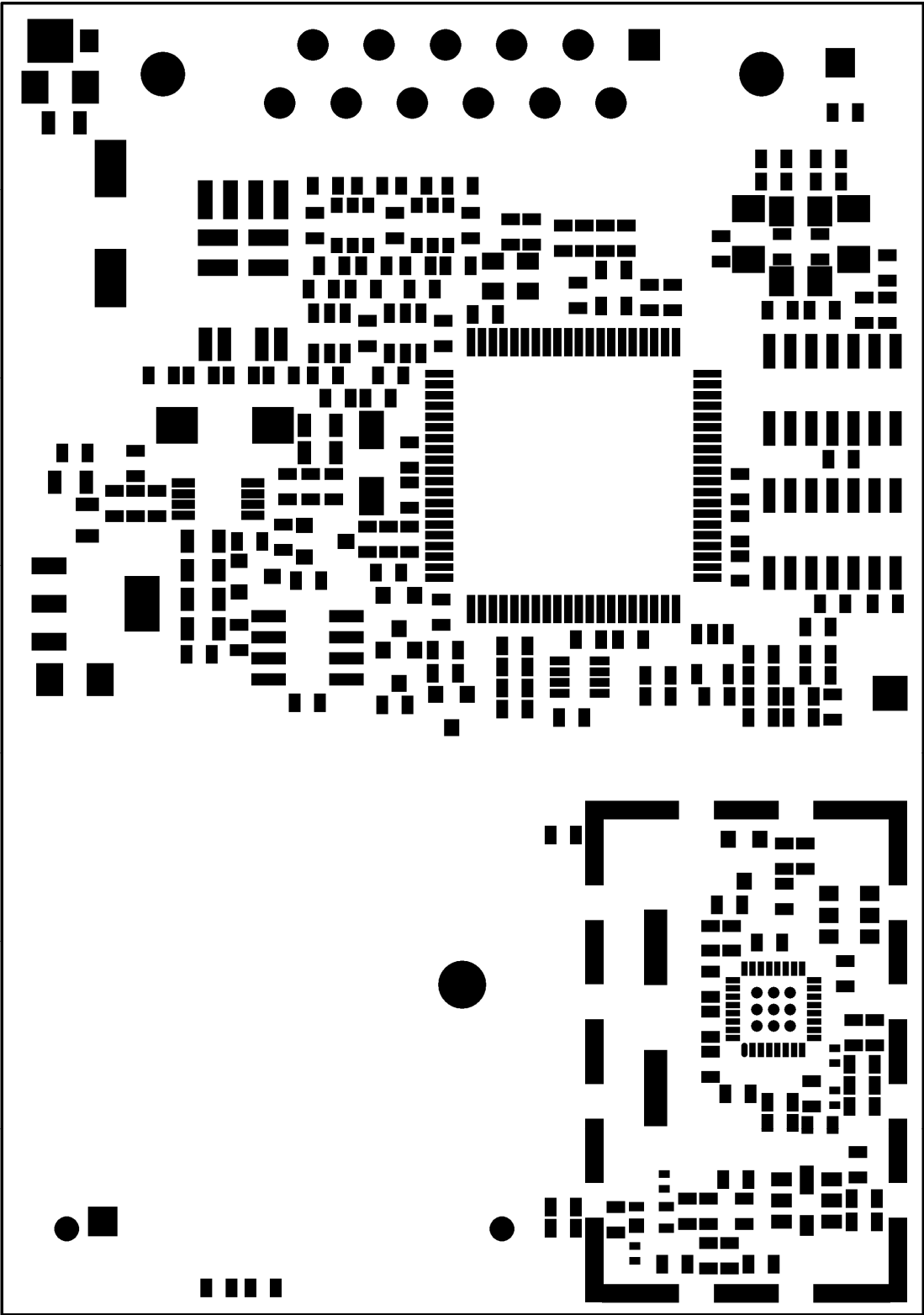
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|---------------------------|----------------------------|---------------------------------------------------------------|----------------------------------------|---------------------------|-------------------|
| erstellt<br><i>drawn:</i> | geprüft<br><i>checked:</i> | <b>Layout Komfortsteuergerät</b><br><i>layout Comfort ECU</i> | Dok.Nr./<br><i>drawing</i><br>no.:     | <b>3531 300 121 04 15</b> | Index<br><b>c</b> |
| Datum/ <i>date:</i>       | Datum/ <i>date:</i>        |                                                               |                                        |                           |                   |
| Seemann                   | Härter                     | <b>PCB TSS LP SG G4</b>                                       | Für Sach-Nr./<br><i>belongs to pn:</i> | 1531 300 121 xx xx        |                   |
| 24.03.09                  | 24.03.09                   | <b>PCB TSS PCB ECU G4</b>                                     | <b>Seite/page 4 / 8</b>                |                           | DIN A4            |

