



Model 230

Announcer's Console

The Model 230 Announcer's Console is designed to serve as the audio control "hub" for announcers, commentators, and production personnel. The tabletop unit is suited for numerous applications including on-air television and radio broadcasting. The Model 230 is compatible with essentially all broadcast and production audio system environments. Standard connectors are used to interface microphone, headphone, on-air, talkback, IFB, and intercom signals.

Whether it's the mic preamplifier, audio switching, talkback signals, intercom interfacing, or headphone cue feed, superior audio quality is maintained throughout. A microprocessor provides the Model 230's logic power, allowing precise control of the unit's operation. With extensive flexibility built in, creating the desired operating configuration is a simple matter. While the operating features of the unit can be extensively configured, the user is presented with an easy-to-use set of controls and indicators. A wide range of resources, great performance, and simplicity during use—these are the hallmarks of the Model 230.

A truly next-generation product, extensive research into the needs and desires of field production personnel was integral to the Model 230's creation. Providing a veritable "tool kit" of features, the unit supports a wide variety of applications that include on-air television and radio broadcasting, stadium announcement, and simultaneous interpretation. In addition, with the unit's broad range of capabilities many other specialized "behind-the-scenes" applications can also be implemented.



Model 230 front panel shown with buttons labeled for on-air applications

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Microphone Input

A high-performance microphone preamplifier circuit provides low-noise/low-distortion amplification over a 20 to 60dB gain range. The gain is adjustable in 10dB steps. The input is compatible with balanced dynamic and condenser microphones. The microphone power source is 48 volts nominal and meets the worldwide P48 phantom standard. An LED indicator serves as an aid for optimizing the preamplifier's gain setting. The output of the microphone preamplifier is used by the main output as well as being routed to the compressor circuit that supports the talkback functions.

Main Output

The Model 230 provides a main output that is designed to serve as the on-air, stadium announcement, or other primary audio feed. Nominally -2dBu, it is designed as a fully professional interface with high output capability, low distortion, and low noise. The output circuitry features a high-performance output transformer expressly designed for professional audio applications.

For specialized applications an optional direct microphone output card is available. This allows an external microphone preamplifier to be used. Of course this output also provides "click-free" microphone on/off ("muting") control.

Talkback Functions

The talkback functions are intended to provide personnel associated with production trucks, control rooms, live-performance, and sports venues with talent-originated cue signals. The Model 230 contains two pushbutton switches that control the talkback functions. Each button can be configured to allow talkback audio to be routed to one of three locations: intercom channel 1, intercom channel 2, or a line-level talkback output. The line-level talkback output is transformer-coupled with a +4dBu nominal signal level. It contains resistors in series with the output connector, allowing line-level talkback outputs from multiple units to be directly "summed."

For applications where the talkback-to-intercom functions are not required an optional line output card can be added. This provides another transformer-coupled, line-level talkback output.

For non-on-air applications, special Model 230 features can be enabled by placing the unit in one of two production modes. Using these configurations the unit can be even more powerful when used in live-event applications. With all the available talkback flexibility, the exact needs of many specific applications can easily be met. And, of course, whatever configuration is implemented, the talkback audio quality will be excellent.

Dynamic Range Control

To enhance the Model 230's talkback functions, a studio-quality compressor circuit is provided to control the dynamic range of the signal coming from the microphone preamplifier. Far from a simple "clipper," the circuit utilizes a sophisticated laser-trimmed voltage-controlled-amplifier (VCA) integrated circuit for quiet, low-distortion level control. The signal from the compressor is used by the talkback functions. This ensures that talkback audio signals remain clear and intelligible under all real-world conditions. In addition, dynamic range control is especially important when talkback signals are being routed to intercom channels.

User Controls and Status Indicators

Three pushbutton switches, four LED indicators, and two rotary controls provide the user with a clear, easy-to-use interface. One pushbutton switch controls the status of the main output. This is the audio output intended for on-air, announcement, or other primary uses. Two LEDs display the on/off status of the main output. Two additional pushbutton switches control the status of the talkback functions. These are the audio cue signals used to communicate with producers, directors, "spotters," or other behind-the-scenes production personnel. A status LED is associated with each talkback button. Two rotary controls allow the user to adjust the level of the headphone output.

