



Model 220

Announcer's Console

The Model 220 Announcer's Console is designed to serve as the audio control "hub" for announcers, commentators, and production talent. The tabletop unit is suited for numerous applications including on-air sports broadcasting. The Model 220 is compatible with essentially all broadcast and audio system environments. Standard connectors are used to interface microphone, headphone, on-air, talkback, and IFB signals.

Whether it's microphone switching, talkback outputs, or headphone cue feed, superior audio quality is maintained throughout. A microprocessor provides the Model 220's logic power, allowing exacting 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. Power on the inside, simplicity during use—that's the hallmark of the Model 220.

A truly next-generation product, extensive research into the needs and desires of field production personnel was integral to the Model 220's creation. While primarily targeted for on-air television applications, specialized features are included to allow the Model 220 to be used in a variety of other audio applications. These include on-air radio broadcasting, stadium announcement, and voice-over/narration booths.



Model 220 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 setting of the preamplifier's gain. 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 220 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. It features a high-quality transformer expressly designed for driving long broadcast cable runs.

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 Outputs

The two talkback outputs are intended to provide production trucks, control rooms, or support personnel with talent-originated cue signals. These outputs are transformer-coupled with +4dBu nominal signal levels. They contain resistors in series with their output connector, allowing the talkback outputs from multiple units to be directly "summed."

For non-on-air applications, a special Model 220 feature can be enabled, placing the unit in a "production" mode. This allows the main output to be used as a third talkback output. In this configuration the unit can be even more powerful when used in corporate or theatrical events, for example serving as a master console for a production director.

Dynamic Range Control

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 always used by the talkback outputs. In addition, the audio source for the main output can be selected to be either the output of the microphone preamplifier or the output of the compressor. While possibly not appropriate for major on-air situations, having dynamic range control of the main output can offer increased performance for many applications. These could include stadium announcement positions, sports events using nonprofessional on-air talent, and situations where cable crosstalk is of concern.

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 two talkback outputs. These are the audio outputs 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 220'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 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

Product Highlights:

- Excellent Audio Quality
- Simple User Interface
- Standard Connectors
- Configuration Flexibility
- Next-Generation Performance

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 220 is used in a production-support application.

In addition to the two modes provided for talkback 1, the button associated with talkback 2 supports three additional operating modes. One mode allows talkback 2 to be disabled. This is useful when only talkback 1 is to be utilized. The other two modes provide special momentary and hybrid functions. With these modes the operation of the main and talkback outputs are not impacted. This allows the talkback 2 button to control the state of the Model 220’s auxiliary relay, making specialized implementations possible.

IFB Input

A broadcast-standard “wet” (DC with audio) IFB circuit can be directly connected to the Model 220’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 220 as well as two channels of cue audio.

Cue Sources

The Model 220 allows up to four audio sources to be selected for routing to the headphone output. The sources are IFB channel 1, IFB channel 2, line input 1, and line input 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 IFB input can be assigned to the headphone output. Originating in production trailers, control rooms, or remote locations, these unbalanced sources normally 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 also be connected to the Model 220. 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 a stereo audio feed such as would be associated with a broadcast music event. Two trim potentiometers, located on the bottom of the unit, allow signals with wide nominal audio levels to be cleanly interfaced.

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.

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.

Audio Quality and Protection

The Model 220’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. 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 220 can derive its operating power from either the IFB input or an external nominal 24 volt DC source. For redundancy, both power sources can be connected simultaneously. An internal switch-mode power supply ensures that all Model 220 features, including phantom power, are available when the unit is powered by either source.

The Model 220 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

The Model 220’s circuitry includes a general-purpose relay, allowing specialized configurations to be created. Under software control, the relay can be configured to follow the state of the mic, talkback 1, or talkback 2 buttons. Taking advantage of

the locations provided for additional XLR-type connectors, a technician may easily implement a variety of functions such as mic active indication, audio muting during talkback, or audio insertion control. Several modes were specifically included to allow direct control of the relay using the talkback 2 button, without impacting any of the audio signals. The auxiliary relay is also used by the optional direct microphone output card.

