

# *StudioComm*

## **Model 60 Central Controller and Model 61 Control Console**

### **User Guide**

Issue 2, March 1998

This User Guide is applicable for serial numbers:  
Model 60 00200 to 00300  
Model 61 00151 and later

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## Foreword

I am pleased to present the StudioComm series of products. As both president and owner of Studio Technologies, I take a very personal approach when designing products. Getting older has increased my appreciation of the more subtle things in life—be they a part of nature or the nuances contained in a well-designed piece of electronic equipment. Do the technical and operational aspects of a product work together to “feel” right? A Studio Technologies’ design is ready to go only when I am completely satisfied. My entire focus for the StudioComm series was to make a system that you’d really enjoy using, and one that would perform reliably for years. I hope you share my enthusiasm.

Many fine people worked toward making the StudioComm “happen.” Mitch Budniak (ace consulting engineer) designed many of the circuits. Jim Cunningham contributed to the analog design. Carrie Loving provided engineering support. Al Lux designed the printed circuit boards. Fred Roeck performed the mechanical design. Joe Urbanczyk coordinated the safety testing and agency approvals.

Many thanks to Bob Tjarks, professional audio sales manager at Gand Music & Sound, Northfield, Illinois. Bob brought to my attention the need for a product to serve digital audio workstations. His product idea evolved into the StudioComm series. Additional thanks to Timothy Powell of Metro Mobile Recording, Glenview, Illinois, who provided his excellent ears when issues of sonic quality arose. His extensive field and studio experience was extremely helpful in keeping me on the audio “straight and narrow.”

Studio Technologies is receptive to your comments and questions. Please contact me via phone (847) 676-9177, fax at (847) 982-0747, or the Internet at [www.studio-tech.com](http://www.studio-tech.com)—I’d like to hear from you.

Sincerely,

Gordon K. Kapes  
President

# Introduction

The Model 60 Central Controller, along with the companion Model 61 Control Console, are members of the StudioComm family of products. The Models 60 and 61 are specifically designed to work in conjunction with digital audio workstations to provide routing, monitoring, and communications functions. Features include insert switching, control room monitoring, dub (copy) output, and an integrated headphone cue system. Several of the functions can be configured, allowing the performance to be tailored to a specific installation.

## What This User Guide Covers

This User Guide is designed to assist you when installing and using the Model 60 Central Controller and the Model 61 Control Console. A limited amount of troubleshooting information is also provided. Should you require detailed technical information please refer to the Service Guide covering the Models 60 and 61. The Service Guide contains detailed service information, including schematic diagrams. The Service Guide is not shipped with each StudioComm system, but is available from the factory upon request. It is free of charge to purchasers of StudioComm equipment. Give us a call or send a fax or E-mail if you need this highly exciting document!

## System Overview

The StudioComm system is designed to provide control over monitor and dub sources, implements a passive insert switching system, and includes a headphone cue system that allows communica-

tions from the control room to the talent. A complete StudioComm system consists of a rack-mounted controller and a desktop control console.

The Model 60 Central Controller and the Model 61 Control Console work together to provide a simple, convenient operator interface, extensive features, and excellent sonic performance. The units interconnect using a standard 5-pin MIDI-style cable. Switches and controls on the Model 60's front panel allow access to many operating parameters, including activating insert devices, selecting control room and dub input sources, and setting headphone cue system level. The Model 61 Control Console places the most important controls at the operator's finger tips. These include the control room level potentiometer and monaural button, as well as the cue microphone and enable button.

## System Features

### Insert Switcher

The insert switcher section allows an unbalanced stereo audio signal to be routed to up to three processing devices. This feature is specifically provided to allow an analog output signal from an audio workstation to be processed by equalizers, compressors, or other analog devices, then be returned to the workstation's analog input. Three switches on the Model 60's front panel are used to select which one (or more) of the three devices are active in the insert audio chain.

Alternately, the insert switcher can be wired so as to create a four input/one output stereo input source switcher. This can be used for routing analog sources to a work station's analog input.

### Stereo Line Inputs

The Model 60 contains four stereo line-level inputs which are compatible with both balanced and unbalanced signals. Each input is independently configurable for a nominal input level of  $-10\text{dBV}$  or  $+4\text{dBu}$ . Analog audio outputs from digital audio workstations, DAT recorders, video editing equipment, CD players, cassette decks, or virtually any analog source can be connected.

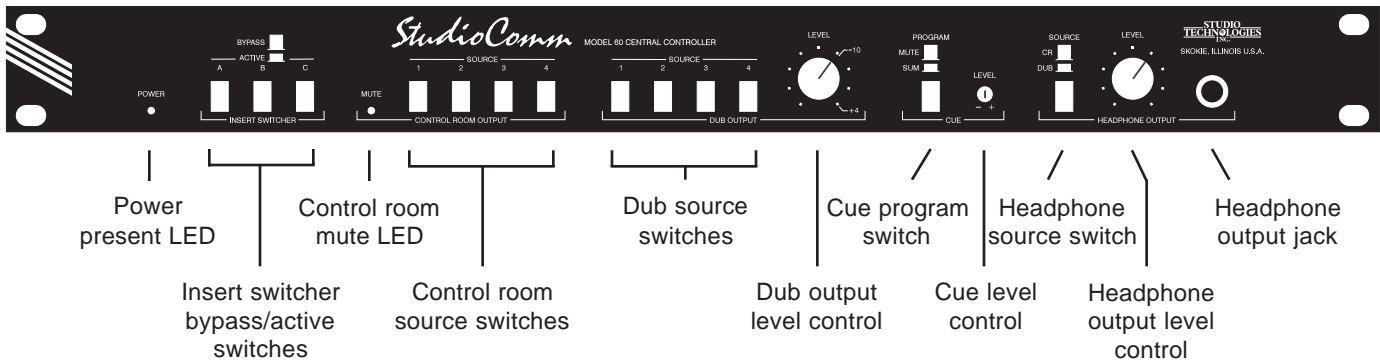
### Control Room Output

A stereo line-level output is provided for connection to a power amplifier associated with control room monitor loudspeakers.

