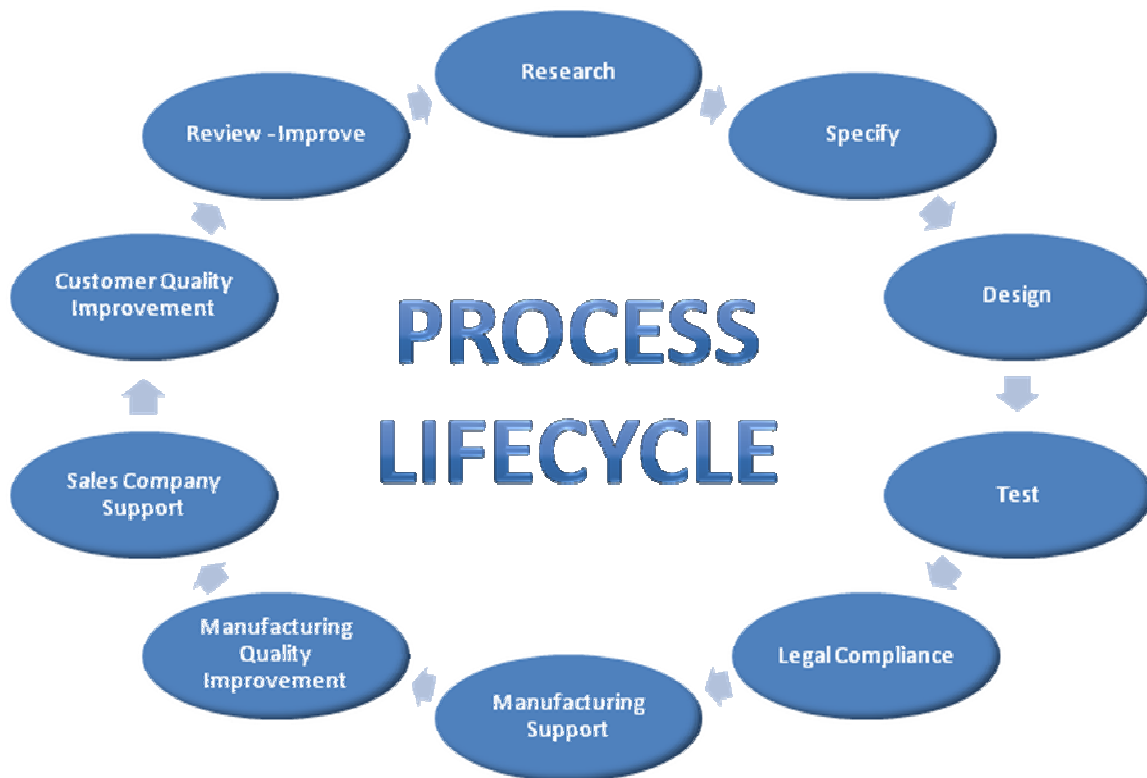


# TV Design Centre UK Capability Overview

12/07/2011 v4

TV Design Centre UK is an R&D/ Product Engineering Business Unit covering European Flat Panel TV developments for Panasonic, from the Research phase through to Manufacturing and Customer support.



The below document is a summarised view of TV Design Centre UK activities and key skills. More detailed information (section by section) is available upon request.

## **Product Development Management**

Managing a team of professionals to deliver complex projects working with Global partners under time, technological and commercial challenges and meet regulatory requirements. We are responsible for setting project objectives and business unit KPI's, driving the project schedule and reporting impact (actual and potential) on the business to the Senior Management Team. Monitoring and implementing continuous improvement of systems and processes to achieve the Business requirements.

### **Keys Skills:**

- Logical approach to problem solving.
- Strong Leadership and people management.
- Driving the business requirements through people and processes.
- Ability to manage multiple complex projects.
- Excellent communication skills in a global business environment.
- Quality management systems and procedures to BS EN ISO standards.
- Cost management, Profit and Loss and budget control.
- Document creation and presentation skills.
- Implementation of best practice and supporting the creation of recovery plans.

## **Electrical Hardware**

The team of highly experienced and professional engineers provide complete hardware solutions in the design of Analogue and Digital TV receivers for the European and Global market. Delivering customised solutions from the initial Concept phase through to Volume Production. Our team offers a wide range of engineering capabilities and skills which are transferrable within the Electronic and the Manufacturing industry. We pride ourselves on delivering the best in performance and quality engineered solutions to meet the market and customer requirements.