BOTTOM Layer



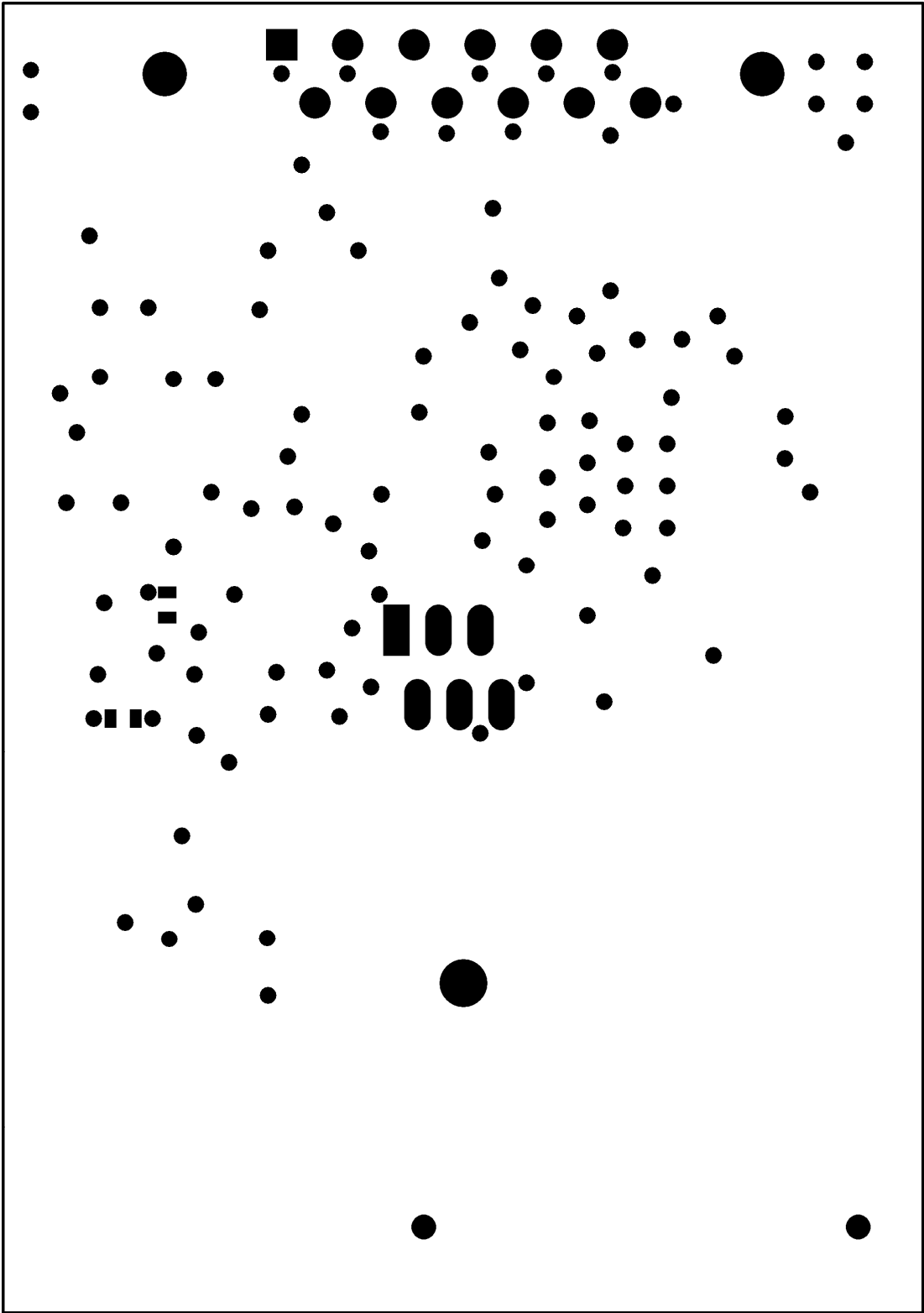
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|---------------------------|----------------------------|---------------------------------------------------------------|-----------------------------------------|--------------------|-------------------|
| erstellt<br><i>drawn:</i> | geprüft<br><i>checked:</i> | <b>Layout Komfortsteuergerät</b><br><i>layout Comfort ECU</i> | Dok.Nr./<br><i>drawing</i><br>no.:      | 3531 300 121 04 15 | Index<br><b>c</b> |
| Datum/ <i>date:</i>       | Datum/ <i>date:</i>        |                                                               |                                         |                    |                   |
| Seemann                   | Härter                     | <b>PCB TSS LP SG G4</b>                                       | Für Sach-Nr./<br><i>belongs to pnr:</i> | 1531 300 121 xx xx |                   |
| 24.03.09                  | 24.03.09                   | <b>PCB TSS PCB ECU G4</b>                                     |                                         |                    |                   |
|                           |                            |                                                               | Seite/ <i>page</i> 5 / 8                |                    | DIN A4            |

