StudioComm
for Surround

Model 58 Central Controller and Model 59 Control Console

User Guide

Issue 4, December 2000

This User Guide is applicable for serial numbers:
Model 58 M58-00351 and later
Model 59 M59-00231 and later

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50079-1200, Issue 4

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Foreword

Simply stated: I had a blast working on the StudioComm for Surround components! It is very rewarding to develop a set of products for a market that's actually receptive to new ideas and supportive of innovation.

A big thanks to Jeff Levison, formerly of Warner Hollywood Studios. He patiently answered our questions over a period of many months, helping to guide us in the right direction. I recently read an interesting book on the history of the Warner Brothers and their movie empire. One of the things that stood out was their long-term commitment to audio. From the *Jazz Singer* to the current DVD releases, they haven't been afraid of staying on the forefront of sound for picture. Good going guys!

Additional thanks to a couple of smart audio dudes. Thierry Jeandroz of LTRT in Paris encouraged me to add several features to improve our audio-post support. Rob James, formerly of the BBC and now a consultant and writer, suggested how the operator interface could be improved. The software now reflects the sage advice of these gentlemen.

Mitch Budniak designed much of the hardware and kept us out of "digital trouble." Carrie Loving provided engineering support and designed the product graphics. Larry Leviton wrote the excellent software that makes the hardware "come to life." Fred Roeck performed the mechanical design. Al "PCB PRO" Lux designed the...you guessed it! Joe Urbanczyk coordinated the safety testing and created the automated test routes for our Audio Precision System Ones.

Our plans are to continue with other StudioComm for Surround components. Your praise, comments, or complaints are encouraged, helping to keep us going in the right direction. Please contact me via E-mail at gkapes@studio-tech.com.

Sincerely,

Gordon K. Kapes
President

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Introduction

What This User Guide Covers

This User Guide is designed to assist you when installing and using the Model 58 Central Controller and the Model 59 Control Console.

StudioComm for Surround

As the production of multi-channel "surround sound" audio material becomes more prevalent, the need for monitoring these sources becomes imperative for more and more facilities. Whether it's 4-, 6-, or 8-channel formats, a means to select input sources, insert support devices into the audio path, and control the output level to monitor loudspeakers is required. Studio Technologies has addressed this need with the StudioComm for Surround Model 58 Central Controller and Model 59 Control Console. Using these components a system can be configured to meet a facility's exact monitoring requirements.

A StudioComm for Surround system starts with a Model 59 Control Console, a compact but comfortable "command center," that is designed to reside at the operator's location. Using a single 9-pin cable, a Model 59 connects to up to four Model 58 Central Controllers. Each Model 58 supports four 2-channel inputs and two output channels in a single rack space. By selecting two, three, or four Model 58s, 4-, 6-, or 8-channel systems can be created.

The Models 58 and 59 were developed in conjunction with experts in the post-production audio field. The overall goal turned out to be very straightforward: Provide the necessary technical performance and features, while keeping it simple to operate! Be certain that users won't have to go through a long "learning curve" before they become efficient. Allow the StudioComm for Surround system to be flexible, but not so much as to hinder the "big picture." The end result achieves these goals, providing extensive capability in a simple-to-operate format.

Model 58 Central Controller

The Model 58 Central Controller is a single rack-space unit that supports two output channels. Multiple Model 58s are connected together to achieve 4-, 6-, or 8- channel systems. Each Model 58 provides eight main inputs, organized as four 2-channel pairs. Two 2-channel insert sections allow connection to external processing equipment, specifically surround-sound encoder-decoder units. The insert sections can also be used for special applications, such as creating a phantom center channel. The 2-channel monitor output section is switched, using electro-mechanical relays, to allow connection of two separate loudspeaker systems. Protection circuitry provides power-up and power-down protection for the loudspeakers. A 2-channel meter output provides a "reference" signal, and is not affected by the monitor output's level-control circuitry.

The main inputs, insert sends and returns, and monitor outputs are electronically balanced, while the meter outputs are unbalanced. Fifteen-turn trim potentiometers are used to precisely calibrate the main input, insert return, and monitor output signals. Audio signal connections are made using three 25-pin D-subminiature connectors. The connectors follow an industry-standard multi-channel wiring scheme. Two 9-pin D-subminiature

connectors are used in a simple loop-through arrangement to connect the Model 58 to a Model 59 Control Console, as well as to additional Model 58 units.

The bypass function allows a line-level audio source to be passively routed to the monitor output channels. The bypass audio source is normally the monitor output of an audio console. The bypass function, along with remote control input 2, makes it simple for an existing facility to add surround monitoring capability, while maintaining its existing resources.

An 8-bit micro-controller provides the logic "horsepower" for the Model 58. DIP switches are used to select the Model 58's unit ID and operating mode. AC mains power is connected directly to the Model 58, which is factory selected for 100, 120, 220/240V operation. The internal power supply utilizes a toroidal mains transformer for quiet audio operation.

Model 59 Control Console

The Model 59 Control Console is a compact, self-contained unit designed to be located at the operator's position. It allows fingertip control of all monitoring parameters. Numerous LEDs provide complete status information. The Model 59 supports up to eight output channels, and up to four, 8-channel input sources. The actual operating configuration simply depends on the number of Model 58 Central Controller units which are connected.