Flexibility

A large part of the Model 230's unique power is the ability to configure the operation of the main output and talkback functions. To meet the needs of the many specific broadcast and production applications, a variety of button operating modes is available. The main output button can be selected to operate from among four modes. In the "push-to-mute" mode the

Product Highlights:

- Excellent Audio Quality
- Simple User Interface
- Configuration Flexibility
- Advanced Intercom Interface
- Next-Generation Performance

button performs a momentary mute of the main output. In this way a “cough” button function is created, something typically required for television sports broadcasting. In the “push-to-talk” mode the button provides a momentary active function for the main output. This mode would be appropriate for applications such as stadium announcement. An alternate action “latching” configuration allows the button to enable or disable the main output as desired. This is useful in radio broadcasting, announce-booth, or voice-over applications. The fourth mode provides a hybrid function, supporting both push-to-talk and tap-to-enable/tap-to-disable operation. This operation is similar to that found in many broadcast intercom system user stations.

The two buttons associated with the talkback functions can be configured to operate from either of two modes. One of the modes supports a “push-to-talk” function. This is typically used for on-air broadcast applications. The other mode provides a hybrid function, the operation of which is discussed in the previous paragraph. The hybrid mode is especially useful when the Model 230 is used in a production-support application.

The main button mode configures how the main output, when it is in the “latched” on state, responds to talkback activity. One choice momentarily turns off the main output when talkback is active, returning the main output to the on state when the talkback function has ended. The other choice “unlatches” the main output in response to a talkback function.

IFB Input

A broadcast-standard “wet” (DC with audio) IFB circuit can be directly connected to the Model 230’s IFB input. Originated by sources such as the RTS™ 4000-series IFB system or IFB interface devices from Studio Technologies, the connected IFB circuit can provide DC power to operate the Model 230 as well as two channels of cue audio.

Cue Sources

The Model 230 supports the connection of up to six audio sources, each of which can be selected for routing to the stereo headphone output. The sources are IFB channel 1, IFB channel 2, line input 1, line input 2, intercom channel 1, and intercom channel 2. Each source can be individually assigned to the left channel, right channel, or both left and right. This allows a wide variety of stereo and mono headphone mixes to be created.

The two audio signals associated with the Model 230’s IFB input can be assigned to the headphone output. Originating in production trailers or control rooms, the IFB circuits typically provide DC power and program-with-interrupt audio on one channel and program-only audio on the other.

For application flexibility, two line-level audio sources can be connected to the Model 230. Possible signal sources include off-air receivers, wireless IFB systems, and audio consoles. The

connected signals can be from two independent sources, or could be from a stereo audio feed such as would be associated with a broadcast music event. Two level trim potentiometers, located on the bottom of the unit, allow signals with wide nominal audio levels to be cleanly interfaced.

Audio signals associated with a single- or dual-channel intercom system can be routed to the headphone output. The Model 230’s intercom interface is compatible with standard party-line intercom systems from manufacturers such as RTS and Clear-Com®.

Headphone Output

Two rotary controls are provided for user adjustment of the headphone output levels. For application flexibility the actual function of the two “pots” is configurable. For traditional on-air sports applications they can be selected to the dual level control mode which provides independent control of the left and right channel volume. For use with stereo cue signals, or to support user preference, the level/balance mode can be selected. In this mode one control adjusts the overall level of both the left and right channels, while the other allows adjustment of the left/right level balance. To help minimize the chance of broadcast cues being missed, both level control modes can be configured so that a minimum headphone output level is maintained. Alternately, the headphone output can be set to fully mute when the controls are at their minimum position.