Solder Resist TOP Layer



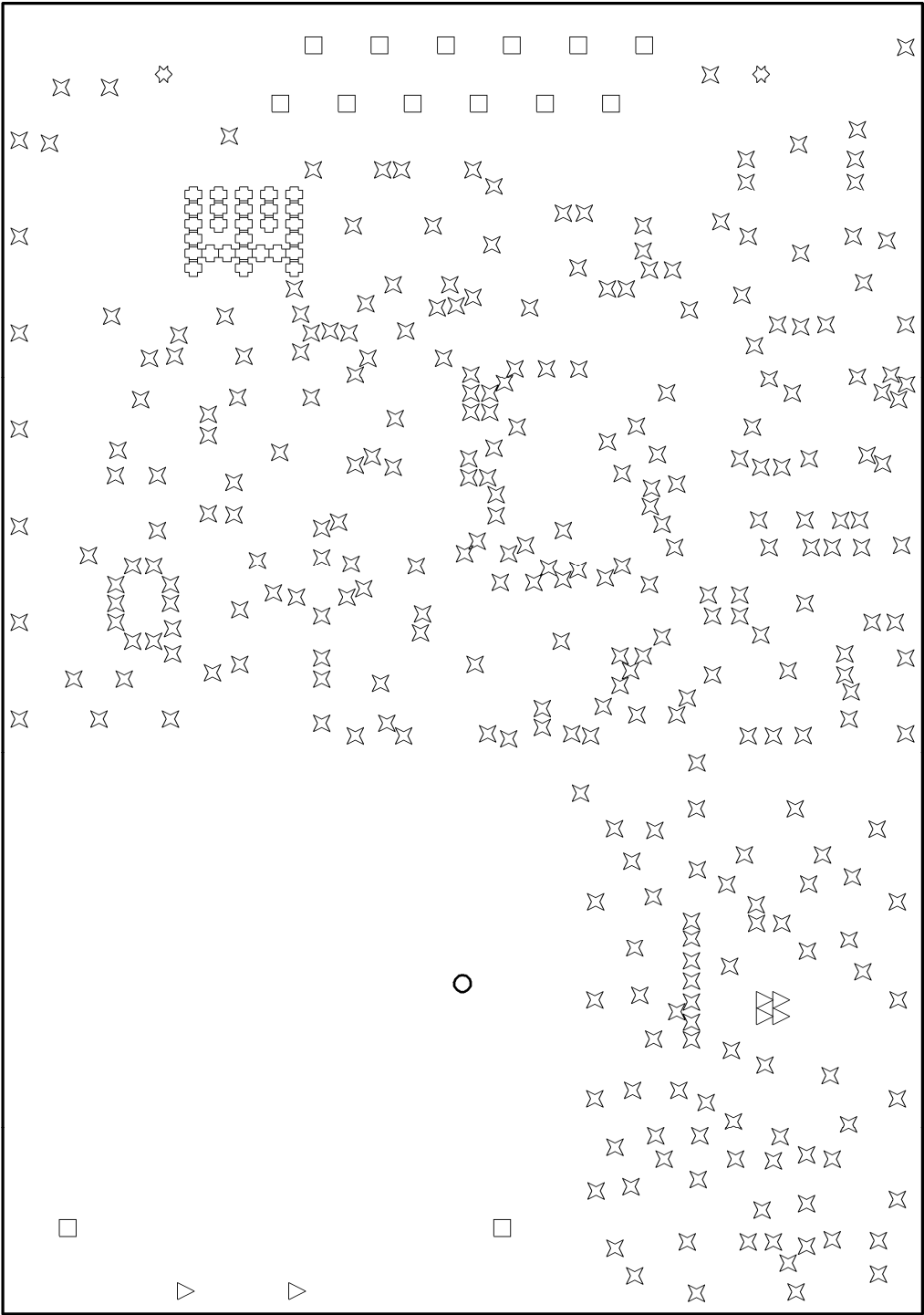
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|---------------------------|----------------------------|---------------------------------------------------------------|----------------------------------------------|---------------------------|-------------------|
| erstellt<br><i>drawn:</i> | geprüft<br><i>checked:</i> | <b>Layout Komfortsteuergerät</b><br><i>layout Comfort ECU</i> | Dok.Nr./<br><i>drawing</i><br>no.:           | <b>3531 300 121 04 15</b> | Index<br><b>c</b> |
| Datum/ <i>date:</i>       | Datum/ <i>date:</i>        |                                                               |                                              |                           |                   |
| Seemann                   | Härter                     | <b>PCB TSS LP SG G4</b>                                       | Für Sach-Nr./<br><i>belongs to part no.:</i> | 1531 300 121 xx xx        |                   |
| 24.03.09                  | 24.03.09                   | <b>PCB TSS PCB ECU G4</b>                                     | Seite/ <i>page</i> 6 / 8                     |                           | DIN A4            |

Solder Resist BOTTOM Layer



|                           |                            |                                                               |                                         |                           |                   |
|---------------------------|----------------------------|---------------------------------------------------------------|-----------------------------------------|---------------------------|-------------------|
| erstellt<br><i>drawn:</i> | geprüft<br><i>checked:</i> | <b>Layout Komfortsteuergerät</b><br><i>layout Comfort ECU</i> | Dok.Nr./<br><i>drawing</i><br>no.:      | <b>3531 300 121 04 15</b> | Index<br><b>c</b> |
| Datum/ <i>date:</i>       | Datum/ <i>date:</i>        |                                                               |                                         |                           |                   |
| Seemann                   | Härter                     | <b>PCB TSS LP SG G4</b>                                       | Für Sach-Nr./<br><i>belongs to pnr:</i> | 1531 300 121 xx xx        |                   |
| 24.03.09                  | 24.03.09                   | <b>PCB TSS PCB ECU G4</b>                                     |                                         | Seite/ <i>page</i> 7 / 8  |                   |

