



# ARENA

## AEQ ARENA



**DIGITAL AUDIO MIXER FOR  
RADIO AND TELEVISION BROADCAST**

# Main Features

The **AEQ ARENA** is a digital mixing console for radio and television broadcast applications. It is specifically designed for controlling on-air transmissions, can easily be adapted to any working environment. The ARENA incorporates all the features needed for any working situation: automatic monitor cut-off, cough muting, fader start, control signaling, control signals for the automation of external equipment, external communications management, intercom, etc.

Thanks to its special features, it easily adapts to different applications: auto-control (self-op), control room-studio, control associated with several studios, audio and video production centers, mixed configurations, integration in large facilities, etc.

One of the most important virtues of this mixer is its routing capabilities. The system can make more than 30,000 crosspoints. This routing power makes it possible, for example, for all the system outputs to be summed and re-routed to other outputs; it enables as many n-1 busses or clean-feeds to be created as there are available outputs.

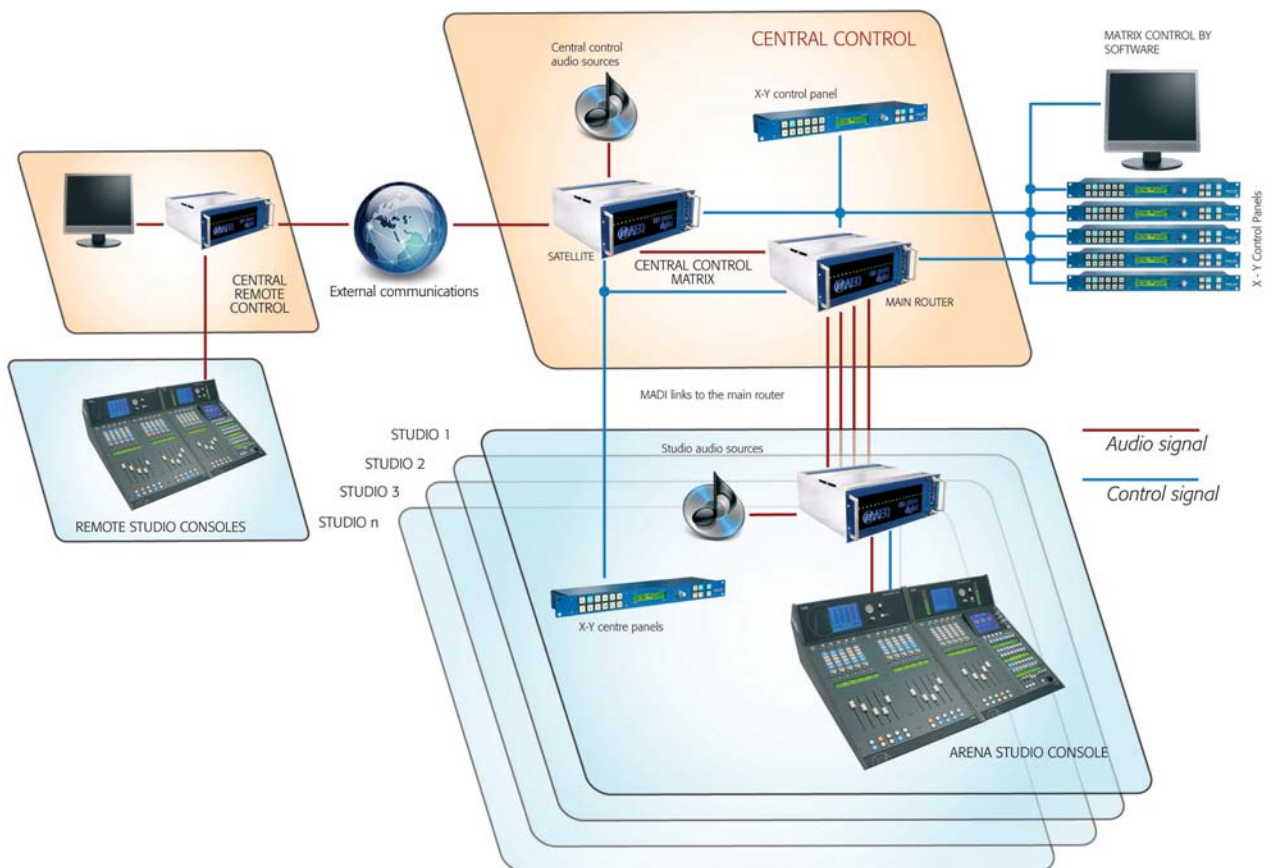
Simplicity and control power are combined to make both the most basic as well as advanced operating tasks easy.

