

dB Broadcast reflect on their role in the largest broadcasting engineering project ever undertaken in the UK – Digital Switchover

The digital switchover programme (DSO) completed in 2012 was the largest broadcast engineering project ever undertaken in the UK; everyone in the UK who watches TV was affected. dB Broadcast, one of the UK's leading system integrators and established supplier of Programme Input Equipment (PIE), played a central role in delivering this critical national infrastructure up-grade on-time and on-budget. The team reflect on their role in making the UK's transmission network fit for the 21st century.

dB Broadcast (dB) were first appointed to manufacture, supply and install the PIE bays and on site infrastructure at all 90 UK main transmitters. As work progressed parallel projects were introduced such as the upgrade to the new DVB-T2 standard (providing HD and other benefits to the UK), and the manufacture, build and installation of monitoring and protection systems for high powered transmitter sites.

Tom Swan, dB Broadcast's Director of Sales and Marketing, says: "We were independently appointed by both of the original DSO network providers, Arqiva and NGW (National Grid Wireless via Rohde & Schwarz). This was a real endorsement of dB's expertise: our in-house engineering knowledge, quality of installation services and our ability to develop and manufacture bespoke products cost effectively."

"Working to a fixed timetable, the contract itself was massive, with the manufacture, installation and commissioning of over 550 bays at 90 key sites across the UK. These bays included routers, MPEG-2 analysers, SI managers, network and distribution equipment and more than 500 Hawkeye frames with over 2,000 modules. Hawkeye is dB's modular product range which monitors and switches all types of broadcast signal. We also supplied 350 of dB's Cardinal MDUs and nearly 1,000 of the company's MERlin DVB-T2 monitoring receivers."

dB Broadcast DSO Project Facts

- Four year programme across the entire UK from the tip of Scotland, across NI and Wales to the south of England
- 250,000 miles travelled
- 550 bays installed at 90 main transmission sites
- Prefabrication and testing at dB's factory
- 500 Hawkeye frames with over 2,000 modules
- 1000 MERlin DVB-T2 monitoring receivers provided for relay stations
- 500km of cable
- 20 dB staff involved

The installation journey of 250,000 miles...

“The installation side of the project has been a real journey,” James Sparkes, dB’s Lead Installation Supervisor says. “In fact, it’s been literally a journey of over 250,000 miles for the team! We’ve been to some of the most remote and beautiful parts of the UK – and driven along what feels like all the UK’s roads! This project required considerable logistical expertise and planning. Initial site installations were a learning curve and remote sites with low viewer populations were the first to be upgraded. This is where the levels of pre-planning really paid off as we had built in flexibility to manage practically all eventualities.



Risk management and time management was a constant focus on the project and we were pleased to hear from Arqiva that they gave dB a ‘Gold Star’ in terms of project performance.”

“Combining manufacturing know-how with broadcast expertise streamlines development for large programmes.”

Prefabrication of the PIE systems was essential to keep onsite costs to a minimum and the flexibility of dB’s designs allows different system architectures to be built within common frameworks. This enabled the team to prefabricate and install location specific systems, addressing differing transmission and programme input situations that arise across the UK.

Enhancing value on large programmes

- Experienced teams
- Investing in pre-planning
- Extensive use of off-site prefabrication and testing
- Utilising manufacturing expertise
- Build in upgrade capability

“Managing the dB Broadcast works from the Welsh Valleys to the mountains of Scotland and to central London threw up many different challenges along the way”, states Stuart Osborne, dB’s lead Design Engineer on the DSO project. “Our in house knowledge and expertise allowed for a very productive and confident design phase. Standardised design configurations were rolled out across the 90 sites, with around 20 requiring specific tailored development. We’re fortunate, and a bit unusual at dB, in having staff with extensive production engineering experience. With their input we can be extremely cost effective when manufacturing at scale. The strong dB team ethos has paid dividends in providing the required on site flexibility while keeping the project on schedule.”

“Everyone will say that their approach to clients is to be as cost-effective as possible and of course we say that also,” adds Tom, “but I see it very much in the culture of dB to also support the customer as the operational requirements change throughout the project; reflecting on the DSO programme you can see this in a variety of areas. Where a return site visit was needed, work was undertaken on live systems and this involved careful planning and liaison between our customer and dB’s engineering team. On-site time was minimised with extensive prefabrication and testing at our factory allowing dB to remain competitive even when further engineering visits were required for design upgrades as the project progressed. We build cost-effectiveness into the process from the very beginning.”

