

## Leading-edge technology for a 21st century radio station



After moving out of its old studios on Bilbao's Gran Vía, Radio Euskadi has completed the move into its new headquarters, located in the city's former Trade Fair Center (Feria de Muestras) across from the San Mamés soccer stadium. Between studios and recording booths, 13 digital mixing tables were installed, as well as a matrix with five 1024 x 1024 frames enabling a colossal flow of signals among the various local stations and facilities. In the realm of news broadcasting, Radio Euskadi has consolidated itself as the reference radio station in its region, with excellent sound quality thanks to the integration of the latest technology. \_ A. Castillo

**T**he media that make up the Basque regional government radio and television broadcasting authority (EITB, in its Basque initials) have just opened a new headquarters in Bilbao. Located in pavilions 7 and 8 of the former Trade Fair Center (Feria de Muestras), this new facility brings together radio, television and Internet services. Although the television section is still completing its "move" from the old Iurreta headquarters, the radio division is fully operational on the new premises located across from the emblematic San Mamés soccer stadium. The old studios on Bilbao's Gran Vía are history now that the Basque regional broadcaster has begun its work in a gigantic multimedia newsroom for TV, radio and Internet with a

surface area of 3,000 square meters and a height of nine meters.

During opening ceremonies for the new facilities, EITB General Manager Andoni Ortúzar emphasized that, in this multimedia project, "we have taken care over both the audiovisual project—since EITB has the opportunity to construct a digital headquarters in a new building, a facility integrating all our services and bringing forward what will be the confluence of the media—and the architectural design, because we want to place ourselves on a par with the new Bilbao". Radio Euskadi is the Basque government broadcasting authority's main station; other member stations include Radio Vitoria,

Euskadi Irratia, Euskadi Gaztea and Radio EITB. Radio Euskadi began its FM broadcasting operations on March 31, 1983, and by the 1990s was also transmitting on medium wave; in 2000 it began satellite broadcasts, and the year 2003 saw the start of Internet broadcasting.

### Facilities

**R**adio Euskadi occupies part of pavilion 8 of the former Bilbao Trade Fair Center. It consists of six studios, one of which can accommodate a live audience, and several editing rooms. From this impressive new headquarters in Bilbao, EITB broadcasts its programs while also contributing and distributing its own programs to the territorial broadcast



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centers in San Sebastián, Vitoria, Pamplona, etc., thus generating a copious flow of signals. Its new headquarters is the largest and most complete digital radio equipment facility developed and manufactured in Spain. The Madrid-based firm of AEQ has played a special role in the new Radio Euskadi. AEQ supplied and integrated key elements in the new facilities, such as its Arena digital consoles, the BC2000D matrixes and the Systel multiconferencing system.

The new Radio Euskadi headquarters consists, basically, of a central control room in which the AEQ BC-2000 Router digital matrix is installed, as well as the entire AEQ Systel 6000 communications management system, a main studio with two live broadcasting sets (for news and programs), four control-broadcasting studios, three self-monitoring studios and four recording booths. Each of the booths is equipped with a "mini" AEQ Arena console with Eagle Real-time Control for recording telephone calls. Both the studios and the booths come with an acoustic treatment based on Auralex surfaces. When EITB was contemplating moving its radio broadcasting facilities to a new location, a working group made up of a dozen EITB professionals assessed and tested several intercoms and tables, to include equipment manufactured by Labor, DHB y AEQ. They finally decided on the AEQ Arena because of its extraordinary modularity and versatility. That versatility finally made it possible to integrate the console into all of the studios, self-monitoring facilities or recording booths with the most varied needs, without any reduction or variation in the functionality with respect to what the Basque authority

had planned. Because the main control room has two live broadcasting studios, one for news and the other for programs, it is equipped with two AEQ ARENA mixers with 25 and 15 faders, respectively. Control rooms 2, 3, 4, and 5 are also provided with AEQ Arena mixing consoles with 25 faders each, while self-control facilities 6, 7 and 8 have the same console, but in a 15-fader configuration. The Arena, in this case with five faders, is also installed in each of the recording booths. Independently of the composition for each of the studios, the functional characteristics are invariable. Each Arena includes headset amplifiers in its BC-2203MH output boards. Each board has two independent outputs to which ten 600-Ohm headsets can be

connected with no need to connect external headset amplifiers. From the programmable buttons on these mixing consoles, or from the external button units, GPI and GPO functions of console peripheral equipment can be controlled. Each console offers capabilities for controlling monitoring operations, signaling, cough muting, etc., and it is even possible to control more than one live broadcasting set simultaneously by keeping the signaling independent. All these signaling, audio muting, GPI and GPO functions are fully identified on the console; they are an integral part of it, and there is no need to have any external equipment to handle these functions. One of the advantages of the console selected by EITB is the fact that its control surface is completely



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Goio Torrontegui, technical services manager for Radio Euskadi, and AEQ engineer Javier Ferrer configuring one of the editing booths

modular, which enables its users to locate different control and fader modules on the console surface, placing them in different positions according to the preferences of each station. Thus, the channel ON/OFF pushbuttons can be placed above or below the faders. Each group of faders and its associated parts are composed of groups of five potentiometers. The link between frame and surfaces is ensured by means of a single category 5 cable via IP protocol. Because each surface and each frame has a different IP address, it is possible at any time (with the supervisor's authorization) to connect any surface in the station with any control frame.

