**Working with BE-CEM-EPR-WS electronics assembly workshop: how to guide**

1. Introduction

The goal of this document is to provide you guidelines in order to help you working with BE-CEM-EPR-WS assembly workshop in the best possible conditions.

Below are detailed the file sets and parts that shall be provided by you so that we can assemble your boards in compliance with your delivery lead time and quality expectations.

1. Files to be provided

In order to program the machines and eventually order the required tooling, some files are mandatory. Below are described the different options available with respect to different situations.

Side note: those files are mandatory only in the event of SMD parts assembly. For through hole parts, a bill of material with a circuit drawing showing parts position are enough for us to do the job.

* 1. Circuits designed by BE-CEM-EPR design office

If your circuit has been designed by our design office and thus has an EDA number into EDMS, then you don’t have to take care of that part as the design office automatically generates the required files. So then you only have to take care of the parts supply.

* 1. Circuits designed by the customer

If you have designed your circuits on your own, then you shall provide us one of the following file set.

* + 1. ASCII CAD file, panel gerber file and bill of material

This file set is the most convenient for us to assemble your board. In this case, you have to provide us the following files:

* Circuit CAD file in ASCII format
* To generate this file, please refer to the following side document « Aegis\_Cad\_Import\_Guide-V\_7\_6.pdf » that describes the steps to follow with respect to the CAD software you are using
* Panel gerber file
* If your board is panelised, then you have to provide us the panel gerber file
* BOM file
* The file can be provided in text or excel format including parts references (C1, R1, IC1, etc) as well as part numbers (10k/1%/100PPM, etc) and case (0603, SOT23, etc)

ODB++ file, panel gerber and bill of material

This file set is less convenient but is still allowing us to assemble your board in good conditions.

* ODB++ file of your design
* An ODB++ export of your design including assembly data; BEWARE, in general, ODB++ files provided by PCB manufacturers only contains manufacturing data and lack assembly ones, rendering this file set useless for us
* Panel gerber file
* If your board is panelised, then you have to provide us the panel gerber file
* BOM file
* The file can be provided in text or excel format including parts references (C1, R1, IC1, etc) as well as part numbers (10k/1%/100PPM, etc) and case (0603, SOT23, etc)
	+ 1. Gerber files, pick and place file and bill of material

This file set is the less convenient for us but is still allowing us to assemble your board in good conditions.

* Solderpaste deposition gerber file
* Solderpaste deposition gerber files of both sides; if the circuit is panelised, then we need the panelised gerber files
* SMD parts pick and place file
* A text file including the parts references (C1, R1, etc), the center parts coordinates on the board, the parts orientation as well as the part numbers (10k/1%/100PPM, etc) and parts cases (0603, SOT23, etc)
* BOM file
* The file can be provided in text or excel format including parts references (C1, R1, IC1, etc) as well as part numbers (10k/1%/100PPM, etc) and case (0603, SOT23, etc)
	+ 1. You don’t have the above described files

If you cannot provide us one of the file sets described above, we still can fully assemble your boards by hands. However, please note that if your board contains leadless cases – BGA/LGA/QFN – then we cannot guarantee the soldering quality of those parts if we don’t have at least the solderpaste deposition gerber files.

In addition, we will need as a minimum a BOM as well as a circuit drawing showing parts references on the board.

1. Provided parts and packaging
	1. Standard parts

The assembly workshop is maintaining a stock of so-called standard parts and thus can provide them to you for the assembly of your boards.

Those parts are:

* E96 series SMD resistors, 1% value tolerance, 100PPM thermal stability, in 0402/0603/0805/1206 cases
* Ceramic SMD capacitors, 10% value tolerance, 50V voltage, X7R dielectric type, in 0402/0603/0805/1206 cases
* Tantalum SMD capacitors, 10-20% value tolerance, 50V voltage, standard ESR, in A/B/C/D cases
* Parts available by the CERN store and thus having a SCEM number
	1. Non-standard parts

Parts that do not fit in the above descriptions are considered as non-standard and shall be provided by you.

* + 1. Provided parts packaging and quantities

So that we can use the parts you provided us on our machine, they should be properly packaged:

* In the case of passive parts, they should be packaged in continuous tape or tape and reel
* In the case of active parts, the preferred packaging are trays and continuous tape or tape and reel
* Both Farnell and Radiospares offer so-called production package for the delivered parts
* Small tape parts are not useable as is on our machine and thus impose us to assemble them by hand

Regarding the amount of provided parts, please plan a slightly bigger quantity than needed in total for the assembly as when we use the machine some parts may be lost:

* For taped parts, plan an excess in the range of 3% or minimum ten additional pieces
* For other parts, active or connectors, we recommend to provide two additional pieces, except for high value parts like FPGA, for example

We thank you in advance for your collaboration and hope that we meet your expectations when we assemble your boards