The flexibility offered by the configuration of the ARENA allows assignment of signals present in the system to any control channel, and the modification of that signal distribution can be done from the control surface itself.

## THE ARENA CONSOLE WITHIN THE BC 2000 D SYSTEM

The BC 2000 D system functions either as a router or as an audio mixer, and is controlled by the ARENA control surface. The main system components are the same for both router and mixer. By using different firmware, the system can serve as a powerful router or a versatile mixer.

The BC 2000 D system can be configured to control, process, and route all audio in a program production center, even if it is distributed throughout several facilities. The ARENA is used as the mixing console in the studio, and the matrix is controlled by X-Y panels or the software application.



Large facility integration



## Power and Flexibility

The fundamental concept of this digital mixer is differentiation between control and signal processing, mixing and processing of audio signals is done by the BC 2000 D. The ARENA control surface provides mixing within the system.

The mixer is fully scalable to customer requirements. Users can implement a variety of set-ups, from a system with very few inputs and outputs, to one having more than 100 inputs and outputs. Similarly, the control surface can have from five to seventy-five physical faders.

The new ARENA control surface is an enhanced version of the one originally used with the BC 2000 D. The new Arena has notable improvements such as the ability to monitor all signals and the use of multiple memory pages.

ARENA's great new features includes enhanced design and styling, dedicated power supplies, increased operational capacity, and modularity. For example, users can now decide if they prefer the ON/OFF controls beneath the faders for quicker access, or above them for greater security.

The user can also select between four independent modes of operation on the control surface allowing it to be adapted to most any application.

**Normal:** Each channel has adjustments for input gain, dynamic processing, equalization, filtering, and cue.

**Buss Send:** Each channel has four user configurable send buttons for routing Master, Aux, Rec.

**Channel Setup:** Each input channel has an associated return channel with integrated talk-back – ideal for use on consoles which deal with multiple codecs, telephone hybrids, etc.

**Multiplex:** Each input channel has an assigned default output channel with talk-back. The console assigns mix-minus for each defined multiplex group. A useful feature for multi-conferencing, sporting events, and commentators. Arena has frontal access to facilitate easy maintenance, and can be simultaneously controlled from multiple studios.

# ARENA Control Surface

The ARENA control surface allows users to set up a modular control system specifically designed for on-air broadcast applications.

## ARENA D10



Two ARENA control surfaces are available: the ARENA DM and ARENA D10. The ARENA DM constitutes the basic system, and has five channels and a control and monitoring section for all signals in the system. The D10 complements the DM, and has ten channels. Up to seven ARENA D10s can be linked to an ARENA DM. This makes it possible to create systems composed of up to seventy five fader channels. Thanks to the use of multi-pages and motorized faders, users are able to control a great number of signals utilizing a single DM and just a few D10s.

