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| **Statement of Work**  **for the DTB assembly** |

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| **Prepared by** | *Signature* |  | **Accepted by** | *Signature* |
| K.-H. Sulanke, DESY |  |  |  |  |
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| **Summary** |  |

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| **Document Change Record** | | |
| *Version* | *Date* | *Observations* |
| 1 | 2020/10/18 | First draft |
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| **Distribution** | ***See Distribution list at the end of this document*** |

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# Introduction

## Purpose of this document

This document describes the manufacturing requirements and procedure for the DTB board.

## Contractor’s tasks and responsibilities

**Tasks expected from the contractor:** DTB board manufacture and assembly

**Limits in terms of responsibilities:** Board delivery

# References

## Applicable Documents

|  |  |  |  |
| --- | --- | --- | --- |
| **Applicable Documents (AD)** | | | |
| **AD** | **Title** | **Reference** | **Version** |
| 1 | Product assurance plan | MST-CAM-PL-0166 | 2.2 |
|  |  |  |  |

## Reference Documents

List here all documents that have been used to write this SoW, and where information can be found to increase understanding of activities. Reference documents are not intended to be fulfilled as requirement documents.

|  |  |  |  |
| --- | --- | --- | --- |
| **Reference Documents (RD)** | | | |
| **RD** | **Title** | **Reference** | **Version** | |
| **1** |  |  |  | |
| **2** |  |  |  | |
| **3** |  |  |  | |
| **4** |  |  |  | |

## Normative Documents

Follows the general normative in its last version: IPC-A-600 and IPC-4101D

Contractors quality system under normative ISO-EN-UNE 9001:2008

## Abbreviations and Nomenclature

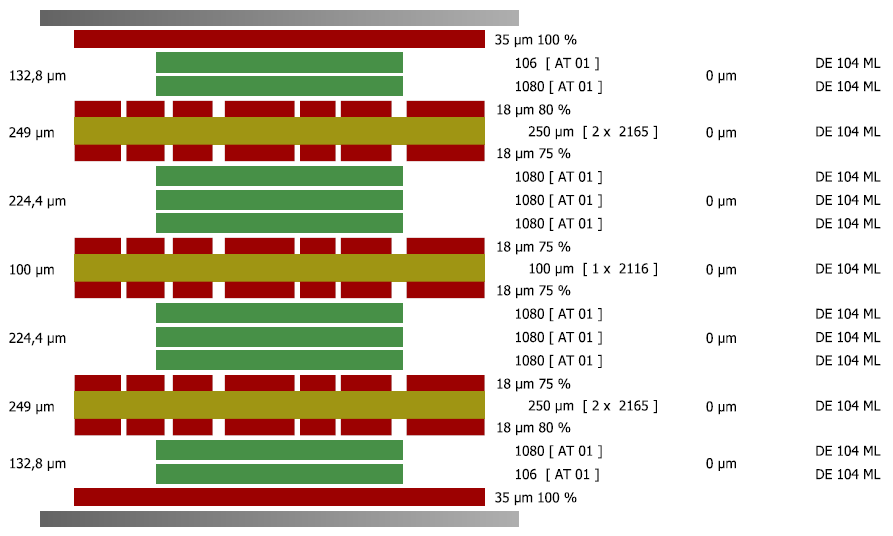
|  |  |  |  |
| --- | --- | --- | --- |
| **List of Abbreviations** | | | |
| DTB | Digital Trigger Backplane |  |  |
| CTDB | Clock & Trigger Distribution Board |  |  |
| PCB | Printed Circuit Board |  |  |
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# SPECIFICATIONS FOR MANUFACTURING

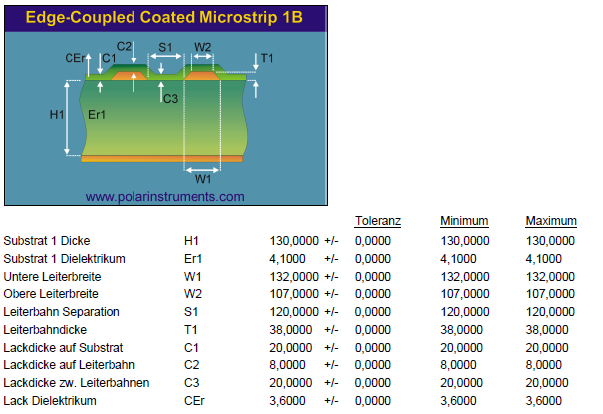
|  |  |
| --- | --- |
| **Regulations** | IPC-A-600  IPC-4101D |
| **Soldering** | RoHS directive 2011/65/EU |
| **Electric test** | IPC-9252 level B |