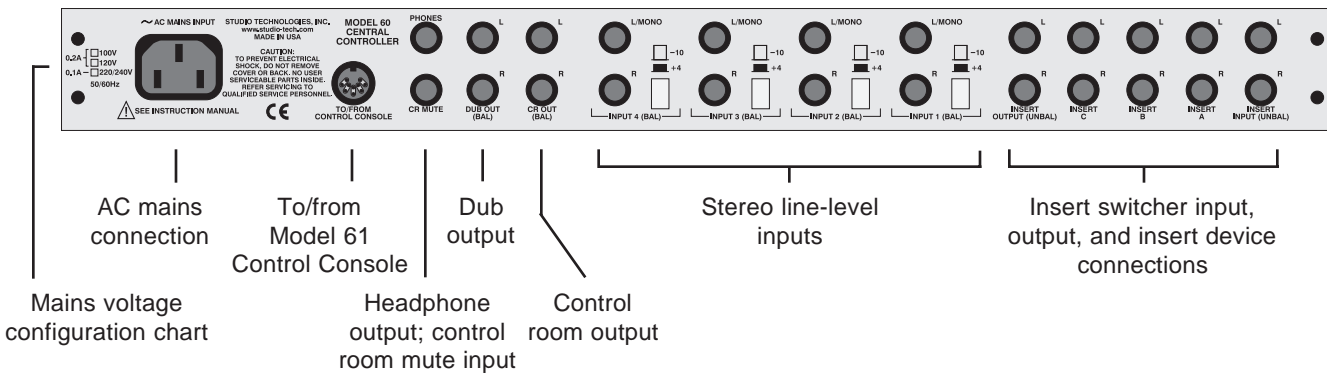
Switches on the Model 60's front panel allow selection of one or more of the four input signals as the control room source. A smooth-feeling rotary control on the Model 61 Control Console allows the control room level to be adjusted. As a production or mixing aid, the Model 61 contains a button that activates the control room monaural (L+R) function.

For broadcast or other special application, an external switch or contact closure can be connected to the Model 60, allowing the control room output to be fully muted as required. An LED indicator on the Model 60's front panel lights whenever mute is active. A power up/power fail

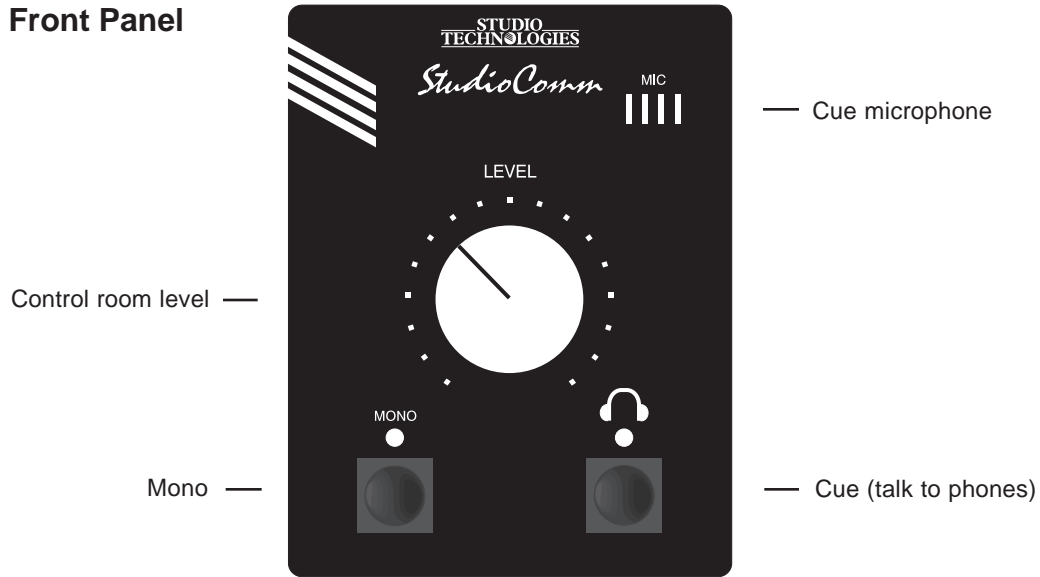
### Model 60 Front Panel



### Model 60 Back Panel



### Model 61 Front Panel



### Model 61 Back Panel



To/from Model 60  
Central Controller

detection function is associated with the mute circuit. This limits the chance of transients being present in the control room output, protecting the control room power amplifier and associated loud speakers.

#### Dub Output

A stereo line-level output is provided for dub (copy) use. It can also serve as a

general-purpose output, useful in many applications. Switches on the front panel of the Model 60 Central Controller allow selection of one or more of the input signals as the dub source(s). For flexibility, a rotary control allows the nominal output level to be adjusted. Turned fully clockwise the output is set for +4dBu, with a calibration mark also shown for a nominal -10dBV output.

## Headphone Monitoring

The Model 60 contains a stereo headphone output section that is capable of driving one or two pairs of high-impedance headphones. With acoustically efficient headphones, such as those from Sony, you can easily reach sonic nirvana! On the Model 60's front panel is a headphone output level control and a source selection switch. The switch allows either the source(s) selected for the control room or the source(s) selected for the dub output to be sent to the headphones. For flexibility, headphone output jacks are provided on both the front and back panels, with separate output circuits driving each jack.

## Cue (Talk to Phones)

The Model 61 Control Console contains an internal microphone and enable button that is used to send voices "cues" to the talent by means of the headphone outputs. To improve voice clarity and prevent acoustic feedback the control room output level automatically attenuates (dims) upon activation of the cue microphone. A control on the Model 60's front panel allows adjustment of the voice level. Also on the Model 60's front panel is a switch that selects whether the voice cue will replace (interrupt) or add (sum) with the normal headphone program source.

# Installation

In this section you will be installing the Model 60 Central Controller in an equipment rack. Input and output connections will be made using the Model 60's multitude of jacks. A location will be selected for the Model 61 Control Console, and it

will be connected to the Model 60. AC mains power will be connected to the Model 60.

## System Components

The StudioComm shipping carton contains a Model 60 Central Controller, Model 61 Control Console, 5-conductor MIDI-style cable, User Guide, and warranty card. Units destined for North America are shipped with an AC mains cord. Your dealer or distributor will provide an AC mains cord for non-North American destinations.