# ARENA DM

Display of VU meters, and signal routing and adjustment

2 high precision digital VU meters

Stereo CUE monitors

Talk-back microphone with PTT button

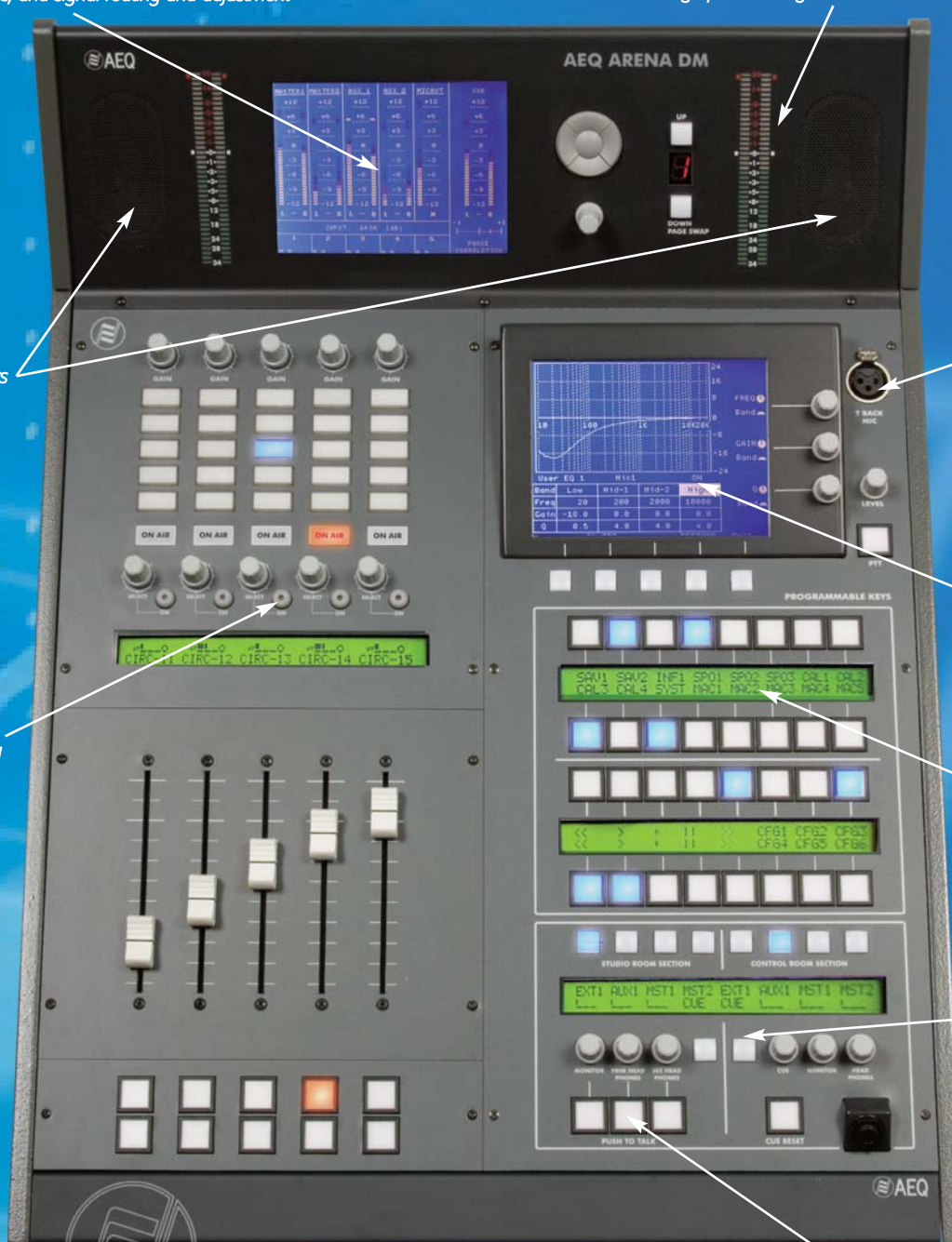
Balance/Panorama

Central display for additional channel configuration and general system information

32 programmable function keys

Independent monitoring for studio and control room

3 PTT buttons for direct talk-back





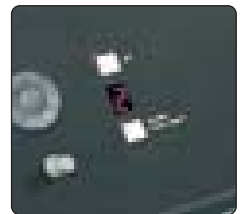
# Paging and Memory

## More Control in Less Space

### PAGING

Thanks to advances in digital technology, the paging concept gives users a greater number of channels in the final mix, with no need to have the corresponding control physically in sight. The transition from one page to another is virtually instantaneous. So, not having simultaneous direct physical access to all channels is clearly offset by the savings in controls and physical space. The use of paging allows better organization of the distributed of signals assigned to each channel.

When one of the page change buttons is depressed, the channels on the console are replaced by the channels assigned to the new page. The labels, fader positions, and settings corresponding to each signal change automatically.



Each surface has capacity for up to nine pages. This makes it possible to simultaneously control as many as 45 signals on a single DM surface, and up to 90 on a D10 surface. Additionally, the user can directly route any signal to any output without having to assign it to a control channel.

