StudioComm for Surround

Model 76DBA Central Controller / Model 77B Control Console

Model 77B Control Console

As creating and distributing multi-channel surround (5.1) and stereo audio material has become a day-to-day reality, the ability to simply and effectively monitor these sources is imperative for recording, post-production, and broadcast facilities. And with audio-with-picture applications becoming so prevalent, additional monitoring challenges have arisen. Studio Technologies has addressed these needs with the StudioComm for Surround Model 76DBA Central Controller and the Model 77B and Model 71 Control Consoles. With digital audio inputs, digital and analog monitor outputs, Dolby® E dialnorm support, and an extensive set of operating resources it's a simple task to integrate a monitoring system into virtually any facility. The carefully selected group of features, including flexible input source selection, configurable input-signal time delay, multiple digital and analog monitor outputs, downmix and solo functions, dialnorm display, along with a multi-format sync input, make the system powerful yet simple to operate. And by using the best of contemporary technology, as well as following rigorous design practices, the system's audio quality is excellent. Its unique feature set makes it especially well suited to meet the needs of broadcast master control applications.

Key Features:

- Dolby® E metadata dialnorm support
- Flexible input source selection
- Unbalanced digital inputs
- Supports multiple control consoles
- Excellent audio quality
- Channel pop solo function

Model 77B and Model 71 Control Consoles

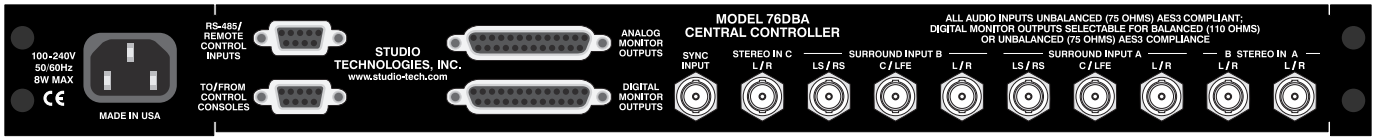
A StudioComm for Surround system starts with the Model 77B Control Console. It's the system's "command center" and is designed to reside at an operator's location, allowing fingertip selection of all monitoring functions. Numerous LED indicators provide complete status information. A 4-digit numeric display indicates the post-fader monitor output level or dialnorm level in real time. A major strength of the Model 77B is its ability to configure, under software control, many important operating parameters. Intended for secondary monitoring locations, the Model 71 Control Console is a compact user control surface. It provides three of the most basic functions: a rotary level control, dim on/off button, and reference level on/off button.

While many installations will use only one Model 77B Control Console, up to three additional Model 77B or Model 71 Control Consoles can also be connected. This provides multiple users with full control over a facility's monitor system. And to make installation simple, the Model 76DBA provides power for all connected Model 77B or Model 71 units.

Model 76DBA Central Controller

The core of this StudioComm for Surround system is the Model 76DBA Central Controller. The one-rack-space unit contains digital audio input, digital and analog monitor output, processing, and support circuitry. The Model 76DBA provides two surround (5.1) and three stereo digital audio inputs. These unbalanced digital inputs are AES3id/SMPTE 276M-compliant; sources of this type are ubiquitous in most post-production and broadcast environments. The inputs allow a sample rate of up to 192 kHz and a bit depth of up to 24 to be directly supported. Circuitry associated with one of the stereo inputs provides sample rate conversion (SRC) capability, allowing a wide range of digital audio sources to be monitored. Up to 340 milliseconds of input delay can be selected to

Model 76DBA Central Controller Front Panel



Model 76DBA Central Controller Back Panel

compensate for processing delays in an associated video path. A number of different signals can serve as the Model 76DBA's digital audio timing reference. For synchronization with a master timing reference a dedicated source of word clock, DARS (AES11), bi-level video, or tri-level video can be connected. Alternately, the L/R connection of the actively selected surround or stereo input source can serve as the timing reference.