The Model 59 provides four buttons and associated LEDs for selection of the input source to be monitored. While in most

Figure 1. Model 58 Central Controller Front Panel

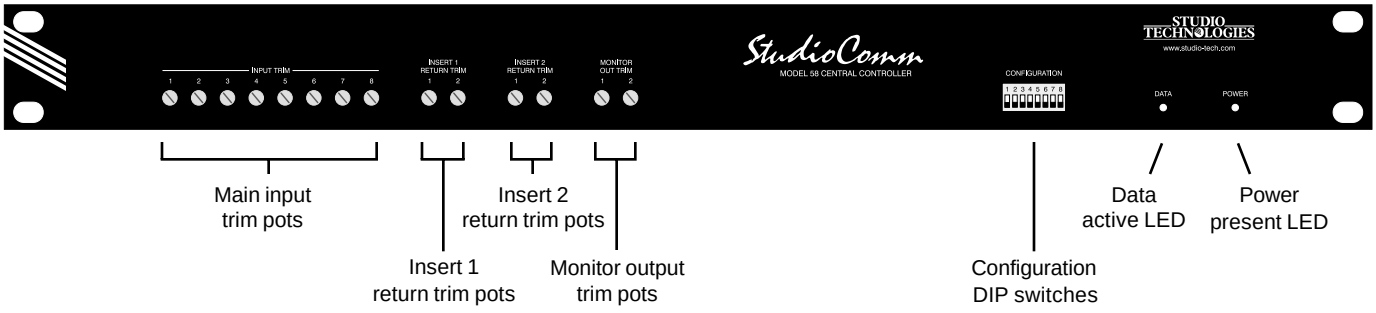
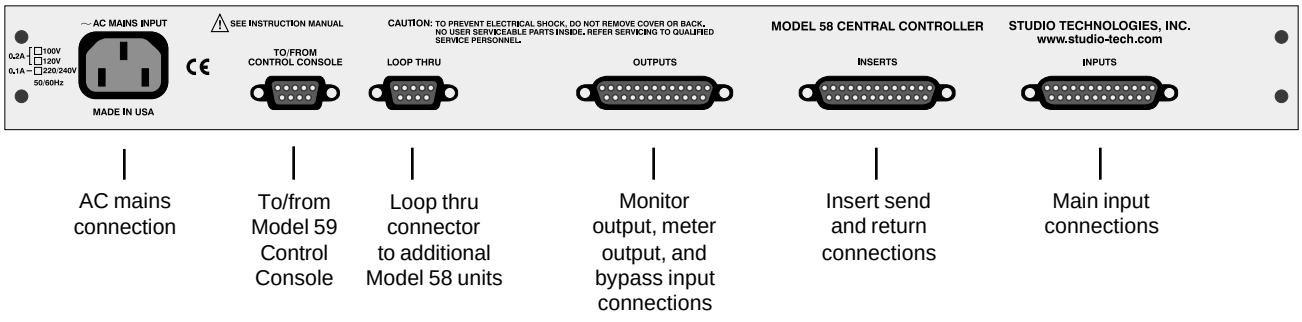


