



Mobile tablet charging trolley



Mobile laptop charging trolley

Creating Agile and Adaptable learning spaces with an agile approach to design, development and testing

As more and more aspects of our lives become connected the need for bespoke electronics continues to grow. One of the most eye-catching ideas currently under development is that of 'intelligent furniture'. Armor Associates is working with an innovative furniture company to manage their Intelligent Furniture Programme. They “Plan, design and manufacture furniture to support and inspire learning and make your space work better for you”.

There is increasing use of mobile devices (tablets, chromebooks, laptops) in schools and thus a need to securely store and charge devices so that they are available for teachers when needed. The next generation of “Charging Trolleys” are internet connected and intelligent – supporting notifications (e.g. of number of devices charging, doors unlocked outside teaching hours, location of trolley), remote control (via a web app) and smart charging of devices to save energy and be confident that devices will be ready when needed by a teacher.

Will Steen, founder and director of Armor Associates, explains more; " Soon after starting work on the Intelligent Furniture Programme, we realised that we needed an electronics design partner and a local PCB assembly service. A search identified Newbury Electronics, a meeting with Phillip King followed and then an introduction to Jon Hawkins and the Newbury Innovation team."

He continues; "Our client's ethos is to create 'Agile and Adaptable Learning Space'". From the start of the Intelligent Furniture Programme we have adopted Agile Management approaches to the design, development and testing of new "connected" products. It is important for us to work with partners who can support the Agile development values of:

- Individuals and interactions over processes and tools
- Customer collaboration over contract negotiation
- Responding to change over following a plan

Electronic design expertise, rapid prototyping and responsiveness to design changes are key to enable us to drive product development at speed."

Newbury Innovation has supplied electronic design services to create the manufacturing packs (BoM, Extended Gerbers) from specifications developed by Armor Associates. These manufacturing packs have then been turned into small quantity prototypes using Newbury Electronics (PCB Train), combined with a WiFi enabled MCU module, tested by Armor Associates and then rapidly iterated to production ready designs with electronic and production engineering (assembly) support.

Jon Hawkins, Technical Director, Newbury Innovation, explains more about how the PCBs contribute to the final capability of the products and how this impacts on the initial design process; " The "connected product" design approach starts with an outline of the key features and customer value areas. From this 'user stories' were developed and from these the key capabilities for the hardware components, including the PCBs, are established and form the basis of a design specification or brief which we take as our starting point. To illustrate, one user story was for the Charging Trolley to report over the internet if unplugged from the mains power. This required a battery-backed supply to the micro-controller with the capability to recharge and which could also protect the battery from discharge if left unplugged over the summer holidays. We were able to design and support development of a robust and cost-effective solution."

One of the products is focused on improving learning space (desk) utilisation. This called for a reliable desk occupation sensor. The sensor PCB designed combines a

movement and heat detector with a nano-power amplifier circuit and DSP performed by an MCU that can be programmed over the connected signal line.

Both Will and Jon recognise the value of the close geographical proximity; "We work with several Chinese suppliers of key components and PCBA services. However, working with a local company (30 minutes travel distance) helps support the "Individuals and Interactions over processes and tools", face-to-face meetings rather than skype calls or emails. Newbury Electronics have fantastic rapid prototyping capability and are totally predictable on delivery timescales which is a big plus," said Will.

Armor's main customer is keen to continue to innovate and has a product development roadmap. "Based on our experience to date, we will continue to use Newbury Innovation to support the develop of the electronics in these products following an agile approach," commented Will.

Background

Formed in 2013, Armor Associates have expertise in Technology enabled Business Transformation Programme Management and specifically in providing Technology Consulting and Programme Management of "connected product" development.

Newbury Innovation is one of the few electronic design companies capable of offering a complete solution for every stage of development project. The company provides expertise through the entire electronic design process; from concept through to production and delivery of the final finished product.

It is the design and development division of Newbury Electronics Ltd , which has been trading for 60 years. The company offers its customers some of the most advanced contract electronic manufacturing (CEM) solutions available in the UK. Philip King became MD in 2011, and has overseen over £2m of capital investment in the last 5 years. The company provides a full electronic design, and PCB CAD layout service alongside PCB manufacture and assembly in Newbury, West Berkshire. It employs over 70 staff and is dedicated to the rapid manufacturing of small and medium batch PCB assemblies. Production includes Surface mounted devices, through hole, assembly work and test and rework. Videos showing the various processes can be viewed at <http://www.newburyelectronics.co.uk/newbury-videos/>

Customers can select from any of the company's services and the company is happy to undertake single, bespoke projects through to the design and supply of manufactured lots exceeding 10,000 pcs on its automated SMD assembly lines. It has recently introduced an economical express same day PCB manufacturing service for orders placed before 9am.

As a contract electronic manufacturer, each year, the company produces more than 15,000 different PCB designs for its clients, who benefit from the economies of scale built from the volume of orders processed. To learn more about the company's capabilities visit www.newburyelectronics.co.uk or watch <https://www.youtube.com/embed/I3oYzWglouU>

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