**PCB Layerstack**

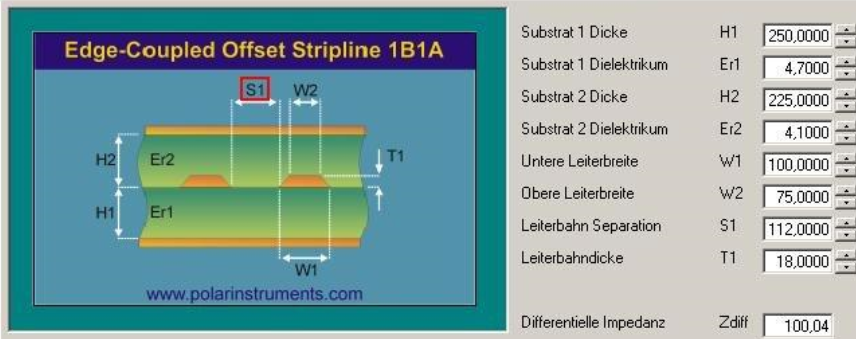
* final thickness : 1.5mm
* prepreg-resin-content : 65.8%
* 100 ohm impedance in layers : 1,3,6,8



**100ohm Impedance Layers 1,8**



**100ohm Impedance Layers 3,6**



# DELIVERABLE ITEMS

## Customer contacts and responsibilities

|  |  |  |
| --- | --- | --- |
| Name | Responsibility | Contact |
| Juan Abel Barrio | Project Manager | barrio@gae.ucm.es |
| K.-H. Sulanke | Schematic and Firmware design | karl-heinz.sulanke@desy.de |
| Carola Ruger | PCB design | carola.rueger@desy.de |

## Manufacturer contacts and responsibilities

Manufacturer:DESY-ZE, +49 40 8998 1839, ulrich.lachmann@desy.de

## Design tools

Schematic and PCB layout :Mentor Graphics Version VX.2.5

## Deliverable Hardware and Firmware

DTB board

## Spare Philosophy, Spare Provision and Re-Use

The total quantity of manufactured boards includes spares if failure during production or testing occurs. Some samples will remain at DESY for a 7 cluster test bench.

## Ground Support Equipment and Test Equipment

The DTB board will be tested by the DESY team. The manufacturer is responsible for automated electrical tests (flying probes)and optical inspections. Further comprehensive functional tests take place at DESY Zeuthen. The test setup consists out of a lab power supply, a CTDB board in standalone mode, a L0 test board and a PC.

# SPECIFIC WORK TO BE PERFORMED

## Manufacturing Activities

### Process description

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Step** | **Activity** | **Responsible** | **Description** | **Document/record** |
| 1 | Manufacturing files delivery | Customer | Deliver of every file for the manufacture of the PCB. | Gerber files |
| 2 | File acceptance | Sub-contractor | Files for manufacture are revised and accepted |  |
| 3 | Components delivery | Sub-contractor | Procurement of the components to be mounted on the board. | Bill of materials for assembly |
| 4 | Control of component | Sub-contractor | Control the delivered component. |  |
| 5 | Component storage | Sub-contractor | Component will be stored in a controlled humidity and temperature room when unpacked/unsealed |  |
| 6 | PCB manufacturing | Sub-contractor | The PCB is delivered by the subcontractor | Impedance test protocol |
| 7 | Manufacturing revision | Sub-contractor | Manufacturing procedure validation by the customer (written by the manufacturer and validated by the customer) | Manufacturing procedure |
| 8 | Manufacturing | Sub-contractor | In compliance with the manufacturing procedure | To be define |
| 9 | DTB delivery | Sub-contractor | Arrival of the product. | Incoming Inspection sheet. |
| 10 | Functional tests | Customer | Performed at DESY | Validation report |

## Delivery, Final Acceptance, Preservation and Storage Activities

### Delivery

Boards will be sent to DESY after the visual inspection and flying probe testing. In case of non-conformities, the non-conformity should be documented and reported to the customer.

The list of materials will be stored. The spare components of the manufacture will be stored in the case of another production needed or for future versions.

### Final acceptance

Boards must fulfill at least IPC class 2. Non-conformities should be documented and reported.

Functional tests are performed at DESY. A board to be accepted should pass the test. Rejected board will be returned to the manufacturer for repairing action.

## Export Control

Not applicable, the sub-contractor is hosted inside the European Union

# CUSTOMER FURNISHED ITEMS

## Manufacturing files and documents

|  |  |  |  |
| --- | --- | --- | --- |
| **Manufacturing files and documents** | | | |
| **Title** | **Description** | **Reference** | **Version** |
| Statement of work | This document |  | 1 |
| Images for reference | CAD screenshots and layer stack | Board\_Images | 4.2 |
| DTB Bill Of Material | Components list for DTB board assembly |  | 4.2 |
| Gerbers files | Mentor output, Manufacturing files for PCB, and components placement |  | 4.2 |
| Pick and place file | Mentor output |  | 4.2 |
| NC drills | Mentor output |  | 4.2 |

## Components and materials

No components are delivered by DESY

## Tools

No tools are delivered by DESY

**DISTRIBUTION LIST**

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