Figure 2. Model 58 Central Controller Back Panel



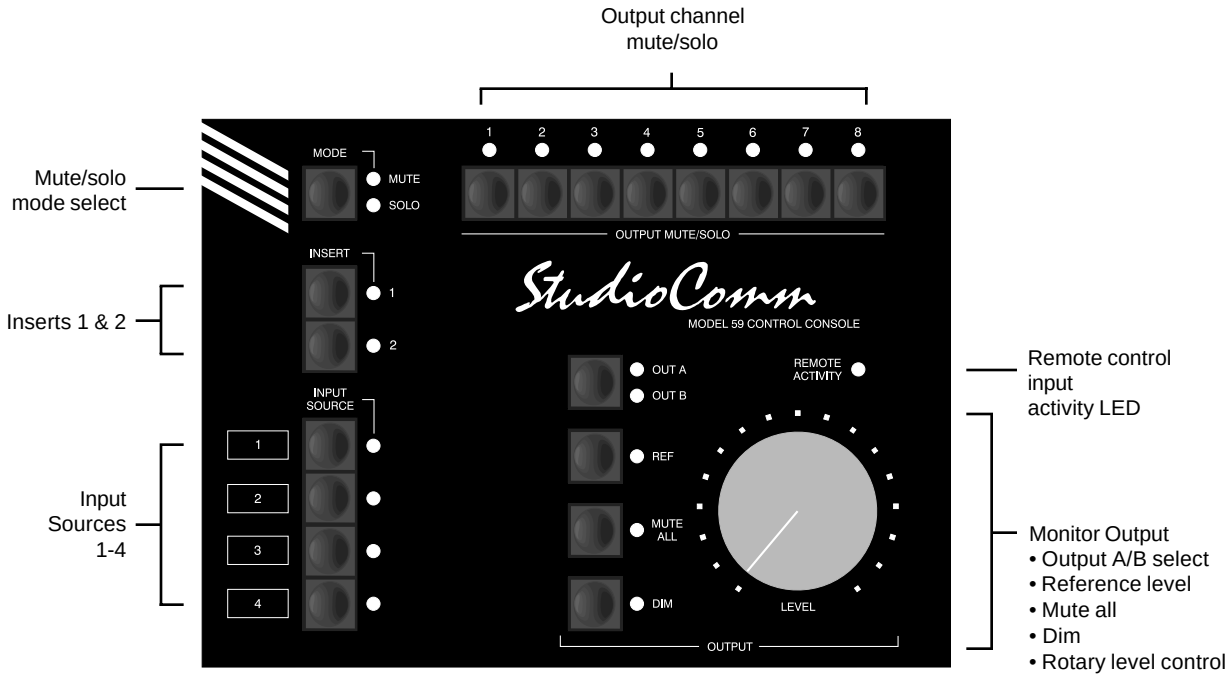


Figure 3. Model 59 Control Console Front Panel

cases only one input source will be monitored at a time, multiple inputs can be selected for simultaneous monitoring. This allows two, three, or all four of the input sources to be combined ("summed"). While there is no independent control of the input levels, this feature can be useful for creating rough mixes from the source signals. It is also a fast, effective means of making a "seat-of-the-pants" check on the phase relationship between synchronized signals.

The monitor output level is controlled either through the use of a large, easy-to-use rotary control, or by enabling the preset reference level. For operator convenience, the dim function allows the monitor output level to be reduced by a fixed dB amount. The mute all function disables all monitor outputs by activating the mute relays on the Model 58 Central Controller units. A push-button switch and two LEDs are used to select the desired monitor output—either A or B.

The StudioComm's two insert sections are directly accessible using push-button switches. While they can perform a standard insert action, they can also be used to provide a wide range of muting, routing, and summing functions. Each insert can be configured, on a channel-by-channel basis, to act in one of four modes: Mute, maintain connection of the normal signal, insert the return signal in place of the normal signal, or sum the return signal with the normal signal.

Control of individual monitor output channels is provided by the mute/solo section. One push-button switch sets the operating mode for either mute or solo. In the mute mode, individual channels can be muted or un-muted as required. In the solo mode, one channel can be monitored while the

others are automatically muted. (Of course, multiple channels can be simultaneously selected for “soloing.”) The flexibility of having both mute and solo available allows an operator to quickly select the most comfortable and productive operating mode.

A major strength of the Model 59 is the ability to configure, under software control, many operating parameters. During initial installation the Model 59 is “taught” the number of monitor output channels to be controlled, the number of channels associated with each of the four inputs, and the routing to be performed by the insert sections. The monitor output reference level is set by taking an electronic “snapshot” of the position of the rotary level control. The dim level is selected from among four choices. A number of other operating parameters can also be configured, including how the remote contact and level control inputs will function. All configuration parameters are stored in non-volatile memory.

A Model 59 Control Console connects to a Model 58 Central Controller using a standard 9-pin D-subminiature cable. Multiple Model 58 units connect together in a bus fashion. Power for the Model 59 is provided by the Model 58s. The Model 59 generates MIDI system-exclusive messages to control the Model 58 units. Remote control signals connect to one of the Model 58 units, then on to the Model 59 via pins in the 9-pin interconnecting cable.

Remote Control Capability

Three remote control functions are provided: Contact input 1, contact input 2, and level. Contact input 1 can be configured as either a remote mute all or a remote dim function. This supports external functions such as talkback or slate. Contact input 2 can be used to remotely enable insert 1 or 2, or to activate the bypass function. Remote activation of the bypass function allows the PFL/solo function on an audio