Each set of faders (fader module) is made up of five 100-mm motorized sliding potentiometers made of conductive plastic

(optionally, P&G). Each fader has a display to indicate the currently active audio source in the channel, as well as the pan or balance of the channel; the fader also has a rotary encoder / gain pushbutton and an input option menu access selector in each of the channels.

All of the audio processing is accomplished in the board frame, including all of the system control and memories. Because all of the configuration is in the frame, the replacement of any component (programmable keys, pushbuttons, potentiometers, etc.) of the control surfaces, and even the total replacement of the entire control surface, can be accomplished without stopping the broadcast audio at any time. Once it is reconnected, each pushbutton, sliding potentiometer, label, etc. recovers its operating state, with automatic

positioning of the faders. Although the analog or digital outputs of the table can be used to connect any VU meter, peak indicator or phase meter (in the EITB installation, each console is connected to Dorrough VU meters), the console itself is equipped with two completely software-programmable VU / peak meters with high-precision LEDs, as well as level indicators for all the console inputs and outputs.

## Matrix

With a capacity of 1024 x 1024 audio signals (100% summing / distributing), the AEQ BC-2000 D Router matrix chosen by the Basque public radio authority uses the same hardware utilized in the AEQ Arena audio console, a feature that makes maintenance easier.

The fact that this equipment is a switching and / or summing matrix enables its users, for example, to disconnect Vizcaya from the table itself without the listener being aware of the disconnection (summing the digital synchronization of the table and the matrix via AES). In the configuration installed at EITB, all the audio inputs and outputs are made through AES / EBU connections. For this reason, only two types of audio connection boards are used: AEQ BC-2202 boards, which are input / output boards with GPI and GPO for each connection. These inputs / outputs can be configured in AES / EBU mode or SPDIF mode. Further, they include sampling rate converters (SRC) in the inputs and outputs, and are able to force the output of the same board to a different sampling rate. The other type of boards used at EITB are MADI connection boards capable of transporting up to 64 input audio channels and 64 output audio channels for each of their two links. One of these was installed for each of the studio consoles; each console simultaneously has an optical fiber connection and a copper coaxial connection.

The matrix has all the security elements needed for proper system operation. Outstanding among these security features are the silence detectors (with automatic changeover to another output or input in case the programmed time margin is exceeded) and timing error detectors (with changeover or activation of a pre-programmed function to solve the problem); switching agenda by hour, sequence, GPI, manual...; redundant power supply with dual feed input; alarm notifications by software and in the boards themselves signaled by error LEDs; dual redundant controller; hot-swapping of



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## 25 años



Detail of the Radio Euskadi machine room, where the AEQ-supplied 1024 x 1024 BC2000 Digital matrix stands out.



The Basque public radio network keeps a total of 32 ISDN consoles continuously active (these consoles are managed from this Systel 6000)

audio boards without disconnection or noise in the audio; back-up system in the process DSPs—a DSP is configured in standby mode and, if any DSP in the frame fails, the standby DSP takes over for the failed one; and hot-swapping of the frame cooling fans, with no need to disconnect the frame. Physically, the matrix supplied by AEQ to EITB consists of a main frame and four satellite frames. The main frame performs and manages the principal functions of the matrix, crosspoints, additions, processes, etc., and is connected with the rest of the frames through dual MADI boards capable of managing 128 time slots of the general system TDM bus. The rest of the frames support MADI communications with the 13 AEQ ARENA consoles, and the digital audio boards for all the signals in the system (32

per studio and 16 per recording booth), including the 40 ISDN lines coming in from the SYSTEL 6000 communications manager. The Basque public radio network keeps a total of 32 ISDN consoles continuously active (these consoles are managed from the Systel 6000), from which the usual collaborators participate in programs or send in their reports with impeccable sound quality.

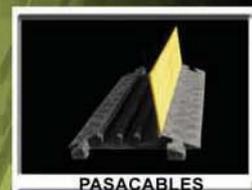
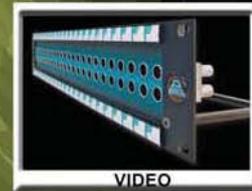
There is also one redundant frame which is wired from the consoles with AES digital lines so that, if the MADI optical fiber network were to go down, the system would continue operating with an acceptable minimum number of signals.

The installation also has, for the AEQ BC-2000 D Router matrix, remote programmable panels of the NCB 100 type, with 12 access and switching keys, LCD status display and recording, call and programming keys.