## Mounting the Model 60

The Model 60 requires one space in a standard 19-inch (48.3cm) equipment rack. Select a location near where the Model 61 Control Console will be located. A 10-foot (3.1m) cable is provided to connect the Model 60 to the Model 61. You can supply a longer cable, however 50 feet (15.4m) is the recommended maximum length. It is desirable to locate the Model 60 to allow easy access to both the front and the back panels. The back panel contains most of the input and output connectors, while the front panel contains many switches, controls, and indicator lights. In addition, the front panel also contains one of the headphone output connector. The Model 60 is secured to the equipment rack using two mounting screws per side.

## Audio Inputs and Outputs

The Model 60's line-level audio input and output connections are made using ¼-inch phone jacks. Don't be concerned about your audio quality, the jacks we use are manufactured by Neutrik and feature gold-plated contacts.

**Caution:** For reliable audio interconnection, the plugs you use must comply with industry standard RS-453. Switchcraft No. 297, Neutrik NP3C, or equivalent will work correctly.

### **Insert Switcher**

Of all the functions on the Model 60, the insert switcher may be the most confusing to understand and connect to—even us here at the factory sometimes have trouble explaining it to people! However, it is really quite simple and, once you've connected it into your system, we think you'll find it a very useful, timesaving feature.

The insert switcher is really just a set of ¼-inch jacks on the Model 60's back panel and three push-button switches on the front panel. The insert switcher is entirely passive; the audio signals don't go through any electronic circuitry.

The insert switcher's design premise was that it would be very useful for signals that reside within a digital audio workstation to be easily "processed" by one or more of an engineer's favorite analog devices. In most situations only a small number of devices are used frequently, such as a reverberation unit, tube-type equalizer, and dynamic range processor. The insert switcher eliminates the need to "patch" devices into the audio chain.

Using the switcher is easy: with the workstation interface (mouse, keyboard, or control surface), route the signal to be processed to and from the insert switcher. Then use the switches on the Model 60's front panel to select which of the three devices is active in the audio "chain."

Installation is quite simple:

- connect an analog stereo line-level output signal from the workstation to the insert switcher main input
- connect the insert switcher's main output to an analog input on the workstation
- connect up to three analog processing or effects devices to the insert connections

The following paragraphs cover an installation in detail.

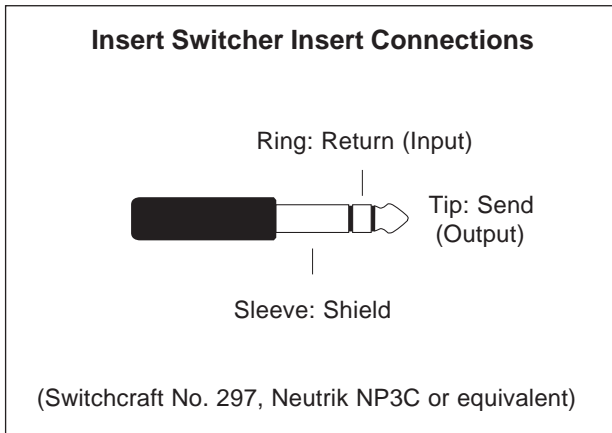
The source audio signal connects to the insert switcher input via two ¼-inch jacks. One jack serves the left channel, the other the right. Using phone plugs connect tip to audio high (+ or hot) and sleeve to shield. If the signal source is balanced it needs to be wired in accordance with the manufacturer's recommended method for unbalanced operation. In most cases the source of the audio signal will be an analog output from a workstation or digital-to-analog converter associated with a workstation.

Two ¼-inch jacks allow access to the insert switcher output. Using phone plugs connect tip to audio high (+ or hot) and sleeve to shield. It is expected that the output signal will be connected to an analog input on a workstation or analog-to-digital converter associated with a workstation.

There are three sets of ¼-inch jacks that are used to connect to the insert devices. The sets are labeled Insert A, Insert B, and Insert C. Each set contains two jacks, one for left and one for right. Like many recording and sound reinforcement consoles, each jack provides both a send (an

output) and a return (an input); tip is send, ring is return, and sleeve is shield. So for each stereo device you'll need two insert cables, each having both a send and a return plug.

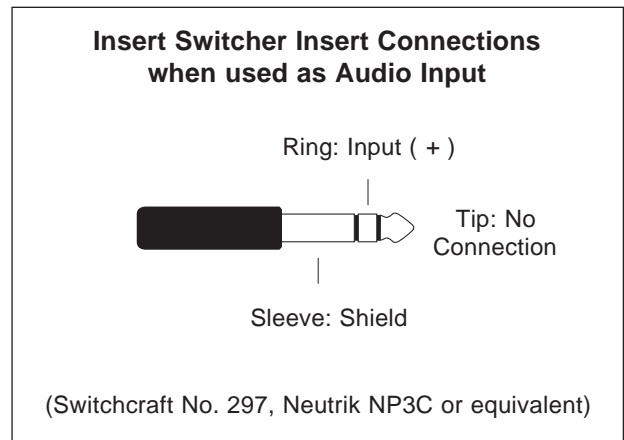
While you can certainly prepare your own "Y-cables," it is far easier to use pre-made insert cables. Your dealer or distributor can assist you in getting the exact cables you need. Studio Technologies has all its production test cables custom made by RAPCO International, Inc. (Jackson, Missouri 63755, U.S.A., (800) 467-2726) with great results. They follow our excruciatingly detailed specifications without a complaint!



### Using the Insert Switcher as an Input Source Switcher

Frankly, when we were designing the Model 60 the decision to include an insert switcher versus including an input source switcher was difficult. While an insert switcher had a lot of merit, it would also be useful to include a feature that would allow analog sources such as CD players, cassette decks, or microphone preamplifiers to be easily selected as an analog input to a workstation. This would save time by eliminating the need to patch

sources or having to buy a separate audio routing switcher. Our final decision was easy once we realized that by including an insert switcher the features of a 4 input/1 output stereo source switcher would also be provided! Follow the next paragraph if you want to implement a source switcher instead of an insert switcher.