Assignment of signals to channels is totally user defined. The user can also pre-assign any number of signals present in the system to one or more channels. In other words, a single channel can control a given signal at a certain time, and another (different) channel can control the same signal later on. This enables users to reorganize the distribution of channels so the system can be adapted to different uses or programs. Additionally, the various assignments of signals to channels can be stored in memory for subsequent use.



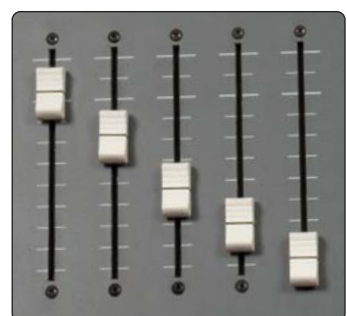
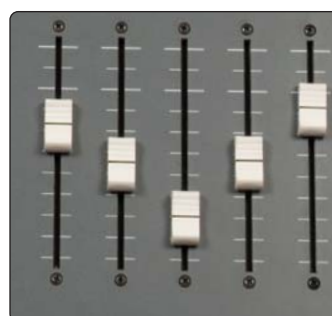
### MEMORY

ARENA users can use memory which stores the settings of each signal assigned to channels on the first page. Since the system is designed for on-air applications, changing from one memory to another is protected so the signals which are being broadcast remain unaltered, thus never affecting the transmission.

Using multiple memory locations makes it possible to adapt the system to production of different programs involving different technical requirements. Distribution configuration of signals via the control surface are stored in memory, as are routing of each of those signals to the different output busses, and the parameters and activation of different digital FX.

MEMORY CONFIGURATION	
Current Selected:	
Label	Description
Memory 1	Empty
Memory 2	Admin 12/21/2005 13:31:28
Memory 3	Admin 12/21/2005 13:33:02
Memory 4	Admin 12/21/2005 13:35:12
Mem-0	Empty
Memory 6	Admin 01/04/2006 13:41:34

MEMORY CONFIGURATION	
Current Selected:	
Label	Description
Memory 3	Admin 12/21/2005 13:33:02
Memory 2	Admin 12/21/2005 13:31:28
Memory 3	Admin 12/21/2005 13:33:02
Memory 4	Admin 12/21/2005 13:35:12
Mem-0	Empty
Memory 6	Admin 01/04/2006 13:41:34



# Ease of Operation

## Main and Monitoring Section



### MAIN SECTION

The DM control surface has an additional display for general system administrative functions. This is a dual-purpose display, with Select keys for each channel used to apply dedicated functionality to a particular signal.

Among the functions are the control of DSP resources, IP address management, configuration and memory administration, overall control of effects, display of installed firmware, and other utilities such as a timer, stopwatch and clock.

The Select keys for each channel enables the functionality associated with the selected signal in the ARENA DM main display. These functions include specific signal settings, such as phase changes or to enable Phantom Power (if the signal in question is a microphone). The Select key also serves to insert a test signal (tone, etc.) and to activate and adjust audio effects: equalization, filters, limiters, etc.

### MONITORING SECTION

The ARENA control surface has a multi-purpose display which shows parameters specific to each channel, the routing of the signals, and a VU meter for each signal present on the surface.

The DM control surface also offers two high precision digital VU meters that can be assigned to any signal. By employing programmable keys, the user can dynamically assign different signals to the main VU meters. Additionally, the DM control surface display has a VU meter dedicated to the CUE signal with an associated phase meter.

The ARENA DM has two sections for monitoring the control room and the studio(s). These sections have independent level controls for the control room monitor, studio monitor, and headphone monitor circuits, as well as the CUE monitor speakers built into the control surface itself.

A multi-studio situation can be defined that enables ARENA users to manage two or more studios independently from a single control room. This includes independent, centralized control of the ON-AIR signalling, the signals assigned to the monitors and headphones, levels of those monitoring circuits, cough muting, remote PFLs, etc.



# Ease of Communication

## TALK-BACK

As a control surface, the ARENA contains no audio signals except for a few which permit the operation and control of the system. One of these signals is the microphone input that has its own A/D converter. There are predetermined circuits between the ARENA surface and the studio - an independent one for the monitors and two headphone circuits.

Additional talk-back circuits can be set up in the system to make communication management easier. For example, the user can send the DM control surface's microphone to the various hybrid and audio codec returns.