It should be emphasized that AEQ, from its headquarters in Leganés (Madrid), maintains a continuous remote monitoring and supervision of the operation of all the systems installed on the Radio Euskadi premises so that, if any anomaly were to arise, AEQ technicians could intervene immediately. Even so, most of the systems implemented in the Bilbao station have a first level degree of redundancy that is fail-safe.

For file and automation management, Radio Euskadi chose the Lexon GDS system with a capacity for 5,000 hours of audio recordings. Each GDS management PC includes a Digigram 4:2:2 board with two inputs / outputs. A Lexon Prologger continuously records 16 signals from as many tuners in order to place the audio from any preselected radio signal coming from other stations at any writer's or editor's disposal.

Each of the studios has four monitors, from which the following are controlled: the matrix, GDS editing, and the Systel (with touch screen); the fourth monitor is dedicated to office automation applications. Each studio is also equipped with Tannoy digital loudspeakers for audio monitoring, AKG headsets, Sennheiser microphones, a Yamaha SPX 200 multi-effect processor and a Denon Professional CD player. With regard to the intercom, all the rooms at Radio Euskadi headquarters are interconnected by an RTS Zeus II system. The processors for the transmitted signal for Vizcaya, Guipúzcoa and Álava are Urban 9400 Optimod models for MW and Optimod 8400 for FM. The master clock is generated by an Evertz 5600 MSC and a Gorgy Timing for the time signals. The AES clock is a Leitch 6800. ■



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GOIO TORRONTGUI, RADIO EUSKADI TECHNICAL SERVICES MANAGER

## “All of this was practically set up in one month... which seemed impossible at first”

A Technical Engineer trained at the Mondragón engineering school, he was Technical Office Head for three years in the world of hi-fi at Gogar, a Grupo de Mondragón cooperative enterprise devoted to loudspeaker manufacturing. Aged 52, Torrontegui has dedicated half his professional life to Radio Euskadi technical services.

☛ A. Castillo

**In a project of this size, what was the greatest challenge?**

The start-up deadline was a very important question. All of this was practically set up in one month. Anyone who knows what new installations are like would consider that practically impossible. The effort put in by the AEQ and Radio Euskadi professionals has been tremendous. Between studios and recording booths, we've integrated 13 BC 2000 mixing tables and a matrix that has five frames. Getting all this started up has been the hardest part.

Another challenge, for example, was the training. Although our people knew some tools that were used in the old headquarters, and that have been integrated into this facility, the tables are different, and the management of the system is different. Even the Lexon GDS that we were already using on our previous premises is making its debut here in a new version. The fact that each editing PC has access to the GDS has changed our working approach a lot.

**The Basque radio and television approach has always been multimedia, but what will the integration of radio into this platform be like?**

The first step is for ETB to finish the move and wind up the installation, which is now about 90% complete. And then there's a tool that is very powerful—the MAM, which will enable us to work with radio, television and the Internet.... While we'll continue to do television and radio as we have until now, using familiar applications for each medium, both now have a common database, which is the MAM, and any of us can use Windows Explorer to access and know the contents of EITB. So all of us share everything with each

other in radio and television.

Any Radio Euskadi writer or editor can access all of the television contents and vice versa. There's a gateway between TV and radio that tries to exchange audio files from the two media. It's a first step toward integration, although there'll be many others.

**What type of protocols are used in the new broadcast center?**

MADI is used between the studios and the central control room, and AES/EBU between peripherals and the studio and between the editing and digital audio play applications. A much less used protocol is S/PDIF, which we turn to only in cases when MiniDiscs are used, and in monitoring loudspeakers.

**What is the configuration of the working network that connects the local stations?**

We work with a 70 MB data line between the Bilbao headquarters and San Sebastián, and a 50 MB line between Bilbao and Vitoria. Those two lines give us more than enough capacity—after all, a connection via GDS barely consumes 256 kbps.

**You have major medium wave operations in the Basque Country. How do you see the development of DRM?**

I'm not entirely sure. What I am sure about is that DAB is dead for us, and that DRM could be the future. In principle, there are plans afoot to conduct tests in DRM with the broadcasts in the Basque language.

**For AEQ, EITB has become a worldwide flagship installation because it's one of the most complete and complex installations the firm has done. Why did you choose AEQ?**

**Were the table and matrix joined together in your minds when the decision was made?**

It was clear to us from the outset that the tables and the matrix could come from two



different manufacturers, but we felt it would be advisable for them to come from the same one. In a very exhaustive evaluation of tables and matrixes, the equipment offered by the suppliers that entered the competition for the Radio Euskadi project were analyzed. There was an evaluating group of twelve people that were present for the presentations made by the three suppliers. A very meticulous process was undertaken for the study of each table and its functions; we tested up to 50 of the most usual operations performed in radio. We evaluated each one of these operations, and then the evaluating group assigned a score to each step. The scores were tallied, and the outcome was an overall grade for each table and each matrix. In the end it turned out that the highest scoring table was AEQ's, and the matrix with the highest grade was also an AEQ product. ■