



# StudioComm for Surround

## Model 76DB Central Controller / 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 an “all-digital” world now upon us, additional monitoring challenges have arisen. Studio Technologies has addressed these needs with the StudioComm for Surround Model 76DB Central Controller and the Model 77B and Model 71 Control Consoles. With the digital audio inputs and outputs, Dolby® E dialnorm support, and extensive set of user 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, multiple outputs, dialnorm display, channel downmix, and multiple-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 unique needs of broadcast master control applications.

### Model 77B and Model 71 Control Consoles

An all-digital 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 monitor output 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. The Model 71 Control Console is a compact user control surface that is intended for secondary monitoring locations. 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 76DB provides power for all connected Model 77B or Model 71 units.

### Model 76DB Central Controller

The heart of this StudioComm system is the Model 76DB Central Controller. The one-rack-space unit contains audio input, output, processing, and support circuitry. The Model 76DB provides two surround (5.1) and three stereo audio inputs. These unbalanced digital inputs are AES3id/SMPTE 276M-compliant. Sources of this type are ubiquitous in most post-production and broadcast environments. A sample rate of up to 192 kHz with a bit depth of up to 24 are directly supported. Circuitry associated with one



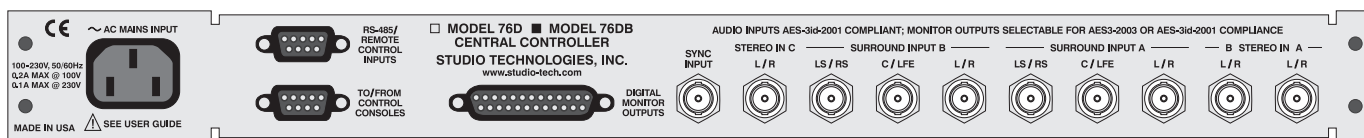
**Model 77B Control Console**

### 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 76DB Central Controller Front Panel**



**Model 76DB Central Controller Back Panel**

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 compensate for processing delays in an associated video path. 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.

Two surround (5.1) and two stereo monitor outputs are provided. The post-fader surround monitor output is intended for connection to a monitor loudspeaker system. The pre-fader surround 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 monitor output is provided for special broadcast applications where an independent output with separate on/off control is desired. The stereo input C direct monitor output allows an installation to directly access the SRC capabilities.

For installation flexibility the 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 76DB 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 76DB 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 monitor output level. 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 when designing the system's architecture, ensuring that the character of the audio input signals is preserved. All audio processing is performed in 32-bit words using a high-speed field-programmable gate array (FPGA) integrated circuit.

The Model 76DB occupies one space (1U) in a standard 19-inch rack. Digital audio signals are interfaced with the Model 76DB's inputs using nine BNC connectors. A tenth BNC connector is used by the sync source. Monitor output signal connections are made using one 25-pin D-subminiature connector. One 9-pin D-subminiature connector is used to connect the Model 76DB 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 with the Model 76DB. AC mains power is connected directly to the Model 76DB, 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 monitor output level 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 monitor output channels to automatically mute whenever the output level control reaches maximum attenuation. Using the reference level

function, the post-fader surround monitor output level 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 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 monitor output level 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 monitor output channels to be simultaneously muted. The channel solo section provides post-fader surround 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 channel to be raised while the level of the other channel 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 monitor outputs. A configuration setting allows the pre-fader surround monitor outputs to be selected for pre- or post-downmix operation.

In addition to the surround (5.1) monitor output, an auxiliary stereo monitor output is also provided. A stereo signal, connected to stereo input C on the Model 76DB Central Controller, can be routed to the auxiliary output. 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 output feature 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, or audio consoles. Three remote-control inputs provide access to the mute all, dim, and auxiliary 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 monitor output or enable the auxiliary output.

# Specifications

## Model 76DB 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

**Dynamic Range:** >135 dB

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

**Digital Audio Inputs:** five (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:** four (16 audio channels)

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

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

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

**Configurable Delay:** 0 to 340 milliseconds @ 48 kHz sample rate (scaled 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)

### 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

### 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)

**Remote Control Inputs:** three

**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, 50/60 Hz, 15 watts 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 76DB Central Controller

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

**Power:** 12 volts DC nominal (9 volts DC minimum), maximum current 35 milliamperes, provided by Model 76DB 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.

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