A range of digital and analog surround (5.1) and stereo monitor outputs are provided. The post-fader surround digital and analog monitor outputs are intended for connection to monitor loudspeaker systems. The pre-fader surround digital monitor output can be used with metering systems that require signals that aren't impacted by level control or other monitoring functions. The auxiliary stereo digital and analog outputs are provided for special broadcast applications where independent outputs with separate on/off control are desired. The stereo input C direct digital monitor output allows an installation to directly access the SRC capabilities.

For installation flexibility the digital monitor outputs can be configured for compatibility with equipment that requires AES3 ("balanced") or AES3id ("unbalanced") digital audio signals. When selected for AES3 compatibility the output impedance is 110 ohms with a signal level of 5 volts peak-to-peak (Vpp). For AES3id operation the impedance is 75 ohms and the level is 1 Vpp.

A source of Dolby E metadata can be connected to the Model 76DBA Central Controller. This RS-485/RS-422 115.2 Kbit/s serial data signal carries numerous data elements, including one that represents the average dialog level of an associated audio program. This dialog normalization or "dialnorm" value is an integral part of many broadcast distribution systems, ending up as part of consumer audio playback systems. Hardware and software within the Model 76DBA separates the dialnorm element that relates to one of the connected surround audio sources. This dialnorm level value can be displayed on the Model 77B Control Console, as well as being used to automatically adjust the post-fader surround digital and analog monitor output levels. This provides a unique solution for the broadcast and post-production world, allowing a professional environment to accurately simulate an end user's experience.

Great care was taken in designing the system's architecture, ensuring that the character of the audio input signals is preserved. All audio processing is performed in 32 bits using a high-speed field-programmable gate array (FPGA) integrated circuit.

The Model 76DBA occupies one space (1U) in a standard 19-inch rack. Digital audio sources are interfaced with the Model 76DBA using nine BNC connectors. A tenth BNC connector is used by the sync source. Digital and analog monitor output signal connections are made using two 25-pin D-subminiature connectors. One 9-pin D-subminiature connector is used to connect the Model 76DBA with up to four Model 77B or Model 71 Control Consoles. A second 9-pin "D-sub" connector is used to interface Dolby E dialnorm data and remote control signals. AC mains power is connected directly to the Model 76DBA, with an acceptable range of 100 to 230 volts, 50/60 Hz.

Model 71 Control Console

Additional Details

The Model 77B provides four buttons and associated LEDs for selecting the input source to be monitored. The buttons are designed such that up to six unique input choices are available. Using the Model 77B's configuration mode, each of the six input choices can be configured from the system's two surround (5.1) and three stereo inputs. The configuration mode also allows stereo inputs A and B to be used as either stereo or monaural sources. This is especially useful in broadcast applications where a 2-channel AES3id source may carry two independent monaural signals. To highlight this powerful feature: the Model 77B allows independent monitoring of the two channels associated with a single AES3id source. Broadcast master control applications can greatly benefit from this configuration flexibility.

The post-fader surround digital and analog monitor output levels can be controlled by way of a large, easy-to-use rotary control. The control, actually a digital encoder, allows level selection in precise 0.5-dB steps. The auto mute all function causes the post-fader surround digital and analog monitor output channels to automatically mute whenever the output level control reaches maximum

attenuation. Using the reference level function, the post-fader surround digital and analog monitor output levels can be set to a pre-configured value. This is provided for audio-with-picture applications that require a specific monitor output level. The reference level is easily configured by taking an electronic "snapshot" of the desired monitor output level. For operator confirmation a 4-digit LED readout can display the level of the post-fader surround digital and analog monitor output channels. To match the needs of a facility, it can be configured to display either the attenuation level or the sound pressure level (SPL).

The dim function allows the post-fader surround digital and analog monitor output levels to be reduced by a fixed dB amount. The dim level is configured from among four available values. A mute all function allows the post-fader surround digital and analog monitor output channels to be simultaneously muted. The channel solo section provides post-fader surround digital and analog channel monitoring control, allowing a single channel to be monitored while the others are automatically muted. Multiple channels can also be simultaneously selected for "soloing."

