

Motherboard Development Process

Source: designed by Martin Roshkev

Transfer the following verbal description into an EPC:

a) When developing a motherboard, the hardware design department selects a chipset that meets the requirements. The module used by this department is called design software (Design SW is used at every step in this part). After the chipset reference schematics and the chipset documents have been downloaded, the same department proceeds with searching for an appropriate motherboard. If the board is not close to the custom specification, the search process starts again. Otherwise, if a board closest to the custom specification has been found, it is then used as a starting schematic. Then simultaneously the design department adds features from other reference boards and removes the useless features from the selected starting schematic.

b) In the next step, the hardware design department adds peripherals. Then the same department assures if there is an existing BIOS support for the peripherals and, at the same time, finds all reference boards of the peripherals that are not available on the chipset. For the case that no BIOS support is available, the process of adding of peripherals starts all over again. Once the reference boards are found, the materials management department (module MM) contacts the manufacturers of the peripherals that are not from the chipset. As a result, the manufacturer's information is provided. Once this is done and the BIOS support for all peripherals is available, the hardware design department continues to the next step – follow c).

c) The hardware design department now assures that the reference schematics for every peripheral used are available. If any reference schematic is missing, the corresponding peripheral has to be replaced by a new one – the process starts over with the activity where peripherals are added. If all reference schematics are available, the hardware design department customizes them, which triggers the creation of a schematic symbol library. Then the materials management department searches for components in every supplier database. Once all components have been found, both the materials management and the hardware design department together gather all components information. Then, in parallel, the materials management department updates the description, the manufacturer information, the product numbers and the supplier's information. As a result, a preliminary schematic is available.

d) Thereafter, the materials management department simultaneously generates a preliminary BOM and determines the component's prices, using the preliminary schematic and the component's information. After that, the same department compares the prices. There are two possible scenarios. The chosen components are either offered at best prices or there are cheaper components on the market. If the first case applies – please follow f). For the second case that there are cheaper components on the market, the hardware design department checks the component's quality. If the quality of the components is worse than this of the components chosen before, please follow f).

e) For the case that the quality is the same or better, the materials management department contacts the new supplier and, as a result, conditions are negotiated. Alternatively, components may not be available via standard supplier and the materials management contacts directly the manufacturer, using the quotation data and the manufacturer's contact information. Consequently, a quotation is made. Regardless of which of the both cases applies, the process goes back to adding the new peripherals.

f) In the next step, the sales department (using the Sales information system) calculates the price of the prototype and, at the same time, the price for board quantity of one thousand pieces. Thereafter the hardware design department is responsible for the following procedures: components' fitment checking, board size checking, carrying out of preliminary placement, creation of 3D model of the board, connector's fitment checking and components' height checking (some of the input data used are components, chipset, 3D data and connectors).

g) After finishing of all procedures, two possible outcomes exist. In the first case, problems have occurred after the previous checks. This forces the hardware design department to revise the problematic component(s). If a peripheral needs to be replaced, the whole process starts over from adding a new one. If the revision has been successful or the second case applies (when the previous checks are done without any problems), the hardware department finishes the checkup. As a result, a checked schematic and a 3D model of the board are available and also the library is updated. The materials management department can now order the components. Once they are received, the hardware design department does the final placement. As the final outcomes, both the placement and the preliminary layout are done.