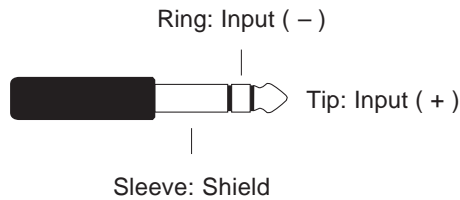


The first audio source should be connected to the insert input jacks. Using ¼-inch plugs, connect tip to audio high (+ or hot) and sleeve to shield. Sources 2, 3 and 4 will be connected to the three insert jacks (labeled A, B, and C) by means of a non-standard wiring scheme. Using ¼-inch plugs, connect ring to audio high (+ or hot) and sleeve to shield; don't connect anything to the tip lead. To be even more clear: you must use a 3-conductor plug and leave the tip floating (isolated)—be warned! The insert output jacks serve as the output of the source switcher. Using ¼-inch plugs, connect tip as audio high (+ or hot) and sleeve as shield.

### Stereo Line Inputs

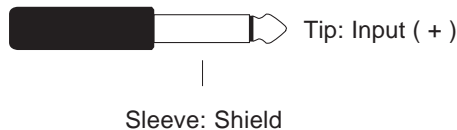
The Model 60 provides four stereo line-level inputs. Each input is electronically balanced and can be individually configured for compatibility with +4dBu or

**Balanced Line Input Connection**



(Switchcraft No. 297, Neutrik NP3C or equivalent)

**Unbalanced Line Input Connection**



(Switchcraft No. 280, Neutrik NP2C or equivalent)

-10dBV signal levels. Switches on the Model 60's back panel allow the input sensitivity to be changed at any time.

Prepare the mating connectors (plugs) so that tip is signal high (+ or hot), ring is low (- or cold), and sleeve is shield. With an unbalanced source connect the tip to high (+ or hot), and both the ring and sleeve to shield. If connecting to an unbalanced source in this manner results in hum or noise, connect tip to high (+ or hot) and ring to shield; leave the sleeve unterminated.

As an installation aid, a connection made only to an input's L/Mono jack routes the signal to both the left and right input circuitry. This allows a monaural signal to be utilized in a 2-channel mono format. If you wish to have a mono input connected only

to the left input, simply insert an unterminated plug into the associated right input. This will break the "normal" connection that links the left and right input circuits.

**Control Room Output**

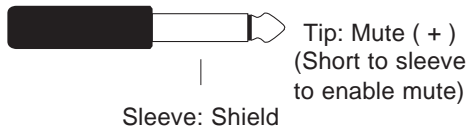
The Model 60 contains a stereo line-level output for connection to an audio power amplifier. This audio amplifier serves a pair of loudspeakers that are located in the control room. (Of course the control room output can be connected to loudspeakers that contain integral power amplifiers, such as the products from Genelec.) The output is electronically balanced and capable of driving loads of 600 ohms or greater. In most situations the best performance will be obtained if the audio amplifier's input sensitivity is set to near maximum. Refer to the Technical Notes section for details on setting amplifier sensitivity.

Prepare the mating connectors (plugs) so that tip is signal high (+ or hot), ring is low (- or cold), and sleeve is shield. To connect to an unbalanced load connect the tip to high (+ or hot), and both the ring and sleeve to shield.

**Control Room Mute**

In special applications, specifically on-air broadcast, it may be desirable to allow the control room output to be manually or automatically muted. This can serve two purposes: eliminating the need to remember to "turn down" the level control on the Model 61 Control Console, and providing a full mute of the control room output signal. The Model 61's rotary control gives a 70dB attenuation range, perfect for normal operation but not the full mute that may be required when a "live" microphone is located adjacent to the control room speakers.

### Control Room Mute Connection



(Switchcraft No. 280, Neutrik NP2C or equivalent)

Access to the control room mute function is via a 1/4-inch jack located on the Model 60's back panel. Mute is enabled whenever the tip lead is shorted (connected) to the sleeve lead. Using a 1/4-inch phone plug, connect a normally open contact to the tip and sleeve. The contact must be capable of handling a current of 7 milliamperes at 15 volts DC.

### Dub Output

The Model 60 contains a stereo line-level output which is intended for connection to a variety of analog audio devices. The dub output is electronically balanced and is capable of driving loads of 600 ohm or greater. With the input impedance of most audio devices being 10k ohms or greater, the dub output can easily drive 10 or more devices simultaneously.

Prepare the mating connectors (plugs) so that tip is signal high (+ or hot), ring is low (- or cold), and sleeve is shield. To connect to an unbalanced load connect the tip to high (+ or hot), and both the ring and sleeve to shield.

### Headphone Output

The Model 60 contains headphone output jacks on both the front and back panels. For flexibility separate amplifier circuits

support each jack; connecting to the front panel jack doesn't affect the jack on the back and vice-versa. The simplest way of using the headphone output is simply to plug a pair of headphones into the front panel jack. In other applications it may be convenient to wire connector panels located in a control room, studio, or voice-over booth to the back-panel headphone output.

Using a 1/4-inch phone plug, the headphone output should be wired with tip as left channel, ring as right channel, and sleeve as output common/shield.

The sonic quality of the headphone outputs are such that they are suitable for use as additional unbalanced line-level outputs. If it is anticipated that the installation may benefit from this ability it may be helpful if the back-panel headphone output is wired into jacks on a patch bay. In this way this headphone output can be rapidly connected to other pieces of equipment.

### Connecting the Model 60 to the Model 61

A standard 5-conductor MIDI-style cable is used to connect the Model 60 to the Model 61; a cable is included with each system. Just connect the cable between the female 5-pin DIN-type connectors on the back panels of both the Model 60 and 61, and viola, you're done.

**Note:** If you require a longer cable, be certain to buy a MIDI-type cable that has all 5 pins wired. If they aren't all connected, the Model 61 will not operate. For best performance, the cable that connects the Model 60 with the Model 61 should be limited to 50 feet (15.4m).

## AC Mains Power

The Model 60 is internally configured to operate from either 100, 120, or 220/240V, 50/60Hz. In most cases, units shipped to North America are factory selected for 120V operation. Units bound for Japan are selected for 100V, while our friends “down under” and in Europe receive units set for 220/240V. Before connecting the Model 60 to mains power, check that it is configured to match the local mains voltage. Look on the back panel, adjacent to the power entry connector, for the configured voltage(s). Note that an incorrect configuration could seriously damage the unit. Should it be necessary to change the unit’s operating voltage it must be performed only at the factory or by an authorized service technician.