Configuration

Model 220 configurations are made using a number of DIP-type switches and two trim potentiometers. One 8-position switch array is used to set the gain of the microphone preamplifier and the on/off status of phantom power. Another 8-position switch array configures which of the cue audio sources are routed to the headphone output. Two additional 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. All switches and trim pots are accessible via the bottom of the Model 220'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

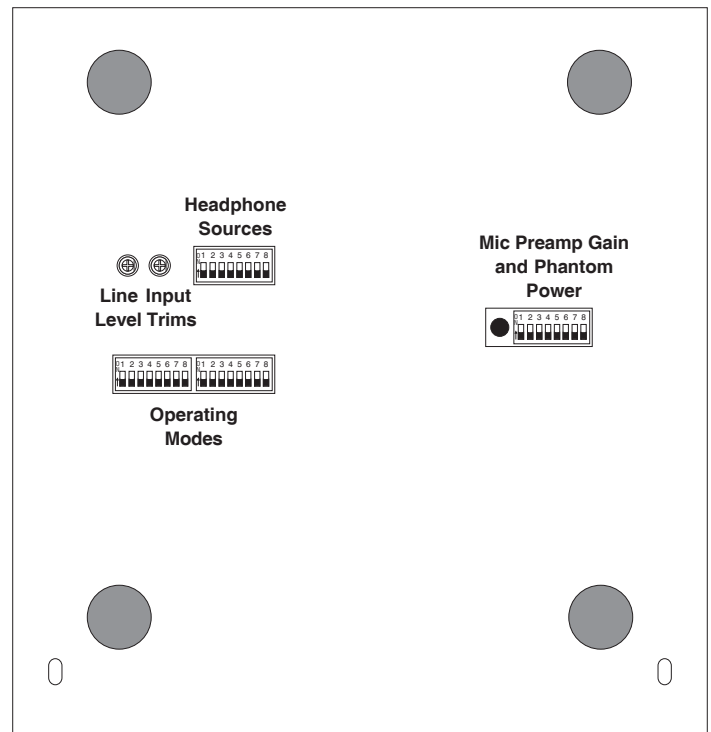
The Model 220 uses standard connectors throughout. The microphone, IFB, and line inputs use 3-pin female XLR-type connectors. The main and talkback outputs use 3-pin male XLRs. The headphone output utilizes a ¼-inch 3-conductor jack. The external source of 24 volt DC power is connected by way of a 2.1 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 220's back panel. Multiple 3-position "headers" located on the Model 220's circuit board provide technician-access to literally every input and output connection. Using a factory-available

interface cable kit, these allow a Model 220 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 220.

Optional Direct Mic Output

In most cases the Model 220'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



Model 220 bottom view showing configuration switches and trim potentiometers



Model 220 back panel

available. Each card contains an integral 3-pin XLR-type connector, allowing simple installation into a spare connector position on the Model 220's back panel. The direct microphone output card provides access to the dynamic or condenser microphone that is connected to the Model 220. Passive components, along with the auxiliary relay contact, create a "click-free" audio signal.

Model 220 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, IFB In, Line In 1 & 2: 3-pin female XLR-type
Main Out, Talkback Out 1 & 2: 3-pin male XLR-type
Headphone Out: ¼-inch 3-conductor phone jack
24Vdc Power In: coaxial power jack, 2.1 x 5.0mm, 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, nominal
Gain Range: 20 to 60dB, nominal, adjustable in 10dB steps
Compatibility: dynamic or phantom-powered mics
Phantom Power: 48Vdc, nominal, meets IEC 61938

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
Nominal Level: -10 dBu

Line Inputs: 2

Type: balanced, transformer-coupled
Impedance: 10k ohms, nominal
Nominal Level: -12 dBV to $+6$ dBu, adjustable

Compressor:

Threshold: 2dB above nominal level
Attack/Release Time: 2mSec/100mSec, nominal
Slope: 5:1, nominal
Status LED: compressor active

200-Series Announcer Console Products

The Model 220 is just one in a series of announcer console products available from Studio Technologies. For applications that require an alternate set of features the other products in the 200-series should be reviewed. Complete information is available on the Studio Technologies website.

Main Output:

Type: balanced, transformer-coupled
Nominal Level: -2 dBu
Maximum Level: $+20$ dBu into 2k ohms
Impedance: 100 ohms, nominal

Talkback Outputs: 2

Type: transformer-coupled with series capacitors and isolation resistors
Impedance: 600 ohms, nominal
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: 24-32Vdc, 125mA
External: 24Vdc nominal, 80mA @ 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

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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