A headphone control reverse mode is provided specifically for on-air television applications where a headset with boom microphone is used. The reverse mode ensures that no matter which headset orientation is used by the talent, the controls will always work intuitively. This results in a comfortable work environment, allowing the left control to impact the level to the talent’s left ear while the right control impacts the right.

Provision has been made to support applications where a monaural cue feed is desired. A configuration switch allows the summing (combining) of the selected left and right headphone sources. In addition to creating a dual-channel mono output it also allows the level controls to be configured as a simple 2-channel mixer. For applications where a single “muff” headset or IFB-type earpiece is connected, another configuration switch can be used to disable the headphone output’s right channel.

The headphone output was designed to meet the needs of contemporary headphones and headsets. Specifically, the output circuits act as voltage, rather than power, drivers. In this configuration they can provide high output levels with very low distortion and noise, along with minimal current consumption. The output circuits are configured to safely drive stereo or mono loads. This ensures that all types of headphones, headsets, and earpieces can be directly connected.

Intercom Interface

Of special note is the Model 230's sophisticated intercom interface. It's designed to work correctly with industry-standard single- and dual-channel party-line intercom systems, including those from RTS and Clear-Com. An intercom line connected to the Model 230 can serve three functions: providing cue audio signals to the headphone output, allowing talkback audio to be sent to intercom users, and as a Model 230 power source. Audio signals present on the single- or dual-channel intercom line can be flexibly routed to the headphone output. Talkback audio can be sent to either or both intercom channels. Trim potentiometers, located on the bottom of the unit, allow adjustment of the talkback-to-intercom "sidetone" level.

Other announcer console products can exhibit talkback-to-intercom-related audio oscillations ("squeals") that end up in the headphone output. A special Model 230 feature ensures that this will never occur. This is accomplished by means of a special "auto-terminate" circuit that becomes active whenever an intercom line is not connected to the Model 230.

Active Sidetone Function

The Model 230 includes a unique active sidetone function that's available whenever the unit is configured for one of the production modes. By routing audio from the microphone input to the headphone output a user confidence ("sidetone") signal is provided. This allows a user to always hear what they are saying, a critical requirement for effective communications. The word "active" is part of the function's name because it involves active circuitry, under software control, to achieve excellent audio performance. The sidetone level is dynamically configurable, allowing the user to adjust the level as required.

Audio Quality and Protection

The Model 230's circuitry is carefully tailored to provide excellent audio performance. Professional-quality components are featured throughout. For reliability all audio routing is performed using solid-state devices under microcontroller direction. In all critical audio paths, "clickless" electronic switches provide noise-free control. All audio inputs and outputs make extensive use of protection components. This limits the chance of damage from ESD and other undesirable, yet real-world, hazards.

Power Sources

The Model 230 can derive its operating power from the IFB input, intercom interface, or an external 24 volt DC source. For redundancy, all three power sources can be connected simultaneously. An internal switch-mode power supply ensures that all Model 230 features are available, including phantom power, when the unit is powered by any of the three sources.

The Model 230 is compatible with IFB circuits provided by most standard broadcast systems. However, maximum performance can often be obtained by using the IFB interface devices