The microphone input can also be used as an auto-control (Self-Op) microphone if desired.

## ADDITIONAL FUNCTIONS

The ARENA DM allows users to program special functions in a library which includes defining GPIs, GPOs, control of hybrids and codecs, management of different studios, etc.

Using the 32 available keys, the user can also enable options explained previously such as sending signals to the main VU meters establishing additional communication circuits.

The programmable keys can also be used to convert the mixer into a multiplex system where channels become input / output channels, thus making it possible to manage whatever Mix-Minus or n-1 groups may be required.



## ARENA CONTROL SURFACE CHARACTERISTICS

### General functionality

- Cough muting, ON-AIR signaling for studio and control room, fader start, remote PFL, talk-back, automatic monitor cut-off
- Multi-studio control from a single ARENA DM surface
- Unlimited number of n-1 outputs
- Signal grouping option
- Integrated control via external equipment (AEQ hybrids and audio codecs)
- Configurable as Multiplex (Mix-Minus) mixer
- Independent pre-fader / post-fader option for all routing
- System input / output interconnection diagram print-out
- Control communication via Ethernet 10/100 connection in TCP/IP protocol
- Selectable auto-start option by which the system starts with the last settings or with the default configuration
- Optional redundant DSP processor
- Multi-level, multi-user passwords: administrator, operator, and basic operation

### DM and D10 control surface features-general

- Signals assignable to any control channel
- Up to nine pages on each surface with option of synchronizing them to each other
- Configurable monitoring for all signals in the system
- VU meters by channel on each control surface
- Four channel control buttons that are configurable as a direct routing keyboard
- Storage in memory of settings of all signals assigned to page one
- ON/OFF buttons can be positioned above or below the faders
- Front panel access to modules for easy maintenance

### DM control surface features-specific

- Stereo monitor speakers for pre-fade monitoring
- Input for talk-back microphone with digital output
- Headphone output with digital input
- Two user configurable precision digital VU meters
- Two headphone circuits and one independent monitor circuit for talk-back
- Auto-adjust timer and clock for each signal
- Phase meter associated with the CUE channel

# Power and Versatility

## COMPLETE ROUTING SOLUTION



Users can activate or deactivate the sends on each channel, independently adjust their relative levels, and individually modify, without limitation, the pre-fader and post-fader assignments.

The system can be configured so any signal can be sent to any output. It is also possible to select which routing will be available to the operator, which will be fixed, and which is hidden for low level users.

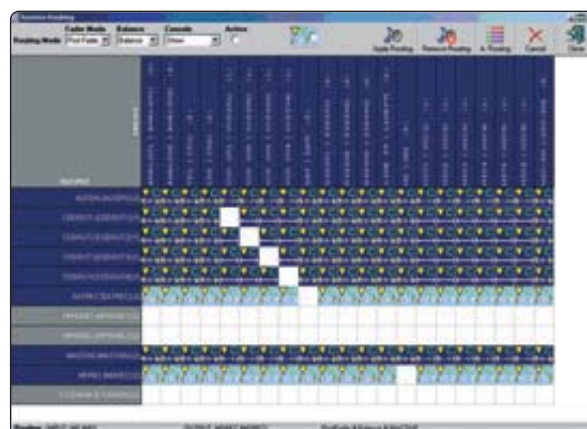
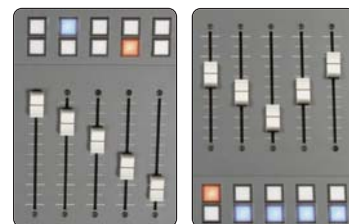
The system's powerful routing capabilities enable users to send all inputs to all outputs, in any combination, and to control all routing parameters from the control surface.

## DIVERSE APPLICATION ADAPTATION

The ARENA control surface easily adapts to different modes of operation. Depending upon operational requirements, controls are able to perform distinct functions which are suited for each purpose.

The surface's channel controls can be configured to provide access to typical functions, to work as direct routing keys, or be converted for use as I/O channels when the control surface is in an operational mode.

Additionally, the new ARENA is physically configurable. Thanks to its modular design, the user can place the ON/OFF or CUE buttons above or below the faders.