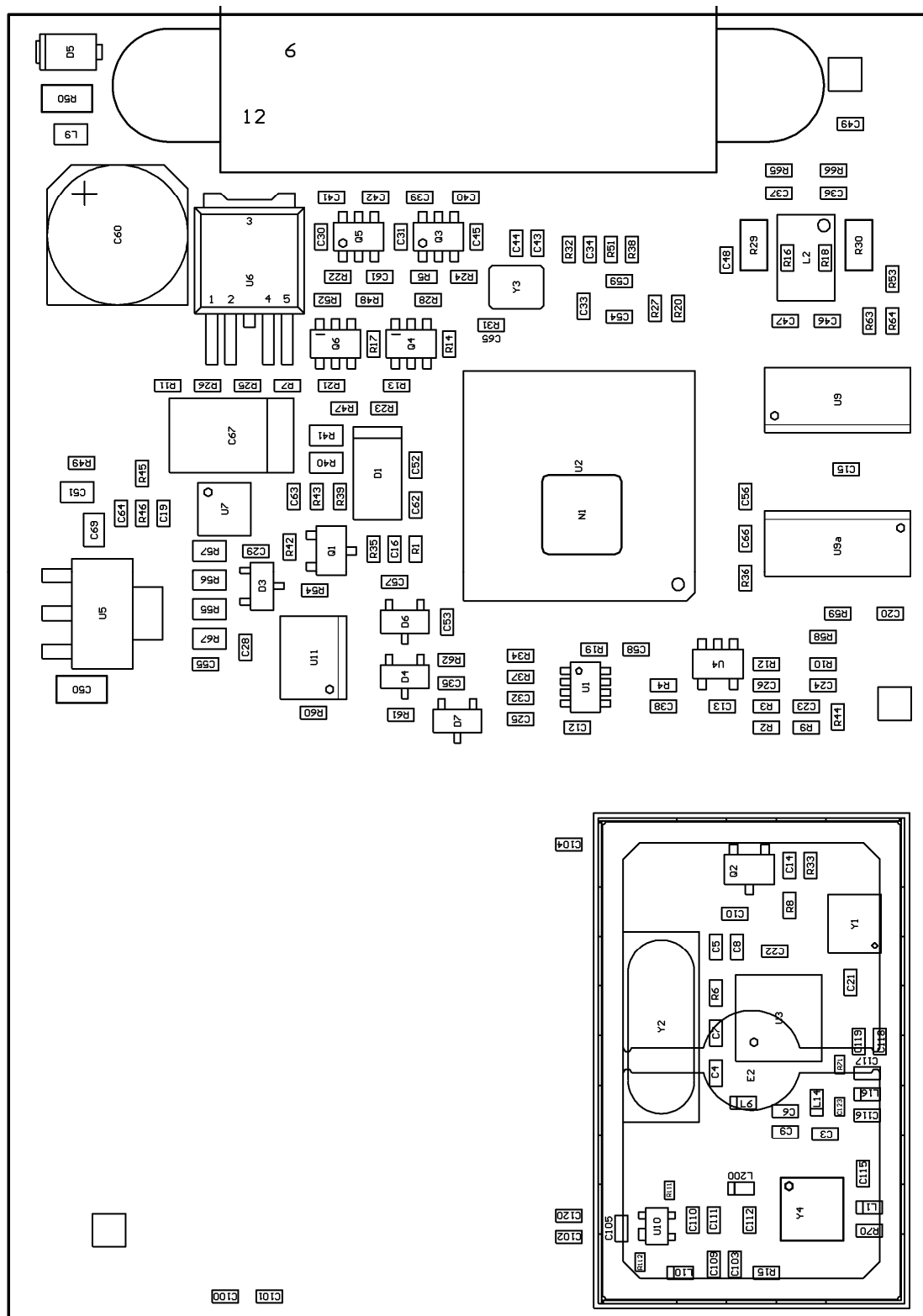
Drill Guide



|   |     |            |           |      |
|---|-----|------------|-----------|------|
| ⊕ | 28  | 13.78m1l   | 0.35mm    | PTH  |
| ✱ | 300 | 15.748m1l  | 0.4mm     | PTH  |
| ▽ | 6   | 19.685m1l  | 0.5mm     | PTH  |
| □ | 14  | 39.37m1l   | 1mm       | PTH  |
| ☆ | 2   | 98.425m1l  | 2.5mm     | NPTH |
| ○ | 1   | 106.299m1l | 2.69999mm | NPTH |
|   | 351 | Total      |           |      |