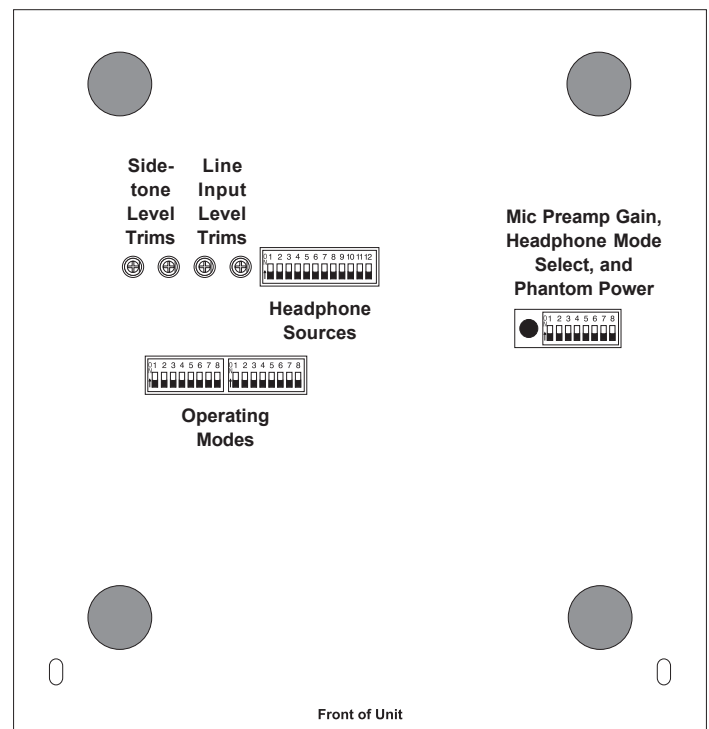
available from Studio Technologies. Single-channel and four-channel units are available, each providing high-quality audio along with an excellent source of DC power. They're directly compatible with most matrix intercom systems, as well as standard line-level audio signals. Refer to the Studio Technologies website for details.

Auxiliary Relay

Model 230 resources include a general-purpose relay, allowing specialized configurations to be created. Under software control, the relay can be configured to follow the state of the main output, talkback 1, or talkback 2 buttons. Taking advantage of the back-panel locations provided for additional XLR-type connectors, a technician may easily implement a variety of functions such as an "on-air" indicator or performing loudspeaker muting during talkback. Special configuration modes are even included to allow direct control of the relay using the talkback 1 or talkback 2 buttons without impacting any of the unit's audio signals. The auxiliary relay is also used by the optional direct microphone output card.

Configuration

Model 230 configurations are made using a number of DIP-type switches and four trim potentiometers. One 8-position switch array is used to set the gain of the microphone preamplifier, the on/off status of phantom power, and control of the headphone output modes. A 12-position switch array configures which of the six cue audio sources are routed to the headphone



Model 230 bottom view showing configuration switches and trim potentiometers

outputs. Two 8-position switch arrays communicate the desired operating modes to the microprocessor. Two rotary trim pots are used to adjust the input sensitivity of the line inputs. Two additional rotary trim pots are provided to adjust the “sidetone” level for the intercom interface’s talkback functions. All switches and trim pots are accessible via the bottom of the Model 230’s enclosure; the unit does not have to be disassembled. Changes made to any of the configuration parameters become active immediately. To prevent access to the configuration controls a security panel, included with each unit, is attached to the bottom of the enclosure.

Connectors

The Model 230 uses standard connectors throughout. The microphone input, line inputs, IFB input, and intercom interface functions use 3-pin female XLR-type connectors. The main output and line-level talkback output functions use 3-pin male XLRs. The headphone output utilizes a ¼-inch 3-conductor jack. The external source of 24 volt DC power is connected by way of a 2.1 x 5.0mm “locking” coaxial power jack.

In the world of broadcast and production audio it’s fair to say that applications vary widely. To this end, up to three additional XLR-type connectors can be easily mounted into the Model 230’s back panel. Multiple 3-position “headers” located on the Model 230’s circuit board provide technician-access to literally every input and output connection. Using a factory-available interface cable kit, these allow a Model 230 to be optimized to meet the exact needs of specific applications. For example, some applications may prefer to use a multi-pin XLR-type connector

to interface with a headset. This could be easily accomplished by adding the appropriate 5-, 6-, or 7-pin XLR-type connector and making a few simple connections. Other applications may benefit from having “mult” or “loop-through” connections, something easily incorporated into a Model 230.

Options

In most cases the Model 230’s standard resources are more than sufficient to support the desired application. But special needs always seem to arise. To that end, several optional cards are available. Each card contains an integral 3-pin XLR-type connector, allowing simple installation into a spare connector position on the Model 230’s back panel. The direct microphone output card provides access to the dynamic or condenser microphone that is connected to the Model 230. Passive components, along with the auxiliary relay contact, create a “click-free” audio signal. The line output card allows the Model 230 to provide a second line-level talkback output. The card uses passive components, including an audio transformer, for reliable signal interfacing.