The Model 60 uses an IEC standard connector to mate with the AC mains cord. The wire colors in the AC mains cord should conform to the internationally recognized CEE color code and must be wired accordingly:

<u>Connection</u>	<u>Wire Color</u>
Neutral (N)	Light Blue
Line (L)	Brown
Protective Earth (E)	Green/Yellow

**Safety Warning:** The Model 60 does not contain an AC mains disconnect switch. As such the mains cord plug serves as the disconnection device. Safety consideration requires that the plug and associated outlet be easily accessible to allow rapid disconnection of mains power should it prove necessary.

As soon as mains power is applied, the Model 60’s power present LED will light.

# Configuration

Once the Model 60 and Model 61 have been installed, the only configuration issue you need to address is input sensitivity.

## Input Sensitivity

Input sensitivity configuration switches are associated with each of the four stereo line-level inputs. For correct Model 60 operation the switches, located on the back panel directly adjacent to the input jacks, must be correctly set. For an input signal with a nominal operating level of  $-10\text{dBV}$  set to switch to the out position, for a  $+4\text{dBu}$  input signal set the switch to the in position.

# Operation

Now that you’ve installed and configured the system, you’re ready to go. You should find operation very easy.

## Status LEDs

There are two LEDs on the Model 60 Central Controller’s front panel. The power LED is lit whenever AC mains power is applied to the unit. The control room mute LED is lit whenever the mute function is active. For normal control room speaker operation the mute LED must not be lit.

There are two LEDs on the Model 61 Control Console. One indicates the status of the control room mono function, the other the status of the cue (talk to headphones) function.

## Insert Switcher

On the Model 60’s front panel are three push-button switches associated with

the insert switcher. Correct operation of the switches depends on how the insert switcher section is wired into your specific audio system. There are two ways the insert switcher may have been configured: as an insert switcher or as an input source switcher. When configured as an insert switcher a signal is sent from, and returned to, an audio workstation. The three switches are used to select which of the insert devices are active in the audio "chain." An insert switch set to its active position routes signal to the insert device and connects the device's output into the signal path. A switch set to its bypass position will still route audio to the insert device, but does not connect to the device's output. If all three switches are in the bypass position then the unmodified input signal is routed directly back to the workstation.

When configured as an input source switcher, operation of the three push-buttons is quite easy but with a little "twist" that must be remembered: only one of the switches can be set to the active position at a time. When all three switches are in their bypass position, input 1, connected to the insert switcher's main audio input, is routed to the output. To select input 2 place switch A to the active position; ensure that switches B and C remain in bypass. Follow the same rules to select inputs 3 and 4. Should you make a mistake and have more than one switch in the active mode at the same time, the "last" switch will take priority. As an example: if you have switches A and C in the active position, input 4 (handled by switch C) will be selected as the input source.

## **Control Room Monitoring**

Using the four push-button switches located on the Model 60's front panel, one or more of the input sources can be selected for monitoring. The switches are such that you can simultaneously depress and "lock-in" two, three, or all four. Some practice may be required to get the "feel" of selecting multiple inputs. Circuitry in the Model 60 electrically sums (adds) the sources you select.

The control room output level is set using the rotary control ("pot") on the Model 61 Control Console. When the pot is fully counterclockwise the output is attenuated by approximately 70dB, not a full mute.

Whenever the cue (talk to phones) function is active the control room output level attenuates (dims) by approximately 18dB. This can prevent acoustic feedback and allows voice signals to be clearly heard.

The Model 61 Control Console contains a push-button switch to activate the monaural function. The switch is electrically set for latching operation; press once to active mono, press again to go back to stereo. An LED, located directly above the mono switch, displays mono status. The mono function sums (adds) the left and right source(s), drops the level 3dB, and sends the resulting signal to both the left and right control room outputs.

The Model 60 Central Controller allows the connection of a switch or relay contact to enable a control room output mute function. Whenever mute is active the control room output is effectively disabled, and the mute status LED, located on the Model 60's front panel, lights. Note that when mute is active the control room level pot on the Model 61 is disabled.

## Dub Output

Four push-button switches, located on the Model 60's front panel, are used to select one or more of the input sources to be routed to the dub output. Circuitry in the Model 60 electrically sums (adds) the sources you select.

A rotary level control ("pot") on the Model 60's front panel is used to set the dub nominal output level. This allows the dub output level to be quickly set to match the input sensitivity of the connected equipment. In the fully clockwise position the circuitry is unity gain. In the fully counterclockwise position the dub output is fully attenuated, allowing the pot to be used as an output "fader" for special applications. Markings on the Model 60's front panel identify where the rotary control should be set for nominal output levels of +4dBu and -10dBV.

## Headphone Output

**Warning:** Protect your ears! The headphone output is capable of driving headphones to extremely high sound pressure levels. Hearing experts (along with common sense and your mother) advise against continuous extended play, especially at high levels.

A rotary level control on the Model 60's front panel is used to set the headphone output level. The "pot" sets the output level for the both headphone output jacks, front and back.

A push-button switch, located adjacent to the headphone level control, is used to select the headphone source. When the switch is set to the CR (control room) position the audio source(s) selected for control room monitoring are also sent to

the headphones. The control room output level pot, mono button, and output mute function do not effect the headphone output. When the headphone source switch is set to the dub position the audio source(s) selected for dub are also sent to the headphones. The dub output level control does not effect the headphone output.

## Cue (Talk to Phones)

The cue function allows voice cues from the control room to be sent to the headphone output. Using cue is quite simple; press the push-button switch on the Model 61 Control Console and start talking! Above the cue switch is a status LED and a graphic outline of a pair of headphones. The cue switch is set for momentary operation so you'll need to press and hold the switch while you are talking to the headphone user.

A rotary level control ("trim pot") on the Model 60's front panel is used to set the voice cue level relative to the normal audio level. Set the trim pot so as to give a comfortable level to the headphone user. Adjacent to the trim pot is a push-button switch that sets the cue operating mode. With the switch set to the interrupt position the normal audio signal going to the headphones is muted (interrupted) whenever cue is active. When the switch is set to the sum position the voice audio is summed (added or mixed) with the normal audio. In an on-air setting or an application such as foley, you'd want to use the sum position. In this way voice cues won't inhibit the talent's ability to hear themselves or other important program material. The interrupt mode is useful when you are not recording or broadcasting in a "real-time" setting and "loud" program material makes a voice cue hard to hear.