|                           |                            |                                                        |                                        |                          |                   |
|---------------------------|----------------------------|--------------------------------------------------------|----------------------------------------|--------------------------|-------------------|
| erstellt<br><i>drawn:</i> | geprüft<br><i>checked:</i> | Layout Komfortsteuergerät<br><i>layout Comfort ECU</i> | Dok.Nr./<br><i>drawing</i><br>no.:     | 3531 300 121 04 15       | Index<br><b>c</b> |
| Datum/ <i>date:</i>       | Datum/ <i>date:</i>        |                                                        |                                        |                          |                   |
| Seemann                   | Härter                     | PCB TSS LP SG G4                                       | Für Sach-Nr./<br><i>belongs to pr:</i> | 1531 300 121 xx xx       |                   |
| 24.03.09                  | 24.03.09                   | PCB TSS PCB ECU G4                                     |                                        | Seite/ <i>page</i> 8 / 8 |                   |

## Components & Test Points Top Layer

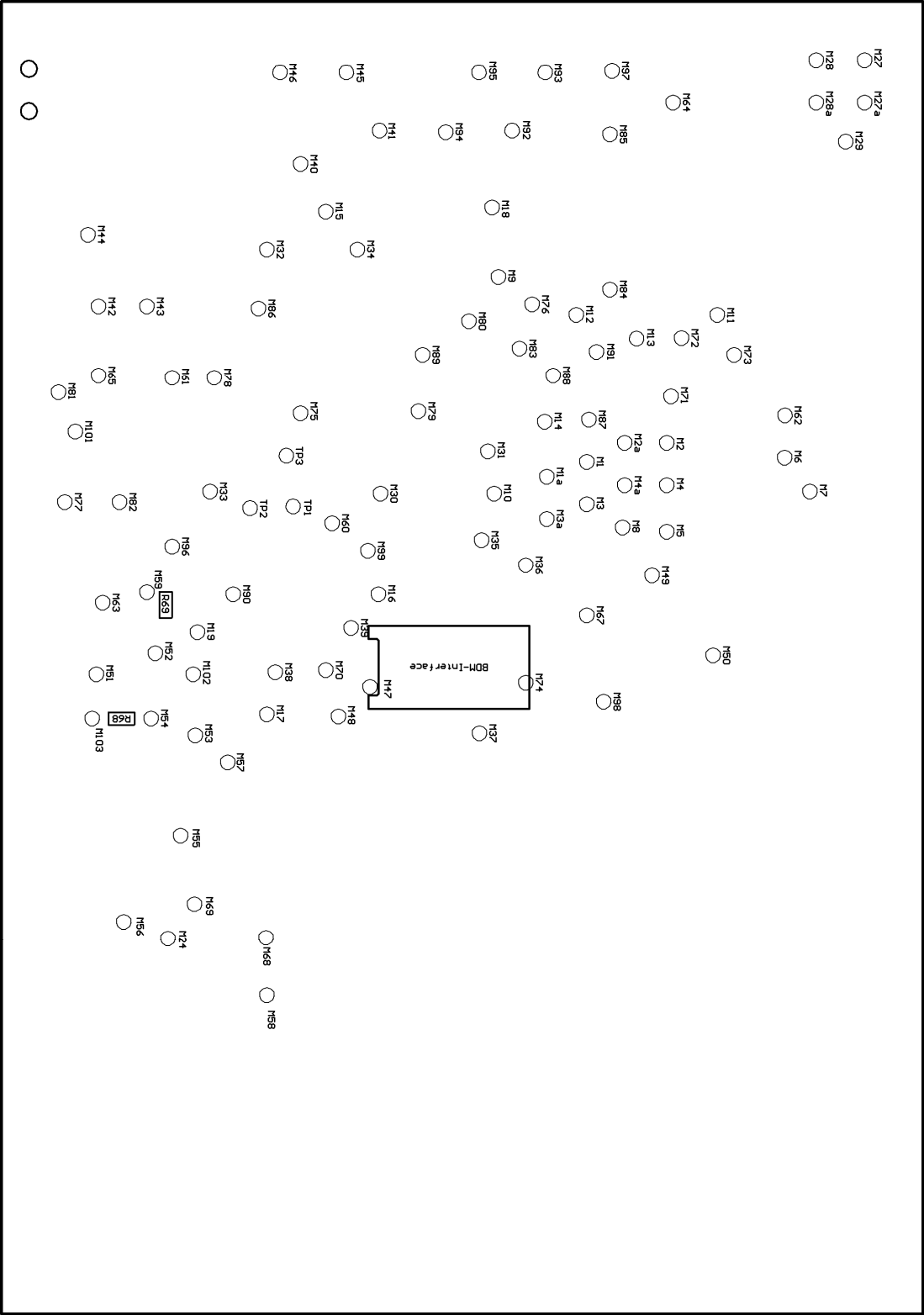


**Ausrichtung L1, L6, L10, L14, L16, L200 beachten!**

**Vollbestückung dargestellt. Bitte Stückliste beachten!**  
***Full assembly displayed. The bill of material applies!***

|                           |                            |                                                                            |                                        |                    |                   |
|---------------------------|----------------------------|----------------------------------------------------------------------------|----------------------------------------|--------------------|-------------------|
| erstellt<br><i>drawn:</i> | geprüft<br><i>checked:</i> | <b>Bestückplan Komfortsteuergerät</b><br><i>equipment plan Comfort ECU</i> | Dok.Nr./<br><i>drawing</i><br>no.:     | 3531 300 121 04 13 | Index<br><b>d</b> |