### **Keys Skills:**

- Power circuit design, AC/DC, DC/DC, SMPS, Inverter and LED driver design.
- HS Digital circuit design, Digital video and decoders, DSP, FPGA, VHDL, Microcontrollers, C++.
- Analogue circuit design IF/RF, Mixed signal, Audio and Video.
- PCB and Schematic design single and multi-layer, Signal simulation SI and PI, thermal design.
- Conformance testing to internal and external regulatory and product licensing standards.
- EMC Product compliance.
- Quality management systems and procedures to BS EN ISO standards.
- Project management, Concept creation, Design for Manufacture. Costing analysis, Risk analysis.
- Value Engineering, component selection.
- Manufacturing and after sales support.

## **Mechanical**

Provision of mechanical design expertise for the origination, design and development of consumer products, specialising in LCD TV's and associated components.

Experienced in concept generation, product engineering, analysis, verification and development through to production, the team utilise a variety of technologies to provide high quality and cost effective solutions for the European market. We operate as part of the Global Panasonic R&D function and also act independently to provide innovations in materials, processes and products.

### **Key Skills:**

- Knowledge and experience of product design for high volume electronic consumer goods.
- Experienced in component design in plastics, metal and wood as part of complex assemblies.
- Extensive knowledge of tooling requirements and experience in development of tooling for injection moulded plastics and metal forming.
- 3D and 2D CAD operation, including surfacing, to provide 'tool ready' data to demanding timescales.
- Experienced in operation of MoldFlow analysis and proficient in thermal analysis (CF Design).
- Preparation of documentation to industry standard requirements.
- Proficiency in product test and verification to internal, company and industry standards.
- Analytical approach to problem solving and quality assurance approach throughout the process.
- Experienced in collaboration with multiple partners during design and development process.
- Experienced in taking lead role in project management across multi-disciplinary, multi-national teams.

## **PCB CAD, Simulation & Schematic Capture**

Our highly skilled Signal Integrity engineers, PCB Design engineers and model creation system specialists have the responsibility to deliver PCB designs and multi level bill of material to the highest standard, with zero manufacturing defects whilst conforming to Panasonic internal design and safety standards (higher than industry standards).

We work with a right first time design approach, which we achieve by identification of critical circuits and creation of physical design constraints to ensure that the required level of electrical performance and all key DFM and DFT Requirements for high volume manufacture are maintained. This is achieved whilst working against very aggressive schedules and time to market requirements.

### **Key Skills:**

- Layer stack design & impedance control design.
- Termination & Topology optimisation, Electrical to Physical conversion.
- PCB Library management & technology file creation.
- Layout constraint creation & constraint driven PCB design:
  - DDR, DDR2, DDR3, PCI, PCI Express, HDMI, and SATA.
- High density PCB design:
  - 1-24 layers, micro via, blind and buried, via in pad, HDI.
- Design for Manufacture & Design for Test optimisation.
- 3D Modelling, PCB thermal analysis.
- Schematic creation and maintenance.
- New model creation & BOM maintenance.

## **Product Compliance / Regulatory Affairs / CE Marking**

Product Compliance is an established laboratory providing testing and certification services in the fields of Safety, EMC, and Environmental Compliance and operates as a single window for Europe on all regulatory matters. We ensure that all products comply with local and international regulatory requirements before products are launched, and that compliance is maintained throughout the manufacturing life of the product.

Product Compliance Laboratory operates within the ISO17025 Laboratory Quality System, and is accredited by Intertek and UKAS.

### **Key Skills:**

- Quality Systems: Operation of an ISO17025 accredited laboratory.
- EMC testing: Emissions testing to EN55011, EN55013, EN55022, EN61000-3-2, & EN61000-3-3  
Immunity testing to EN55014-2, EN55020, EN55024.
- Safety testing: Testing to EN60065 - Recognised as an SMT by Intertek for issuing CB test reports.
- Environment: Evaluation of compliance with RoHS and ErP Directives.  
Power Consumption testing to EN62087.
- Certification: Extensive experience of working with National and International certification bodies.
- Planning: Preparation of comprehensive test / assurance plans.
- Control: Preparation and retention of Technical Files to support CE Marking.
- Research: Active involvement with UK / European working groups/committees.

## **Product and Business Development Group**

The **Measurement, Analysis & Improvement Team** measures key areas of the business & product, collecting data from all concerned internal & external parties - Japan, factory & final customer. They analyse trends in data and identify areas of the business & product requiring improvement and support the management team to implement those improvements.

The **Business Development and Research Team** monitors the market trends with the aim to understand the business environment, competitor strengths and weaknesses. In depth competitor benchmarking is conducted, focusing on construction, costing and concept analysis. Utilising this data create forecast models to support the strategic decision making processes.

The **Control Team** assure and deliver the best possible product on time with zero problem leakage to the factory monitoring the Quality, Cost and Productivity. With additional activities of LCD panel optical analysis and new parts approval.