A special solo mode is also provided, called channel pop solo, which offers a unique aid in monitoring audio material. Channel pop solo allows the level of a single post-fader surround digital and analog monitor output channel to be raised while the level of the other channels is reduced. This helps to emphasize the content on one channel without fully muting the others. Broadcast applications can benefit from the channel pop solo mode by allowing, for example, the center channel to be highlighted while still maintaining some level on the other channels. The amount of level increase—the "pop"—as well as the amount of attenuation can be configured to meet the needs of specific applications or users.

Two functions allow the input sources to be checked for level or phase inconsistencies. The 5.1 to stereo downmix function is used to create a stereo signal from the selected surround (5.1) source. The stereo to mono downmix function allows audio on the left and right channels to be added (summed) and monitored on the center output channel. The two downmix functions can be simultaneously enabled, allowing a surround source to be checked for mono compatibility. The downmix functions always impact the post-fader surround digital and analog monitor outputs. A configuration setting allows the pre-fader surround digital monitor output to be selected for pre- or post-downmix operation.

In addition to the surround digital and analog monitor outputs, auxiliary stereo digital and analog monitor outputs are also provided. A stereo signal, connected to stereo input C on the Model 76DBA Central Controller, can be routed to the auxiliary stereo digital and analog monitor outputs. A pushbutton on the Model 77B Control Console allows on/off control of the signal; no level control or signal modification takes place. The auxiliary stereo digital and analog monitor outputs can be useful in special applications, e.g., in a broadcast control room setting where an audio signal, such as site-event cue signals, needs to be monitored by way of an independent set of loudspeakers.

For flexibility, the StudioComm for Surround system is designed to easily integrate with equipment such as production intercom systems, on-air or recording tally signals, and audio consoles. Three remote-control inputs provide access to the mute all, dim, and auxiliary stereo monitor output on/off functions. By providing access to these functions, talkback or slate activity from an audio console or other communications system can control the level of the post-fader surround digital and analog monitor outputs or enable the auxiliary stereo digital and analog monitor outputs.

Specifications

Model 76DBA Central Controller

General Audio:

Supported Sample Rates: 32, 44.1, 48, 88.2, 96, 176.4, and 192 kHz

Word Length: 24 bits maximum

Internal Processing: 32 bits

Input-to-Output Latency: one sample (e.g., 0.021 milliseconds @ 48 kHz sample rate)

Digital Audio Inputs: 5 (18 audio channels)

Configuration: two surround (5.1) and three stereo

Type: AES3id-2001/SMPTE 276M (unbalanced 75 ohms/1 Vpp)

Connectors: BNC (per IEC 60169-8 Amendment 2)

Sample Rate Conversion (SRC):

Application: available on Stereo Input C

Input Sample Rate Range: 8 to 216 kHz, limited to 1/6 to 6 times the output sample rate

Latency: 1 millisecond, nominal

Sync Source: configured to follow L/R of currently selected input or signal connected to sync input

Sync Input:

Compatible Sources: word clock, DARS (AES11), bi-level video, tri-level video

Jitter: 4 ns pp maximum

Connector: BNC (per IEC 60169-8 Amendment 2)

Termination: 75 ohms, selectable on/off

Digital Monitor Outputs: 16 (8 pairs)

Configuration: organized as two surround (5.1), one auxiliary stereo, and one stereo input C direct

Dynamic Range: >135 dB

Type: AES3 (110 ohms/5 Vpp) or AES3id/SMPTE 276M (75 ohms/1 Vpp), selectable

Connector: 25-pin D-subminiature female (DB-25F)

Analog Monitor Outputs: 8

Configuration: organized as one surround (5.1) and one auxiliary stereo

Type: electronically balanced, source impedance 200 ohms

Nominal Level: +4.0 dBu @ –20 dBFS input source and level control at maximum setting