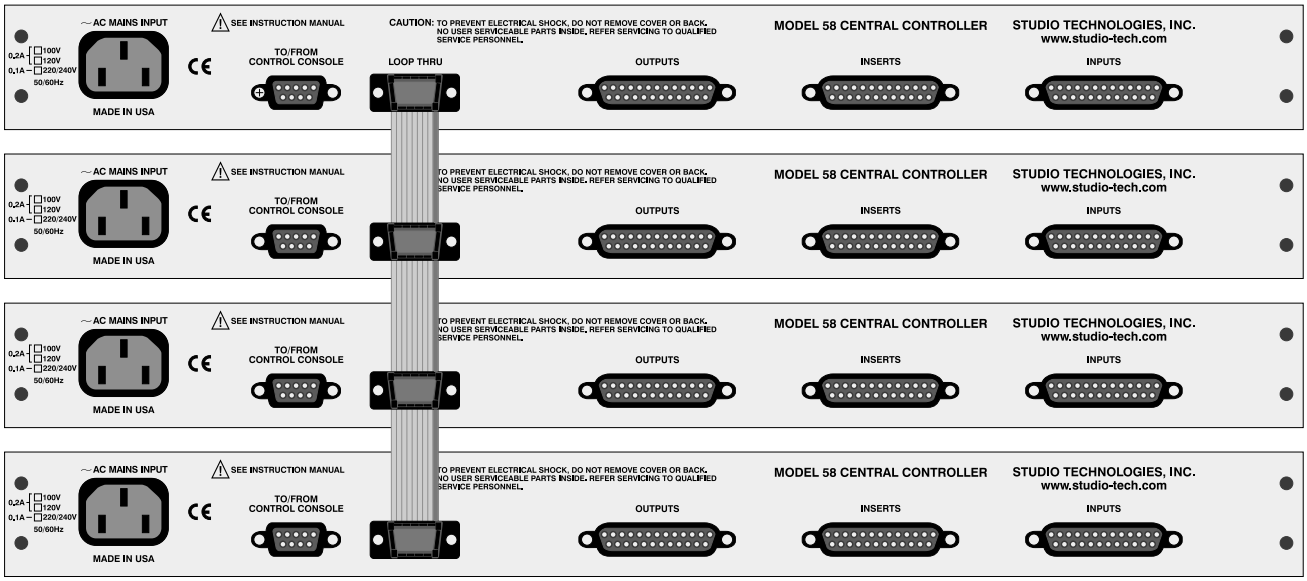


Figure 4. Multi-Channel Monitor System Showing Four Model 58 Central Controllers Interconnected by Means of the Factory-Supplied Ribbon-Cable Bus Assembly

console to be interfaced with the StudioComm for Surround system. Using a standard linear-taper potentiometer, a remote level control can be implemented; no special optical encoder or buffer circuitry is required.

The remote control functions were specifically included to allow the creation of secondary monitoring positions. Producers, directors, or other persons who deem themselves to be important, often find this to be convenient. Provision has been made in the StudioComm's operating software to ensure that critical listening is not affected by remote activity.

Expanded Input Capability

In the standard operating mode the Model 59 Control Console is designed to support up to four Model 58 Central Controller units. This provides eight monitor output channels, and allows connection of up to four 8-channel sources. A special mode can be enabled that lets a slightly modified Model 59 support up to eight Model 58 units. This mode will again support eight monitor output channels, but will additionally allow connection of up to eight 8-channel sources. Specialized playback applications, such as large screening rooms at motion picture studios, can benefit from this expanded operating mode. Contact the factory for details.

Limitations on Signal Routing

While a StudioComm for Surround system for multi-channel monitoring will do many wonderful things, it is not designed to selectively route input signals to the different output channels. An input-channel-to-output-channel relationship is maintained. A signal that arrives on input source 2, channel 6 will, when selected, output only on monitor and meter output channel 6. Any rerouting of the input signals must be done prior to connection to the StudioComm for Surround system. This should not be an impairment in most facilities, but it's important to highlight this fact.

Applications

Configuration Examples

It can initially be confusing to fully understand how a Model 59 Control Console and multiple Model 58 Central Controllers work together to create a multi-channel monitor system. How the main input and monitor output channels are assigned to the Model 58 units can seem especially tricky. In this section several examples are provided that should present a clear picture of how things go together. A careful review of the associated diagrams should quickly make you feel more comfortable. The flexibility of the StudioComm for Surround system is both a blessing and a curse. A simpler system would make installation a "no brainer," but having the resources to achieve the operational goals was deemed to be of overriding importance.

6-Channel (5.1) Configuration

Figure 5 provides an overview of a typical 6-channel installation. The channels are organized in one of the common 5.1 arrangement: Left, center, right, left surround, right surround, and sub. The sub or subwoofer channel is sometimes referred to as the LFE (low frequency enhancement) channel. (The term LFE is actually more descriptive but, as of the date of this writing, isn't as commonly

used.) Two 6-channel audio sources and one set of amplified monitor loudspeakers are connected. Note carefully how the channels are assigned: Model 58 unit 1 supports the left channel and the center channel, Model 58 unit 2 supports the right channel and the left surround channel, and Model 58 unit 3 supports the right surround channel and the subwoofer channel. Three input and three output wiring harnesses are required, each connecting to the Model 58s with 25-pin D-subminiature plugs. These wiring harnesses are not included with the StudioComm for Surround system.

The Model 59 Control Console is connected to Model 58 unit 1 using a 9-pin "D-sub" interconnecting cable. The three Model 58 units are linked together using a ribbon cable bus assembly. A 9-pin interconnecting cable and a ribbon cable bus are provided with the StudioComm for Surround system. AC mains power needs to be connected to each of the three Model 58s. In this example installation many of the available resources are not utilized, including the third and fourth 6-channel inputs, the insert sections, monitor output B, the meter outputs, the bypass inputs, and the remote control functions.