## ARENA SYSTEM CHARACTERISTICS

### Inputs and outputs

- Maximum capacity for 21 input / output modules
- Phantom power and balanced transformer on microphone inputs
- Electronically balanced line inputs and outputs
- Transformer-balanced digital inputs and outputs
- Independent sample rate converters on inputs and outputs
- Accepts AES/EBU, S-PDIF and MADI digital signal formats
- MADI connections via coaxial cable or fiber optic (available in single mode and multi-mode), not only in simple format, but also in double or redundant format for back-up applications.
- Four GPIs and four GPOs on each input / output module (analog, digital and microphones)

### System processing

- Redundant power supply and optional redundant DSP module
- Capacity for up to 20 DSP modules
- Internal sampling rate: 48 kHz at 24 bits
- Internal buss: 32 bits in floating point
- Gain control (digital and analog signals):  $\pm 12$  dB
- Selectable balance / pan control for all channels
- Selective phase inversion
- Available audio effects: four-band parametric equalizer, high and low pass filters, compressor-limiter, noise gate, delay, reverb

### Dimensions and weight

- Main unit: 6RU x 19" (482.6 x 266.7 x 450.0 mm; from 12 to 22 Kg)
- Power supply: 2RU x 19" (482.6 x 89.0 x 360.0 mm; 8.2 Kg)
- ARENA DM: (458 x 260 x 605 mm; 11.2 Kg)
- ARENA D10: (458 x 260 x 605 mm; 11.0 Kg)

# System Components

## POWER SUPPLIES

Line voltage: 90-240 VAC, (50/60 Hz).

### BC 2290 POWER SUPPLY

The BC 2290 is a redundant power supply that occupies two standard rack units. It includes two hot-swappable modules. If the primary module develops a problem, the secondary automatically assumes the load. Compatible with all chassis models.



### BC 2291 POWER SUPPLY

The BC 2291 is a single power supply that occupies one standard rack unit. It is capable of supplying 300 W of power, sufficient to supply a fully populated chassis. Compatible with all chassis models.



### BC 2292 POWER SUPPLY

Provides 200 watts of power, and operates on 90-240 VAC, 50 / 60 Hz. Only available for use with the BC 2000 DF3 chassis. Occupies 2 1/2 rear slots, and each frame can hold a maximum of two BC 2292 power supplies for redundancy.



## CHASSIS

### BC 2000 DF

The BC 2000 DF chassis (frame) accommodates all system modules. It occupies 4 rack units and holds up to 21 input / output modules, or a maximum of 20 DSP modules.

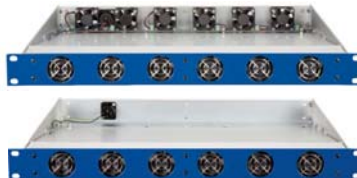


### BC 2000 DF3

The fan-less version chassis where all systems modules are installed.



It occupies 4 RU, and accommodates up to a total of 16 input / output audio modules, a maximum of 20 DSP modules, and two BC 2292 power supplies.



For densely populated BC 2000 DF3 chassis, ventilation can be enhanced by adding a low noise BC 2000 FAN "UP" which has rear exhaust, or a BC 2000 FAN "DOWN" with front intake. Both types occupy only one RU. For equipment racks needing additional ventilation, a BC 2000 FAN "MIDDLE" can be used. It cools by using both front intake and rear exhaust.

## CONTROL SURFACES

### ARENA D10

The D10 fader expansion unit.



### ARENA DM

The DM is the primary unit, has 5 faders, and full monitor and control capabilities.



# Standard Configuration

## AUDIO MIXING SYSTEM FOR BROADCAST:

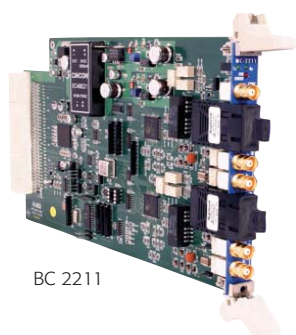
- 1 Control surface, monitoring with speakers, LCD displays and five motorized faders (ARENA DM)
- 1 Expansion control surface with 10 motorized faders and LCD configuration display (ARENA D10)
- 1 External power supply (BC 2291 or BC 2290)
- 1 Frame to house audio, control, and DSP modules (BC 2000 DF or BC 2000 DF3)
- 1 Master controller module (BC 2230)
- 4 DSP modules for audio processing (BC 2221)
- 3 Modules with 4 mono analog line inputs - outputs with GPI/O (BC 2201)
- 2 Modules with 4 AES/EBU - SPDIF digital inputs - outputs with GPI/O (BC 2202)
- 1 Module with 4 transformer-balanced microphone inputs and 2 stereo headphone outputs (BC 2203MH)