Maximum Level: +24 dBu into 2000 (2 k) ohms or greater

Frequency Response, Digital Inputs to Analog Monitor Outputs: 10 Hz-20 kHz +0.0/–0.3 dB @ 48 kHz sample rate; –3 dB @ 64 kHz

Distortion (THD+N): <0.002%, –1 dBFS, 20-22 kHz, 22 kHz bandwidth

S/N Ratio: 89 dB, ref +4 dBu output

Dynamic Range: greater than 109 dB

Crosstalk: 98 dB at 1 kHz; 97 dB at 16 kHz, ref –1 dBFS input

Connector: 25-pin D-subminiature female (DB-25F)

Configurable Delay: 0 to 340 milliseconds @ 48 kHz sample rate (scales up or down depending on actual sample rate)

Downmix:

Functions: 5.1 to stereo, stereo to mono

5.1 to Stereo: LS @ –3 dB summed with L;
RS @ –3 dB summed with R;
C @ –6 dB summed with L and R;
LFE @ –6 dB summed with L and R (if enabled) C, LFE, LS, and RS monitor outputs mute

Stereo to Mono: L @ –3 dB summed with R @ –3 dB to C;
L, R, LS, RS, and LFE monitor outputs mute (for a surround input this results in the C output being the sum of L @ –3 dB, R @ –3 dB, C @ –3 dB, LFE @ –3 dB (if enabled), LS @ –6 dB, and RS @ –6 dB)

Control Console Interface:

Type: RS-485, 115.2 Kbit/s, 8-1-N

Polling Interval: 50 milliseconds

Power: 12 volts DC, 500 milliamperes maximum

Connector: 9-pin D-subminiature female (DE-9F)

Dolby E Metadata Input:

Type: RS-485/RS-422

Data Rate/Format: 115.2 Kbit/s, 8-N-1

Connector: 9-pin D-subminiature female (DE-9F), shared with remote control inputs

Remote Control Inputs: 3

Functions: remote mute all, remote dim, remote auxiliary stereo monitor output on/off

Type: +5 V logic, activates on closure to system common

Connector: 9-pin D-subminiature female (DE-9F), shared with metadata input

AC Mains:

Requirement: 100 to 230 V, +10/–15%, 50/60 Hz, 15 W maximum

Connector: 3-blade, IEC 320 C14-compatible (mates with IEC 320 C13)

Dimensions:

19.00 inches wide (48.3 cm)
1.72 inches high (4.4 cm)
7.00 inches deep (17.8 cm)

Mounting: one space (1U) in a standard 19-inch rack

Weight: 6.2 pounds (2.8 kg)

Model 77B Control Console

Application: up to four Model 77B Control Consoles can be connected to a Model 76DBA Central Controller

Power: 12 volts DC nominal (9 volts DC minimum), maximum current 100 milliamperes, provided by Model 76DBA Central Controller

Control Data:

Type: RS-485

Data Rate/Format: 115.2 Kbit/s, 8-N-1

Connector: 9-pin D-subminiature female (DE-9F)

Dimensions (Overall):

7.20 inches wide (18.3 cm)
2.20 inches high (5.6 cm)
5.40 inches deep (13.7 cm)

Weight: 1.7 pounds (0.8 kg)

Model 71 Control Console

Application: up to three Model 71 Control Consoles can be connected to a Model 76DBA Central Controller

Power: 12 volts DC nominal (9 volts DC minimum), maximum current 35 milliamperes, provided by Model 76DBA Central Controller

Control Data:

Type: RS-485

Data Rate/Format: 115.2 Kbit/s, 8-N-1

Connector: 9-pin D-subminiature female (DE-9F)

Dimensions (Overall):

3.20 inches wide (8.1 cm)
2.20 inches high (5.6 cm)
4.10 inches deep (10.4 cm)

Weight: 0.8 pounds (0.4 kg)

Specifications and information contained in this Data Sheet subject to change without notice.

Studio Technologies, Inc.
Skokie, Illinois USA

www.studio-tech.com