| Datum/ <i>date:</i>       | Datum/ <i>date:</i>        |                                                                            | Für Sach-Nr./<br><i>belongs to pn:</i> | 1531 300 121 xx xx |                   |
| Seemann                   | Härter                     | <b>OVL TSS LP SG G4</b>                                                    | <b>Seite/page 2 / 3</b><br>DIN A4      |                    |                   |
| 27.08.09                  | 27.08.09                   | <b>OVL TSS PCB ECU G4</b>                                                  |                                        |                    |                   |

## Components & Test Points Bottom Layer



**Vollbestückung dargestellt. Bitte Stückliste beachten!**  
***Full assembly displayed. The bill of material applies!***

|                           |                            |                                                                            |                                         |                    |                   |
|---------------------------|----------------------------|----------------------------------------------------------------------------|-----------------------------------------|--------------------|-------------------|
| erstellt<br><i>drawn:</i> | geprüft<br><i>checked:</i> | <b>Bestückplan Komfortsteuergerät</b><br><i>equipment plan Comfort ECU</i> | Dok.Nr./<br><i>drawing</i><br>no.:      | 3531 300 121 04 13 | Index<br><b>d</b> |
| Datum/ <i>date:</i>       | Datum/ <i>date:</i>        |                                                                            | Für Sach-Nr./<br><i>belongs to part</i> | 1531 300 121 xx xx |                   |
| Seemann                   | Härter                     | <b>OVL TSS LP SG G4</b><br><i>OVL TSS PCB ECU G4</i>                       |                                         |                    |                   |
| 27.08.09                  | 27.08.09                   |                                                                            | Seite/ <i>page</i> 3 / 3                |                    | DIN A4            |