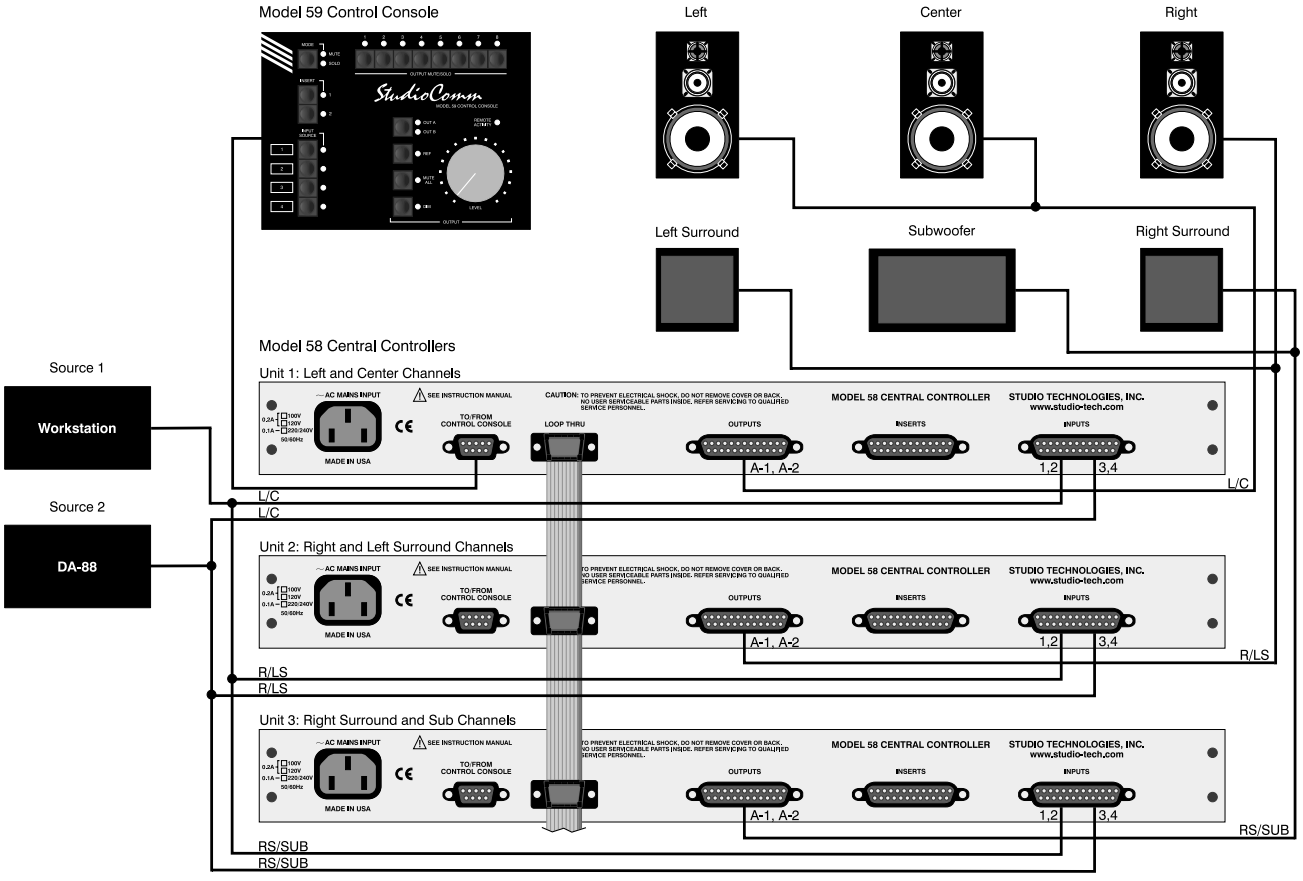


Figure 5. Example of 6-Channel (5.1) Configuration

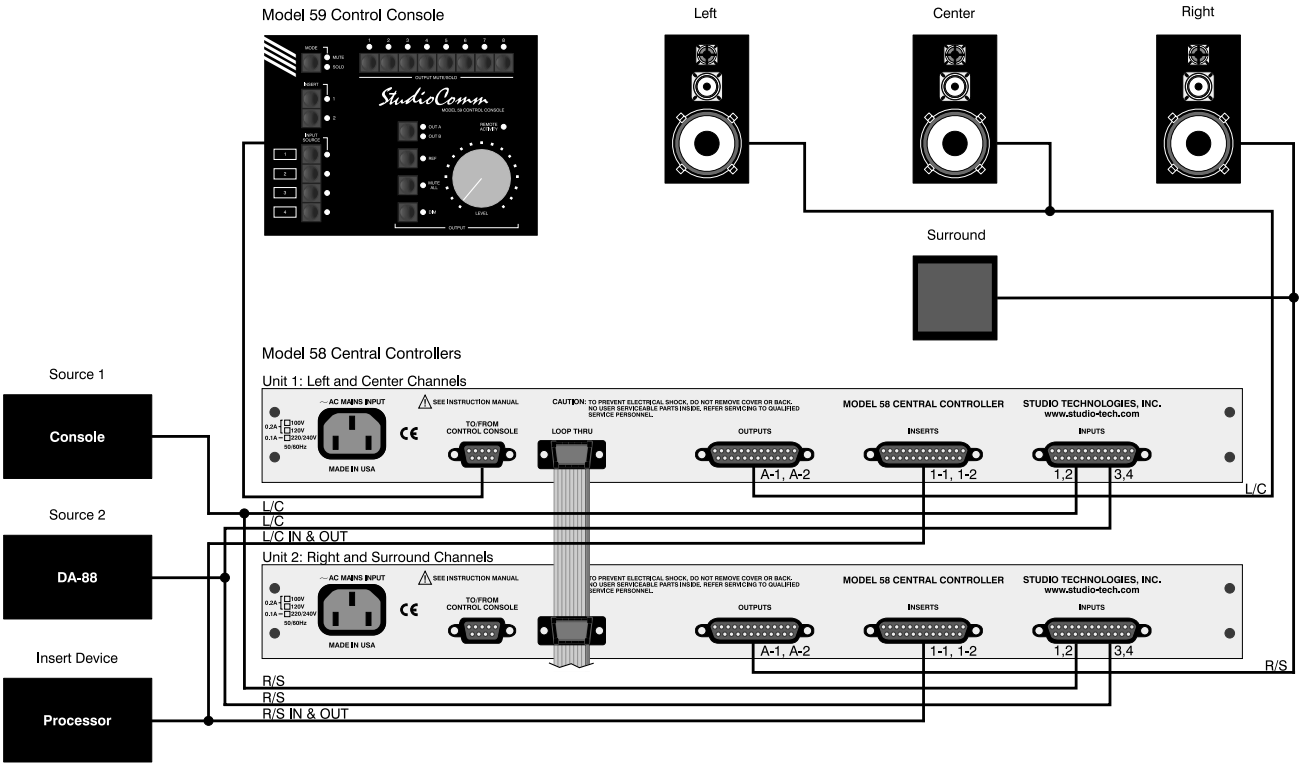


Figure 6. Example of 4-Channel (LCRS) Configuration

4-Channel (LCRS) Configuration

Figure 6 shows a 4-channel installation that follows a traditional LCRS format: Left, center, right, and surround. Again, two 4-channel sources are connected, along with one set of amplified loudspeakers. The left and center channels are supported by Model 58 unit 1, while the right and surround channels are supported by Model 58 unit 2. A processor device is connected to one of the insert sections on both Model 58 units. Two input, two insert, and two output wiring harnesses are utilized for audio interconnection.

The Model 59 Control Console is connected to Model 58 unit 1, and both Model 58s are interconnected using a ribbon cable bus assembly. AC mains power must be connected to both Model 58 units. Many features are available for future use, including inputs 3 and 4, the second insert section, monitor output B, the meter outputs, the bypass inputs, and the remote control functions.

Inserts

The Model 58 insert sections are applicable for far more than the usual console-provided insert functions. Under control of the Model 59 Control Console, each channel of each insert section can independently function in one of four modes: Mute the normal signal flow, maintain the normal signal flow, replace the normal signal with the return signal, or sum (combine) the return signal with the normal signal. (Note that in all cases the insert send signal will remain active.) With this flexibility the inserts can be used for a variety of insert, routing, and mixing functions.

A “phantom” center channel can be easily created by connecting the insert send of the center channel to the insert returns of the channels designated for left and right. In the Model 59’s configuration mode, the left and right channels of the insert section would be selected for sum, while the center channel would be set for mute. With this implementation, however, a level “buildup” problem may occur. If this is the case, the source of the phantom center may need to be attenuated by 6dB (voltage). This would be easily accomplished using a resistor “pad” to drop the level. With the insert sends capable of driving 600 ohm loads, a simple three resistor pad would work well; two 150 ohm and one 300 ohm resistor would do the trick.

Remote Control

Provision has been made to allow remote control of several system functions. Contact input 1 allows remote activation of the mute all or dim functions. Contact input 2 allows remote activation of the insert 1, insert 2, or bypass functions. The level control input allows remote control of the monitor output level. The exact functioning of the remote inputs is dependent upon the configuration of Model 59 Control Console parameters. Refer to the Configuration section of this guide for details.