200-Series Announcer Console Products

The Model 230 is just one in a series of announcer console products available from Studio Technologies. The Model 230 was designed to support a variety of applications where a wide range of features and flexibility is required. For applications whose requirements are more limited in scope, the other products in the 200-series should be reviewed. Complete information is available on the Studio Technologies website.



Model 230 back panel

Model 230

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Model 230 Specifications

General Audio:

Frequency Response: 20Hz-20kHz, ± 0.1 dB, mic in/main out
Distortion (THD+N): 0.008%, measured at 1kHz, mic in/main out
S/N Ratio: 80dB, referenced to -46 dBu mic in/ -2 dBu main out

Connectors:

Mic In, Line In 1 & 2, IFB In, Intercom Interface: 3-pin female XLR-type

Main Out, Talkback Out: 3-pin male XLR-type

Headphone Out: 1/4-inch 3-conductor phone jack

24Vdc Power In: 2.1 x 5.0mm coaxial power jack with locking bushing, compatible with Switchcraft S760K plug

Spare Connector Locations: 3

Allows up to three Neutrik NC*D-L-1 connectors to be installed (*=3F, 3M, 5F, 5M, 6F, 6FS, etc.)

Microphone Input/Preamplifier:

Type: electronically balanced

Input Impedance: 2k ohms

Gain Range: 20 to 60dB, adjustable in 10dB steps

Compatibility: dynamic or phantom-powered mics

Phantom Power: 48Vdc, nominal, meets IEC 61938

Compressor:

Threshold: 2dB above nominal level

Attack/Release Time: 2mSec/100mSec

Slope: 5:1

Status LED: compressor active

Line Inputs: 2

Type: balanced, transformer-coupled

Impedance: 10k ohms

Nominal Level: -12 dBV to $+6$ dBu, adjustable

IFB Input:

Type: 2-channel, unbalanced (pin 1 common; pin 2 DC with channel 1 audio; pin 3 channel 2 audio)

Impedance: 10k ohms

Nominal Level: -10 dBu

Intercom Interface:

Type: 2-channel, unbalanced (pin 1 common; pin 2 DC with channel 1 audio; pin 3 channel 2 audio)

Compatibility: single- and dual-channel intercom systems such as from RTS™ and Clear-Com®

Impedance: 10k ohms

Nominal Receive Level: -10 dBu

Nominal Talkback Level: -10 dBu

Sidetone: 0 to -18 dB, adjustable

Main Output:

Type: balanced, transformer-coupled

Nominal Level: -2 dBu

Maximum Level: $+20$ dBu into 2k ohms

Impedance: 100 ohms

Talkback Output:

Type: transformer-coupled with series capacitors and isolation resistors

Impedance: 600 ohms

Nominal Level: $+4$ dBu

Maximum Level: $+11$ dBu (compressor restricts maximum)

Headphone Output: 1, stereo

Compatibility: intended for connection to mono or stereo headphones or headsets with nominal impedance of 100 ohms or greater

Type: voltage driver

Maximum Output Voltage: 8Vpp, 150 ohm load

Auxiliary Relay:

Function: software configurable

Contacts: 2, form C (Common, Normally Closed, Normally Open)

Rating: 1A, 30W (resistive)

Access: requires user-implemented connector scheme

Power Sources:

IFB Input: 24-32Vdc, 125mA

Intercom Interface: 24-32Vdc, 125mA

External: 24Vdc, 90mA @ 24Vdc; acceptable range 20-30Vdc. Units shipped to North America and Japan include a 120V input/24Vdc output power supply. Units shipped to all other locations include a universal input/24Vdc output power supply.

Options:

Direct microphone output card, line-level output card

Dimensions (Overall):

8.1 inches wide (20.6cm)

3.3 inches high (8.4cm)

8.5 inches deep (22.4cm)

Weight: 4.5 pounds (2.1kg)

Features and specifications subject to change without notice.

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