Only Connect

The BBC's flagship Broadcasting House in London's prestigious West End is a classic Grade II listed 1932 art deco building, the interior of which is being completely transformed and the complex extended to meet 21st century broadcasting needs with a vengeance – and with a DELEC intercom

About the Author:

Chris Collings, managing director of UK MEDIAGROUP distributor Aspen Media, was intimately involved in the development of the concepts for the new BBC Broadcasting House intercom system.

It's a huge project. Not only the buildings, but also the whole infrastructure, studios and operating practices are all being updated to meet the challenges of the new millennium. This is a good opportunity to amalgamate the multitude of communication and intercom systems, which have developed organically over the years, into one integrated system. An ideal task for SALZBRENNER STAGETEC MEDIAGROUP's intercom specialist DELEC and its scalable digital intercom system.

The project

The development is divided into two main phases. The first phase of the rebuild will provide new facilities for the BBC Radio Networks, scheduled to be in use in 2005. The second phase will bring the production facilities of the BBC World Service into the same building, with a brand new wing to Broadcasting House also accommodating BBC News. The new building will have six television studios and 140 acoustic spaces – and requires a lot of communications.

Each phase will involve the construction of a new Central Apparatus Area (CAA), Central Control Room (CCR) and a number of operational areas, each with a Local Apparatus Room (LAR), and associated Control Cubicles, Voice Booths and larger Studios. The DELEC system provides a flexible solution to the BBC's site wide voice and signal communications, bringing together many radio studio functions into one system.

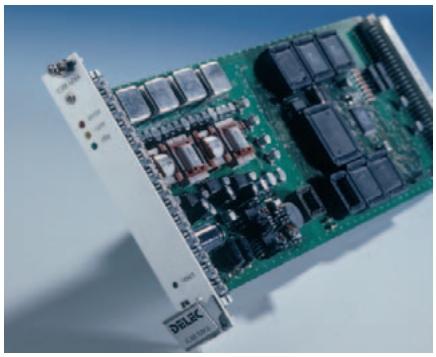
Island life

The heart of the intercom is a central router, a 3U 19" frame which can house up to 16 matrix cards equipped with fibre optic connectors. Each matrix card can handle 128 bi-directional ports, which facilitates a maximum of 2,048. This system architecture is synonymous with NEXUS STAR and NEXUS as the DELEC router is connected via fibre optic cable to the I/O-frames of the system. This allows for a highly distributed system architecture – a key feature of the BBC installation.

About BBC Broadcasting House

In the new Broadcasting House, headquarters of the BBC's national radio networks, World Service and domestic news will be brought together in one building. A live newsroom will be the largest in the world. The first phase of the five-year project involves a complete internal and external refurbishment and refit of Broadcasting House.
The 'state of the art' complex will also have a major impact on the local environment. Public spaces will provide performance zones, cafés, exhibition/art installations, and a children's media workshop.

The BBC central router is equipped with six matrix cards, a total of 768 ports. In this installation, the central intercom router system is an island with secure paths to the satellite LAR racks with DELEC I/O frames. Each frame unit is both a local intercom matrix and the I/O unit for the central intercom router. This means within each Studio group, local facilities and control remain available even in the unlikely event of catastrophic failure of the central router or links.
Each matrix frame also adds additional ports to the system. In total, the BBC intercom system will be equipped with nearly 1,000 ports for Phase 1, and close on 3,000 ports at the completion of Phase 2!



Dual function

The primary function of the locally installed intercom frames is to provide the necessary inter-area communications for Radio Production and multiple studio interoperability and other control functions via GPIs. Thanks to the AES I/O, the new intercom system is also able to handle Speak-Over-Cue, Interrupted Foldback and Listen-to-Music functions, which proved to be the most economically advantageous method of implementation.
The LAR frames also provide the connections to the Subscriber panels installed in the Radio Studio cubicles. The same panels are used for the primary LAR functions and communication with the CAA system. So, to make the LAR frames independent of the CAA system, the subscriber panels have separate, dedicated paths directly to the fibre interface cards and onwards to the CAA system.

Solid standards

The DELEC system uses an SQL database to store configuration data. This allows the intercom system to be integrated with many studio applications because it is easily addressable by any SQL client application.
BBC Technology's networked control system Colledia Control, formerly known as BNCS, which controls all the main switching functions within Broadcasting House, will also talk directly to the DELEC hardware, enabling tallies to be returned from the system, on completion of the remote function, in less than 200 milliseconds.
Apart from the SQL standard, the DELEC system is based on another proven technology: the CANbus serial Control Area Network protocol, which is used for the internal communication within each DELEC unit. Although not yet well known in audio circles the CANbus is probably one of the most successful serial bus protocols ever developed. It offers significant advantages for multi-master real-time, fault tolerant systems.

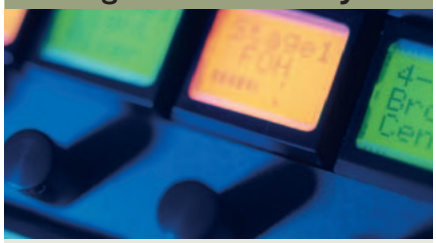
Safety in numbers

The DELEC back-planes within each frame, which carry the TDM audio and control bussing are passive. Hence, with the distributed processing and control installed on each 4-port input/output card, there is no single point of failure that would disable a complete frame or the whole system! This is especially significant in large systems like the BBC's.
For a system equipped for total redundancy, two central routers can be connected to all the frames and the BBC eventually decided to install just such a fully mirrored system, with a second central router in stand-by with automatic take-over functionality. In the final configuration a dual central router system will be installed in each of the two separate Fire Cells. In the event of a catastrophe affecting one CAA, the other will remain fully operational. These strategies reduce the impact of component or assembly failure to an absolute minimum: one card or four stations. The malfunctioning card can be hotswapped without interrupting system operation.
In daily use another even more important feature is that operationally there will be absolutely no blocking, i.e. all specified routing options are available even when a vast number of stations are in use.

We have the power

Fault tolerance is no use if the power supply fails. The systems feature two dedicated power supply racks, either of which can run the system alone. Each has seven modules feeding a common bus; hence the failure of a module is an insignificant event. As with all other modules these can be hot-swapped. This provides strong protection against power supply module failure and, by powering each rack from a different power source, against the loss of a mains power feed or phase.

Armageddon for acronyms



DELEC subscriber panels use Tricolour LCD graphic call keys. The LCD display shows either the global system name for a destination, an alternative local name or one provided by the Colledia control system. Up to 18 characters can describe the destination, group or conference to the operator in clear English. The status of a key is indicated by the colour of the LCD panel with Green as the default setting, Yellow for Listen and Red for Speak.

The heart of the matter

The BBC is famous not only for independent journalism but also for being a technological leader in broadcasting. For both journalism and production, communication is essential. The new intercom system's reliability and ease of use, plus scalability and the right features combine to help maintain BBC Broadcasting House's position as a technological flagship forever sailing down Portland Place. ■