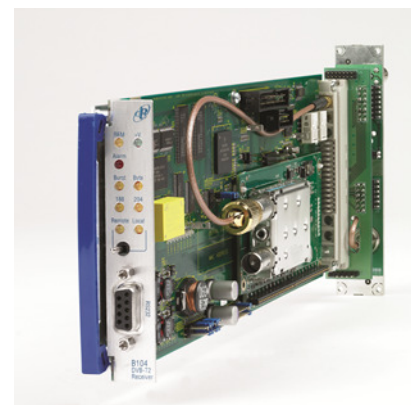
“Working at the forefront of broadcast development means you must have a flexible approach to product development.”

“As anyone working in the broadcasting market knows, things never remain the same for long, and so there were bound to be developments over the period of such a large rolling national-wide programme”, continues Stuart. “The main change was, of course, the move to DVB-T2 in the UK.” DVB-T2 is the second generation of the Digital Video Broadcasting Terrestrial standard. This standard provides higher bit rates for compressed digital audio, video and other data suitable for carrying HD content within the multiplex. Freeview HD launched in December 2009 and now provides HD channels to 98.5% of the population.

“DSO had already started but the engineering team were able to rapidly develop a new plug-in DVB-T2 replacement module (the Hawkeye B104 module) and establish an easy

equipment upgrade path which did not affect the core installation.”

“It’s what you would expect when you’re working at the leading edge of global broadcast development”, Stuart, who also worked on the original UK DTT broadcast upgrade project, continues. “Like many critical path systems, PIE design is based on the principle of ‘no single point of failure’ and the DSO project was no exception. Some of the transmitter locations are extremely remote meaning many hours until an engineer could reach the station to resolve any problems. This could lead to an outage which would be unacceptable. Because of this all of the PIE transmission chain must be monitored and in all cases controlled remotely – this is done with dB’s Hawkeye product range.



B104 Hawkeye DVB-T2 monitoring receiver module



dB Broadcast's Cardinal Mains Distribution Unit

The intelligent monitoring and protection system ensures that not only the transmitter equipment and mast is operating safely, but that the integrity of the whole site is intact. dB's products team worked to very tight timescales to develop the new Cardinal Mains Distribution Unit (MDU) range with web and SNMP interfaces giving easy access to sophisticated remote control and configuration facilities. This allows the PIE mains power system to be monitored and controlled remotely. Unlike other units on the market, the Cardinal intelligent MDUs provide last minute SNMP messages before closing down if they lose mains supply. It also reverts to being a standard dumb MDU in the event of an internal PSU or controller failure – vital features for remote transmitter sites.”



dB Broadcast's MERlin Unit

The 1000 relay stations around the country were supplied with dB's DVB-T2 monitoring receiver, MERlin – another product developed during the programme. This compact 1RU self-contained unit is based upon the hugely

successful Hawkeye B104 receiver module and includes a built in web interface for simple remote control and monitoring and an SNMP interface for integration with Network Management Systems. Tom says, “MERlin was a natural choice for Arqiva because it combines measurement capability and technical performance at a price which enabled wide scale deployment – in this instance at all the signal relay sites across the UK transmission network.”

“I'm extraordinarily proud of the whole team involved in the DSO programme,” says David Bird, MD of dB. “The team built a close and effective relationship with Arqiva – a vital ingredient on a programme like this. We had 20 dB staff dedicated to this massive and challenging project and they consistently delivered to a very high standard of quality on time and on budget. The team truly reflected what we believe in – setting and then exceed industry standards in broadcast systems integration, product development and customer service.”



Summary Project History

2007 Tenders and Testing

- Working with both Arqiva and NGW
- Testing at Whitehaven

2008 First DSO Switchovers

- dB design and prefabrication
- (April) DVB-T2 transmission format agreed
- (May) dB's first installation
- Arqiva and NGW teams merge
- (Nov) Selkirk in Scotland first official switchover site
- dB develops Hawkeye B104 for DVB - T2

2009 First DVB - T2 installations

- dB continue DSO installations
- DVB-T2 parallel upgrade catch-up installation programme starts
- (May) West Country and Borders installs complete
- (July) Grampian installs complete
- dB enhances Cardinal product range with temperature sensors and remote user notification
- (Nov) Wales installs complete
- (Nov) Granada is first DVB-T2 installation with new B104

2010 First DVB-T2 Switchover

- DVB-T2 installations continue
- (April) Grampian installs complete
- dB's Hawkeye B104 officially launched at IBC2010
- (Sept) Freeview HD available to 77% of population.
- (Nov) BBC One HD launched

2011 Getting Olympic ready

- DVB-T2 installations continue
- (May) Anglia and Central installs complete

2012 UK DSO Complete

- Final installation complete
- Nearly 1000 MERlin DVB-T2 receivers provided for relay stations
- 24th October Final switchover at Divis in N. Ireland
- Freeview available to 98.5% of the UK population