Remote control of mute all or dim is provided to allow a variety of applications to be supported. Placing a mechanical switch adjacent to a telephone, allowing personnel to conveniently mute the monitor loudspeakers, is a perfectly acceptable application. Allowing a talkback system to automatically dim the monitor loudspeakers is another typical application.

Remote control of the bypass function is specifically provided to support interfacing with an associated console’s PFL/solo system. By connecting contact input 2 to a switch or contact closure that indicates when the PFL/solo system is active, audio signals connected to the bypass inputs will automatically be monitored.

The remote level control input is one of those features which may rarely be used, but when needed, it’ll really be needed! Without having support built into the Model 59 Control Console’s hardware and software, it would be almost impossible to add a remote level control later.

The remote level control input, along with the remote mute all and dim functions, makes it simple to create a small control console for secondary locations. The remote level control input was provided specifically to allow a producer, director, or other “big cheese” to have their own level control for use when previewing motion picture or video work-in-process.

Note that software “smarts” in the Model 59 Control Console inhibits the use of the remote level control any time the operator selects the reference output level. This ensures that the calibrated monitor level won’t accidentally be changed by some maroon. This, along with a remote activity LED indicator on the Model 59, keeps the remote level control from doing more harm than good.

Bypass

The bypass function was expressly provided so that surround monitoring capability can be added to a facility while maintaining compatibility with existing stereo monitoring systems. The bypass signal source would normally be the stereo

monitor output of an audio console. During surround mode operation, the monitor outputs associated with the left and right channels are connected, via electromechanical relays, to the Model 58's output circuitry. When the bypass function is enabled, the left and right monitor outputs disconnect from the Model 58's output circuitry, connecting instead to the bypass inputs; the other monitor output channels mute. Activation of the bypass function can be by means of a button on the Model 59 Control Console, or remotely using a signal connected to contact input 2.

