



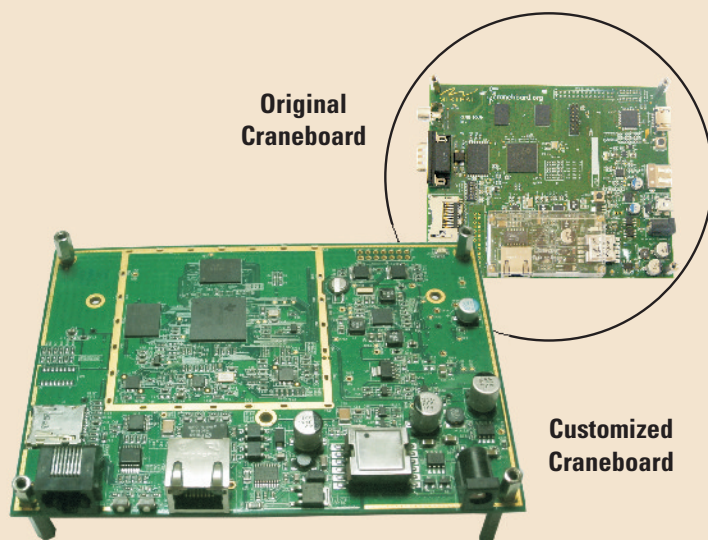
Customization of Craneboard for an Electronic Labeling Solution

Introduction

Mistral's Craneboard is a low-cost, open-source hardware development platform that enables customers to develop general purpose computing and other applications based on the AM3517 Sitara™ ARM® Cortex™-A8 microprocessor. Named among EDN Hot 100 products of 2011, the Craneboard provides robust processor performance while delivering integrated peripherals not found on existing low-cost development boards.

Mistral was approached by a leading player in the area of Electronic Shelf Label (ESL) solutions to customize the Craneboard as an access point for the electronic tag. Mistral's concept-to-deployment services helped in realizing the customer's goal and bringing it quickly-to-market.

This case study showcases Mistral's expertise in providing customization services on its development platform to help adapt it to an end product design for the customer specific application, with a quick turn-around time.



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The Customer

The customer is one of the leading companies for Electronic Labeling solutions.

The Requirement

The customer approached Mistral to develop an Access Point Hardware for one of their electronic labeling solutions. The software would be built by the customer's team and the same would be integrated into the hardware solution developed by Mistral. The customer also wanted Mistral to build the diagnostic software and help them with production of the access point. The following were their key requirements:

- ▶ Providing a cost optimized hardware solution that involved customizing Mistral's Craneboard as an access point for the electronic tag
- ▶ The hardware solution developed by Mistral should work seamlessly with the software that would be developed by the customer
- ▶ Ensure that the design is compliant to CISPR and FCC class B conducted / radiated emissions / susceptibility and ESD standards.

Solution Provided

Mistral designed and delivered the hardware and provided product qualification support. Mistral also customized the Linux BSP for development of quick and effective production test software.

The following key items were addressed by Mistral's team during the design phase that helped in delivering an effective solution to the customer:

- ▶ Since the processor supported dual voltages, the IO voltage was reduced to 1.8V wherever possible (Craneboard was designed to work at 3.3V) to meet EMI/EMC requirements. This included changing major IC's like NAND flash and introducing level translator for MMC/SD card interface
- ▶ The two-chip DDR2 memory solution in the Craneboard was replaced by a single chip LPDDR to reduce EMI. A shield option was also provided

- ▶ Unnecessary interfaces were removed to facilitate cost reduction
- ▶ Mistral developed an engineering diagnostic and production diagnostic software. The diagnostics software tests all the peripherals in detail and identifies issues, if any, in order to make further debugging of the problem much easier. The production diagnostics software focuses on a quick pass/fail test of all peripherals keeping in mind the fastest turn around time required at the production facility.

The Challenges

- ▶ Mistral's team had to adhere to a challenging time schedule which was one of the key requirements of the project. The proto design was validated within two months and the final design was ready for production in four months. The second phase of the project involved mass production of boards over a period of five months
- ▶ With a rigid time schedule it was critical to get the design right in the first spin. This gave very little room for any errors. The team's prior expertise in working on end product designs helped immensely in making critical changes in the design phase that helped to keep a check on any errors.

Key Achievement

- ▶ Prototypes were delivered to the customer in two months from the start of the project
- ▶ Quick and easy integration of customer's hardware, software and mechanicals
- ▶ First pass for EMI/EMC/ESD regulatory compliance
- ▶ After receiving a clearance from the customer, Mistral's team proceeded with the mass production of the boards, which were delivered to the customer in a span of five months.

Customer Benefits

- ▶ Mistral's intricate design expertise in development platforms to end product design facilitated in quick modification of the Craneboard to an end product as per customer's requirements
- ▶ Mistral's prior experience in designing products to meet regulatory compliance helped save valuable development time providing quicker time-to-market value for the customer
- ▶ Mistral being a single source for hardware, software and production allowed the client to get a complete end-to-end solution done at one place. This helped the customer to save time in terms of dealing with multiple vendors, and helped immensely in getting the product-to-market faster.



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