## Troubleshooting

### Intermittent Audio Connections

Should you experience audio connections that seem to be “flaky” or intermittent carefully check the ¼-inch plugs that are used to interface the installation with the Model 60. The ¼-inch phone jacks used on the StudioComm products are of very high quality, conforming to the industry standard EIA RS-453. Some ¼-inch plugs do not meet this standard, specifically in the shape of the tip conductor. In rare cases you may have to replace plugs on interconnecting cables or headphones to remedy an interconnection problem. Switchcraft No. 280 (2-conductor)/No. 297 (3-conductor) or Neutrik NP2C (2-conductor)/NP3C (3-conductor) phone plugs will function correctly.

### Clicks in the Audio

As covered in the Configuration section of this guide, the four stereo line inputs can be configured for +4dBu or -10dBV operation. Setting an input for -10dBV, while connecting an audio source with a +4dBu nominal level can lead to distortion (“clipping”) of the signal. In this fault condition the user might hear a harsh “clicking” sound in the audio, especially when peak levels occur in the program material. To remedy this problem simply use the appropriate switch on the Model 60’s back panel to configure the input for +4dBu operation. The distortion will go away and the gain structure of the StudioComm system will be correctly established.

## Technical Notes

### Definition of Level—dBu and dBV

Whenever possible, Studio Technologies has opted to use the dBu designation as it seems to be quite rational. Using dBm was fine when all audio line outputs were terminated with 600 ohm loads. In this way it was easy to say that 0dBm is 1 milliwatt dissipated in the known load (i.e., 0dBm across 600 ohms will measure 0.775V). In contemporary situations an output is rarely terminated with 600 ohms; generally 10k ohms or higher. The dBu designation is better because it refers to dB referenced to 0.775V, with no reference to load impedance. This takes into account today’s audio scene where signals have a low source impedance, and a high input impedance. The dBu designation is becoming the standard for the professional audio industry.

The Model 60 Central Controller is designed to interface with audio signals that have nominal signal levels of +4dBu or -10dBV. You might wonder why dBV came into the picture. Most people don’t realize that equipment that utilizes “-10” levels usually mean -10dBV, which is substantially different from -10dBu (-10dBV = -7.78dBu). The dBV designation is simply a different way of measuring signal level and is often used when dealing with portable or consumer audio equipment. The dBV designation refers to dB referenced to 1.0V, rather than dBu which refers to 0.775V.

### “Hot” Disconnection of the Model 61 Control Console

Should you need to relocate the Model 61 while your StudioComm system is

operating, there is no reason why you can't disconnect the 5-conductor cable, move the unit, and then connect it again. No clicks, pops, or other noises will occur when the Model 61 is disconnected and then again connected.

### **Cue (Talk to Phones) Noise**

During field trials of the Model 60 and 61 one item came up for discussion: "thumps" in the cue function. A brief discussion may be useful. The Model 60 and Model 61's electronics that support the cue function is quite quiet, not adding appreciable "clicks, pops, or thumps." However, mechanical noise being picked up by the Model 61's microphone can be an issue.

If the cue button is pushed using a relatively light "touch" no objectionable noise will be generated; pressing the button with "gusto" will cause mechanical noise to be transferred into the microphone. While the Model 61's microphone is of good quality, shock mounting it was not possible using a cost-effective method. The fact that the Model 61 is physically small and the button is relatively close to the microphone adds to the difficulty. (Note that most all recording consoles, both small and large, share this condition.) So in conclusion, use a light touch on the button and everyone should stay reasonably happy!

### **Power Amplifier Input Sensitivity**

Optimum StudioComm performance is obtained when the input sensitivity of the control room power amplifier is adjusted to match the Model 60's control room output level. With normal, but loud, listening levels you should find the level potentiometers on the Model 61 to be set to about 2 o'clock. If you find that you don't have to turn up the Model 61's control that high,

reduce the input sensitivity of the power amplifier so you can operate at the 2-o'clock position. Most power amplifiers have controls on their inputs to allow easy adjustment of their input sensitivity.

### **Slating Issues/Cue Audio to Dub Output**

From the factory, voice cues are sent only to the headphone output. It was anticipated that this would be the most common use, specifically allowing personnel in the control room to talk to talent in a studio or voice-over booth. In some cases it may be desirable to have a "slate" function—sending a voice cue to an audio workstation or other recording medium. There is a means of achieving this by modifying the Model 60 to route the cue audio to the dub output. From the factory this is not implemented, but is as simple as having a qualified technician install two resistors into the Model 60's printed circuit board.

After the modification, whenever the cue button is pressed on the Model 61 Control Console the voice audio will go out both the headphone and dub output. The limitation here is that you have to be careful of what is being routed through the dub output when you are voice cueing to the headphones, and vice versa; a voice cue to the phones is a voice cue to the dub! For details on implementing this modification you'll need a copy of the Model 60 schematic diagrams, available by contacting the factory.

### **Modifying the Back-Panel Headphone Output**

Each headphone output, front panel and back panel, is driven by an independent output circuit. From the factory the same audio signal connects to each output

circuit, but provisions have been made to allow the audio source for the back-panel headphone output circuit to be changed. The revised output will give flexibility for those rare applications that seem to so often arise! Once modified, the back-panel headphone output will act more like that of a line-level output. The alternate choices are pre-level-control headphone audio or cue audio. The pre-level-control audio signal is the same source as the standard headphone audio signal, but is not effected by the front-panel level control. This implementation would be useful where an audio facility has an existing headphone amplifier system with level controls. The other choice of having cue audio would prove useful for specialized talkback or cueing applications, such as remote ISDN configurations. In this configuration, only when the cue button on the Model 61 is active will Model 61 microphone audio be present on the back-panel headphone output. When the cue button is not pressed, no audio will be present on the back-panel headphone output jack.

For details on implementing these alternate routing scheme you'll need a copy of the Model 60 schematic diagrams, available by contacting the factory.