Installation

In this section you will be installing the Model 58 Central Controllers in an equipment rack. Model 58 units will be interconnected using a ribbon-cable bus assembly. Audio input, insert, and output connections will be made. A location will be selected for the Model 59 Control Console, and it will be connected to one of the Model 58 units. If required, external equipment will be interfaced with the remote control inputs. AC mains power will be connected to the Model 58 units.

System Components

The main shipping carton contains the Model 58/Model 59 base configuration. This consists of one each of the following: Model 58 Central Controller, Model 59 Control Console, 20-foot (6.1m) 9-pin D-subminiature interconnecting cable, ribbon-cable bus assembly, User Guide, and warranty card. Units destined for North America also include an AC mains cord. Your dealer or distributor will provide an AC mains cord for non-North American destination. Each additional Model 58 Central Controller is shipped in a separate carton. These Model 58 "solo" units include a warranty card and, where applicable, an AC mains cord.

Mounting the Model 58 Central Controllers

Each Model 58 Central Controller requires one space in a standard 19-inch (48.3cm) equipment rack. Select a location that is convenient to both the analog audio signals and the Model 59 Control Console. A 20-foot (6.1m) cable is supplied to connect one of the Model 58 units to the Model 59. You can supply your own interconnecting cable, however 50 feet (15.3m) is the recommended maximum length. Secure each Model 58 in the equipment rack using two mounting screws per side.

Consider selecting a mounting location that can accommodate future expansion. If, for example, you are installing three Model 58 units to create a 6-channel system, you may want to leave room in the rack for one additional Model 58. This will make upgrading to an 8-channel system simple; install a fourth Model 58 and you're ready to go.

Interconnecting the Model 58 Units

In most applications multiple Model 58 units are going to be used together to create a multi-channel monitor system. To assist in this purpose, a ribbon-cable bus assembly is provided with each Model 58/Model 59 base configuration. The bus assembly contains four 9-pin D-subminiature (D-sub) plugs, spaced 2 inches apart, allowing up to four Model

58s to be interconnected. Refer to Figure 4 for a diagram depicting the interconnection of four Model 58 units. Each Model 58 contains a 9-pin D-sub connector labeled LOOP THRU. Use the bus assembly to link these connectors together. Locking hardware for the plugs is not included as it is unnecessary for reliable interconnection. (If you are the compulsive type, the D-subs on the Model 58 use 4-40 threads.)

Audio Connections

Audio signal connections on each Model 58 unit are made by way of three 25-pin D-sub connectors. Three cable harnesses, each with a 25-pin D-sub plug (male) on one end and the desired connectors on the other end, are necessary. These cable harnesses are not supplied by Studio Technologies. Note that our friends in some locations may use the term “loom” instead of harness.

The three 25-pin D-sub connectors are utilized for audio input, insert, and output interconnections. The main inputs can interface using a standard DA-88-style input cable harness. The other two 25-pin D-sub harnesses use a wiring scheme slightly different from the “DA-88 standard.” For example, a harness supporting the monitor outputs, meter outputs, and bypass inputs could have the first six channels using XLR-type plugs (males) and the last two channels using XLR-type connectors (females).

Main Inputs

The connector labeled INPUTS is used to interface the audio sources with the eight main input. Refer to Figure 7 for details on the exact “pin out” of the D-sub connector when used in the normal 2-channel operating mode. In this mode the eight main inputs are used as four 2-channel input pairs. Refer to the Configuration section for details.

The electronically balanced circuitry is intended for connection to balanced or unbalanced sources with a nominal signal level of +4dBu. A trim potentiometer is associated with each main input, allowing adjustment of the input sensitivity over a ±2dB range. The configuration sections of this guide provides details on using the trim pots.

Balanced sources should be wired so that signal high is connected to + on the D-sub, signal low to – on the D-sub, and shield to the D-sub’s shield connection. With an unbalanced source connect signal high to the + connection on the D-sub, and shield to both the – and the shield connection on the D-sub. If connecting to an unbalanced source in this manner results in hum or

Connection	Signal High (+)	Signal Low (–)	Shield	Input Pair
MAIN IN 1	24	12	25	1-1
MAIN IN 2	10	23	11	1-2
MAIN IN 3	21	9	22	2-1
MAIN IN 4	7	20	8	2-2
MAIN IN 5	18	6	19	3-1
MAIN IN 6	4	17	5	3-2
MAIN IN 7	15	3	16	4-1
MAIN IN 8	1	14	2	4-2

Notes: 1) Connector type on Model 58 is 25-pin D-subminiature female. Installer must provide plug (male). Connector uses 4-40 threaded inserts for locking with mating plug.

2) Wiring scheme follows Tascam DA-88 convention. Standard DA-88-type wiring harnesses are directly compatible, with the exception of 4-40 screw threads being required.

3) The column labeled “Input Pair” shows how the inputs are arranged in the 2-channel mode

Figure 7. Two-Channel Mode Connections for Main Inputs

noise, connect signal high to + on the D-sub, and shield to – on the D-sub; leave the shield connection unterminated.

It is important all channels associated with that at least one of the multi-channel inputs be wired by way of an audio patch bay. This will allow the channels to be easily rerouted. While signals generated within a facility may follow a specific format, such as L, C, R, LS, RS, Sub, it is possible that media provided by an outside source will follow a different one.