### **Key Skill:**

- End to end development support (Research – Product Development – Global Manufacturing).
- Global customer relations (Manufacturing sites – Sales companies – Press – Consumers).
- Quality management system control (ISO9001:2008).
- Information security management control (ISO 27001).
- New business process implementation and control (Six Sigma, 5S, Balanced Scorecard, etc.).
- Business environment analysis (PESTEL & 5 Forces).
- Research and report. Benchmarking (Product and Competitors).
- LCD panel coordination and optical analysis.
- New Parts Approval – Functional test, Reliability life testing, RoHS and WEEE confirmation.

## **Technology Research and Business Development (Launch Team)**

The Technology Research and Business development section has the responsibility to establish, verify and define the product design requirements for the present and future. This is achieved through a number of key activities. There are industry meetings and seminars where discussions on specifications and standards for products are determined. Digital TV broadcast analysis and monitoring remotely, and in the field, within UK and throughout Europe.

### **Key Skills:**

- Extensive DVB and other related Digital TV standards/specification knowledge.
- Significant contribution to industry standards / specification development committees.
- Analytical approach to specification interpretation and derivation of design requirements.
- Strong ability to identify, develop and design tools to aid the job function.
- Analytical and pro-active approach to broadcast transmission changes and product functionality.
- Analytical approach to investigate, analyse and identify the cause problems reported in the market.
- Analytical approach to evaluate competitor products on functionality, ease of operation and technical solutions.
- Strong ability to gather related information from multiple sources and report on key elements related to the business objectives.
- Strong ability to identify and analyse new market opportunities.

## **Software Development Team**

The primary function of the software team is the design, development and maintenance of embedded software for UK and European integrated digital flat panel TV's. This activity covers the full development lifecycle, from requirements analysis, specification creation, implementation, debug, conformance testing and final delivery for mass production.

### **Key Skills:**

- Requirements management (analysis of latest industry standards, impact analysis and tracking of requirement changes).
- Specification creation (high level functional specs, low level technical specs, integration test specs).
- Real Time Software development (Embedded C running on Linux & FreeBSD operating systems, embedded C running on RTOS also C and assembly language on single chip micro targets).
- Coordination of 3<sup>rd</sup> party software vendors and integration of their deliverables.
- Communication and negotiation with key stakeholders, including broadcasters, platform providers and approval bodies.
- Integration and regression testing, including analysis and construction of the necessary test material and environment.
- PC Software development - PC based fully automated test system.
- Project management of activity throughout the development lifecycle.

## **Digital Product Assurance**

The Digital Product Assurance section performs independent testing to meet market and industry requirements. Product testing is achieved in both the live environment and Industry specified compliance environment, staying up to date with technological advances. The test team applies knowledge, experience and ingenuity to develop solutions for efficiently testing products and solving/analysing problems.

### **Key Skills:**

- Extensive test methodology and implementation process knowledge.
- High level quality assurance skills based on industry standards.
- Disciplined project management capability ensuring continuous control and visibility.
- Strong product test capability based on extensive knowhow and self-generated documented system.
- Automated test system development experience.
- Industry standard test implementation based on disciplined engineering approach (currently focusing on DVB).
- Analytical approach to product concepts in order to clearly define test requirements.
- Independent test philosophy enabling strict quality judgement criteria.
- Extensive DVB knowledge.
- Direct contribution to industry standard development committees.

## **External Product Design Service Business**

### **e5d (Engineering 5<sup>th</sup> Dimension). [www.e-5d.com](http://www.e-5d.com)**

e5d is a small business unit operating within TVDC environment with separate headcount & budgets providing independent P&L accounts.

The service has been in operation since 2004 when the first customers were Panasonic European R&D Centres. In 2009 the service was expanded to external customers, resulting in us providing industry leading performance in the area of PCB design and virtual engineering and simulation.

### **Key Skills:**

- Hardware Development – Schematic creation, Circuit Review & Bill of material.
- PCB Layout- High Speed, RF, Analogue, Power supply, Micro Via to High layer count. 2D & 3D Modelling, DFM, DFT & Collaboration Design.
- Simulation Design – Signal Integrity, Power Integrity, Thermal Simulation, DC & AC Analysis in a Virtual Engineering world.
- Project management – Including part procurement, PCB Manufacture and Assy.
- EMC & Safety compliance - Radiated & Conducted Emissions, Immunity, ESD, Fast Transient, Burst, Surge immunity, Voltage Dips & Harmonics'.
- Business Development - Benchmarking, SWOT & PESTEL, customer service and new business development.
- Marketing - New Website & E-shot campaigns.