### **Model 61 Momentary/Latching Button Operation**

From the factory the Model 61 is set to have the mono function change state (latch) each time the button is pressed. The cue button is set for push to activate (momentary) operation. In most cases these operating modes will be appropriate. However, if you don't agree with our choices don't despair. In the Model 61's circuitry both functions can support momentary and latching operation. A

qualified technician can remove a strap to make the mono function be momentary and/or add a strap to make the cue function latching. For details on implementing these changes refer to the Service Guide, available from the factory.

### **Control Room Mono Function**

Many arguments were had while designing the control room monaural function. Was the function supposed to be a true mono function, sending the sum of left and right to a separate mono control room output? Was mono to be the sum of left and right sent to both left and right channels? What about level build up with phase coherent signals that are in both the left and right channels? After much head scratching it was realized that the mono function that most people are accustomed to is really a means of observing the character of a stereo mix, and not a "true" mono function. To observe the stereo image of a mix you need to sum the left and right signals, drop the level of the sum by 3dB, and send the result out the left and right outputs. This is what virtually all recording consoles implement, and is what the Model 60 does, too! We understand that specialized applications such as mastering and film mixing may require a more exotic mono function. Sorry, our hardware simply can't support it!

# Specifications

## Model 60 Central Controller

### Mounting:

One space in a standard 19-inch (48.3cm) rack

### AC Mains Requirement:

100, 120, or 220/240V,  $\pm 10\%$ , factory configured, 50/60Hz, 100-120V 0.2A maximum, 220/240V 0.1A maximum

### Connectors:

**Audio and Control:** ¼-inch, 3-conductor phone jacks

**AC Mains:** standard 3-blade plug, meets IEC 320 specifications

### Fusing:

**Qty:** 1

**Type:** 5 x 20mm time lag (Littelfuse 218-series or equivalent)

**Rating:** 0.200A for 100 and 120V mains power, 0.100A for 220/240V mains power

### Insert Switcher:

**Applications:** allows routing of three unbalanced stereo analog audio signals into audio path

**Switching:** passive (no electronics in signal path)

**Nominal Operating Level:** not specified

### Audio Inputs:

**Qty:** 4, stereo (separate left and right input connectors)

**Type:** electronically balanced, direct coupled, compatible with balanced or unbalanced signals

**Impedance:** 24k ohms

**Nominal Input Level:**  $-10\text{dBv}$  or  $+4\text{dBu}$ , each input individually configurable

**Common Mode Rejection:** 100dB @ DC and 60Hz, 70dB @ 20kHz, 62dB @ 40kHz (typical)

### Control Room Output:

**Qty:** 1, stereo (separate left and right output connectors)

**Type:** electronically balanced, intended to drive loads of 600 ohms or greater, balanced or unbalanced

**Output Level (input source at nominal level):**  
 $-68\text{dBu}$  at 0% rotation (fully counterclockwise),  
 $-50\text{dBu}$  at 25% rotation,  $-32\text{dBu}$  at 50% rotation,  
 $-14\text{dBu}$  at 75% rotation,  $+4\text{dBu}$  at 100% rotation (fully clockwise)

**Maximum Output Level:**  $+27\text{dBu}$  into 10k ohms,  $+26\text{dBu}$  into 600 ohms

**Frequency Response:** 10Hz-40kHz  $+0/-0.5\text{dB}$

**Distortion (THD+N):** 0.02% (measured at 1kHz)

**S/N Ratio:** 87dB (20Hz-20kHz ref.  $+4\text{dBu}$  output)

**Mono:** (L+R)  $-3\text{dB}$  to both left and right outputs

**Mute:** output level drops to 90dBu upon application of contact closure. Contact closure must be capable of handling 7mA at 15 volts DC.

**Dim:** output level drops 18dB when cue (talk to phones) active

### Dub Output:

**Qty:** 1, stereo (separate left and right output connectors)

**Type:** electronically balanced, intended to drive balanced or unbalanced loads of 600 ohms or greater

**Nominal Output Level:**  $+4\text{dBu}$ , adjustable  $+0/-\infty\text{dB}$

**Maximum Output Level:**  $+27\text{dBu}$  into 10k ohms,  $+26\text{dBu}$  into 600 ohms

**Frequency Response:** 10Hz-40kHz  $+0/-0.25\text{dB}$

**Distortion (THD+N):** 0.005% (measured at 1kHz)

**S/N Ratio:** 90dB (20Hz-20kHz ref.  $+4\text{dBu}$ )

### Headphone Output:

**Qty:** 2, each jack (front and back) has separate output circuit

**Compatibility:** each output intended for connection to headphones with impedance of 100 ohms or greater

**Maximum Voltage:** 8Vpp, 100 ohm load

### LED Indicators:

**Qty:** 2, power present and control room mute

### Dimensions (Overall):

19.00 inches wide (48.3cm)

1.72 inches high (4.4cm)

6.65 inches deep (16.9cm)

(1 standard rack space)

**Weight:**

6.5 pounds (3.0kg)

**Model 61 Control Console**

**Mounting:**

Desktop

**Power Requirements:**

Provided by Model 60 Central Controller

**Interconnection:**

5-conductor MIDI-style cable, 10-foot (3.1m) cable supplied, maximum length 50 feet (15.3m)

**Internal Microphone:**

**Type:** electret condenser

**Frequency Response:** 3dB roll off at 200Hz

**LED Indicators:**

**Qty:** 2, mono active and cue (talk to phones) active

**Dimensions (Overall):**

3.2 inches wide (8.1cm)