## CONFIGURATION FEATURES

- 15 PAGEABLE FADERS
- 7 AES-EBU / SPDIF DIGITAL STEREO INPUTS
- 4 AES-EBU / SPDIF DIGITAL STEREO OUTPUTS
- 4 TRANSFORMER-BALANCED STUDIO MICROPHONE INPUTS WITH PHANTOM POWER
- 12 ANALOG LINE INPUTS
- 12 ANALOG LINE OUTPUTS
- 2 HEADPHONE OUTPUTS (PRIMARY AND SECONDARY HEADPHONES)

## Input, Output, Control, and Processing Modules



BC 2211



BC 2240



BC 2202

### BC 2230 / BC 2240 CONTROL MODULE

The control module is the brains of the system. It receives power from the BC 2290 (BC 2291) power supply, establishes control of the system, synchronization and communications between the BC 2000 DF (BC 2000 DF3) frame and the various system components. The BC 2230 is intended for use with the BC 2000 DF chassis. The BC 2240 is intended for use with the new BC 2000 DF3 chassis.

### BC 2221 DSP MODULES

Depending on the system's features and complexity, each frame requires between 4 and 20 digital processing modules. DSP modules perform several functions: routing, mixing, signal processing effects, gain display, etc. DSP modules can be configured for redundancy.

### BC 2201 ANALOG AUDIO INPUT / OUTPUT MODULES

Each BC 2201 module consists of four analog inputs and four mono analog outputs, which can be configured as stereo signals "on-the-fly". All inputs and outputs are electronically balanced. Signals are connected via CAT-5 cables, each of which groups together four input and four output signals. Also available are general purpose inputs and outputs that can be used to control external equipment. Four GPIs and four GPOs are present in two RJ-45 connectors on each I/O module. Also available are modules with four analog mono inputs (BC 2204) or four analog mono outputs (BC 2205).

### BC 2202 DIGITAL AUDIO INPUT / OUTPUT MODULES

The BC 2202 provides four digital stereo inputs and four outputs in AES/EBU format, and are individually configurable as SPDIF formatted signals. All are transformer isolated and have independent

sample rate converters (SRC) for the input and output; the sample rate of each of the outputs can be individually configured.

The BC 2202 controls the basic signals of the ARENA DM: main VU meters, control headphones, talk-back microphone and CUE monitors. As with the other input / output modules, the BC 2202 has four GPIs and four GPOs.

Also available are modules with four inputs (BC 2206) or four outputs (BC 2207).

### BC 2203 M ANALOG MICROPHONE AND LINE INPUT MODULE

The BC 2203 M provides four mono inputs that are configurable as microphone or line inputs; they are all transformer isolated. Each input can supply phantom power. The BC 2203 M also has four GPIs and four GPOs. Phantom power and mic / line switching are activated from the ARENA control surface.

### BC 2203 MH ANALOG MICROPHONE / LINE INPUTS AND HEADPHONE OUTPUT MODULE

In addition to the characteristics of the microphone module described above, the BC 2203 MH includes two stereo outputs for headphones.

### BC 2211 MADI INTER-CONNECTION MODULE

The BC 2211 provides a fibre optic or coaxial cable link that carries an AES 10 MADI signal, with sufficient capacity for 56 or 64 channels. Adding this module enables integration with other equipments which have the same link capability; this allows a larger system to be configured based upon the BC 2000 D router, or enables the system to be linked with another control surface.

The BC 2211 HP is a special version module for long distance links.

### BC 2000 CAB WIRING AND INTER-CONNECTION SYSTEM

The BC 2000 CAB provides versatile system interconnection to any signal source. XLR and WAGO modules are available to simplify system assembly.





# AEQ ARENA

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