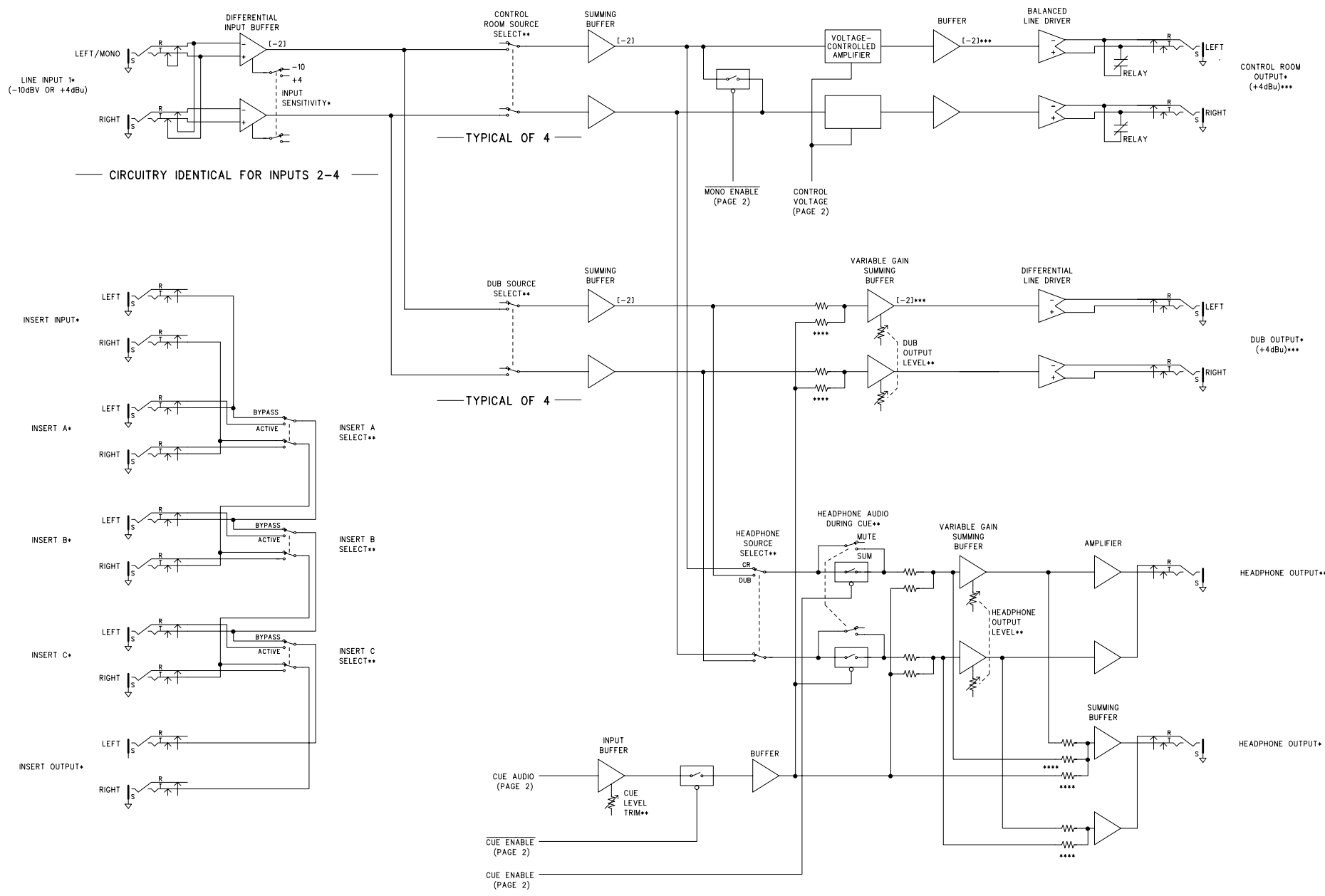
2.2 inches high (5.6cm)

4.1 inches deep (10.4cm)

**Weight:**

0.8 pounds (0.4kg)

Specifications and information contained in this User Guide subject to change without notice.



M60BDC

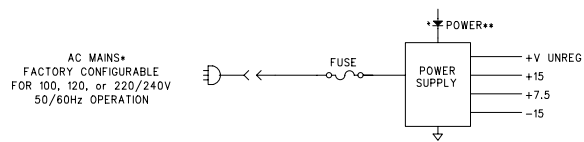
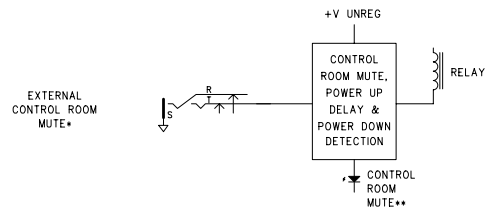
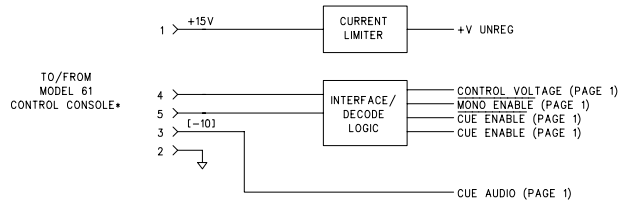
- \* LOCATED ON BACK PANEL
- \*\* LOCATED ON FRONT PANEL
- \*\*\* W/LEVEL CONTROL AT MAXIMUM
- \*\*\*\* OPTIONAL ROUTING (NOT FACTORY CONFIGURED)

STUDIO TECHNOLOGIES, INC.

MODEL 60  
CENTRAL CONTROLLER  
BLOCK DIAGRAM  
FOR SN 00200 AND LATER

(NOMINAL LEVEL IN dBu)

DRAWING NO.	DATE	PAGE
30426	03/06/98	01 OF 02

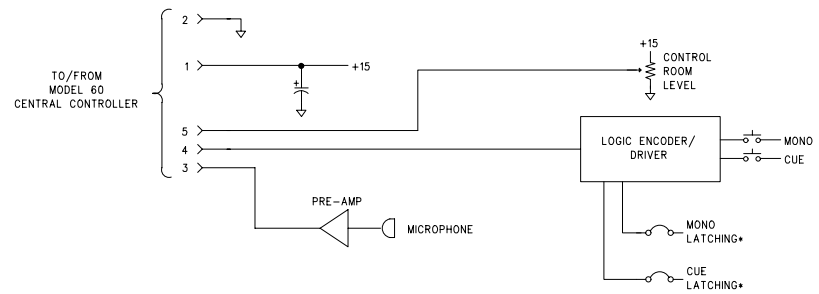


\* LOCATED ON BACK PANEL  
 \*\* LOCATED ON FRONT PANEL  
 \*\*\* W/LEVEL CONTROL AT MAXIMUM  
 (NOMINAL LEVEL IN dBu)

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M61BDB

STUDIO TECHNOLOGIES, INC.  
 MODEL 61  
 CONTROL CONSOLE  
 BLOCK DIAGRAM

• CONFIGURATION STRAPS. FROM FACTORY  
 MONO LATCHES, CUE MOMENTARY

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30434	06/30/95	01 OF 01