Monitor Outputs

The connector labeled OUTPUTS provides access to the two, 2-channel monitor outputs. Please refer to Figure 8 for details on the exact "pin out" of the D-sub connector.

Connection	Signal High (+)	Signal Low (–)	Shield
MONITOR OUT A-1	24	12	25
MONITOR OUT A-2	10	23	11
MONITOR OUT B-1	21	9	22
MONITOR OUT B-2	7	20	8
METER OUT 1	18	6 (See Note 3)	19
METER OUT 2	4	17 (See Note 3)	5
BYPASS IN 1	15	3	16
BYPASS IN 2	1	14	2

Notes: 1) Connector type on Model 58 is 25-pin D-subminiature female. Installer must provide plug (male). Connector uses 4-40 threaded inserts for locking with mating plug.

2) Wiring scheme loosely follows Tascam DA-88 convention. Modified DA-88-type wiring harnesses are required, along with 4-40 screw threads.

3) Meter outputs are unbalanced. Pins 6 and 17 internally connected to Model 58 shield.

Figure 8. Connections for Monitor Outputs, Meter Outputs, and Bypass Inputs

The monitor outputs are intended for connection to audio amplifiers associated with monitor loudspeakers, or to the inputs of loudspeakers with integrated amplifiers. Note that there are two monitor output circuits which are switched, using relays, to the 2-channel A and B output connections. Under normal operation only one set of outputs, A or B, will be active at the same time. An output which is not active has a short-circuit placed across its connections.

Note: While the Model 58's electronically balanced output circuits are capable of driving loads of 600 ohms or greater, the output level will drop slightly as the load impedance approaches 600 ohms. A 0.5dB difference in output level can be expected as the load impedance changes from 10k ohms to 600 ohms. This applies to all of the electronically balanced output circuits provided on the Model 58.

The monitor outputs are electronically balanced and are capable of driving balanced or unbalanced loads of 600 ohms or greater. While balanced operation is preferred, unbalanced operation does not pose a problem. To connect to an unbalanced load connect the + terminal of the D-sub as signal high, and both the – and shield as the signal low/shield. For optimal unbalanced operation, it is important to connect both – and shield together directly on the D-sub, and not where the cable terminates at the far end.

Meter Outputs

The connector labeled OUTPUTS provides access to the 2-channel meter output. Please refer to Figure 8 for details on the exact "pin out" of the D-sub connector.

The same source, or sources, that feed the monitor output feeds to meter output. The major difference is that the meter output is not affected by the monitor output level control circuitry; it is pre-fader (pre-VCA).

The meter output is intended for connection to the inputs of various mechanical, electronic, or electromechanical meter systems. These could range from conventional analog “VU” or “PPM”-type meters, to projection meter systems used in motion picture applications. The meter output can also serve as an additional audio output for special applications, such as a copy or “dub” output. In addition, the meter output serves an important role in the input calibration process, which is discussed in the Configuration section of this guide.

The meter output is unbalanced, has a nominal level of +4dBu, and is capable of driving loads of 600 ohms and greater. Even if the meter output is not going to be used during normal operation it is important to provide access to it. To correctly and accurately calibrate the system input-to-output gain an audio level measurement device must be able to be temporarily connected to the meter output. While not absolutely necessary, terminating or routing the meter output to points on an audio patch bay may prove very helpful for long-term maintenance assistance.

Bypass Inputs

The connector labeled OUTPUTS provides access to the 2-channel bypass input. Please refer to Figure 8 for details on the exact “pin out” of the D-sub connector. It is usual for the source connected to the bypass input to be from the stereo monitor output of an audio console or other monitoring system.

Warning: It is very important that signals connected to the bypass input be “post” a level control, i.e., attenuated from line level. Connecting a standard line level audio signal can result in damage to monitor loudspeaker systems or, more importantly, to the ears of listeners.

Balanced sources should be wired so that signal high is connected to + on the D-sub, signal low to – on the D-sub, and shield to the D-sub’s shield connection. With an unbalanced source the connection method depends on the requirements of the monitor speaker system’s input. This is because routing of the bypass input to the monitor outputs does not involve any active circuitry. Whenever the bypass

Connection	Signal High (+)	Signal Low (–)	Shield
SEND 1-1	24	12	25
RETURN 1-1	10	23	11
SEND 1-2	21	9	22
RETURN 1-2	7	20	8
SEND 2-1	18	6	19
RETURN 2-1	4	17	5
SEND 2-2	15	3	16
RETURN 2-2	1	14	2

Notes: 1) Connector type on Model 58 is 25-pin D-subminiature female. Installer must provide plug (male). Connector uses 4-40 threaded inserts for locking with mating plug.

2) Wiring scheme loosely follows Tascam DA-88 convention. Modified DA-88-type wiring harnesses are required, along with 4-40 screw threads.

Figure 9. Connections for Inserts

feature is active, the signal connected to the bypass inputs is simply passed through to the associated monitor output channels by means of electromechanical relay contacts.

Insert Sends and Returns

The connector labeled INSERTS is used to interface with the two 2-channel insert sections. Please refer to Figure 9 for details on the exact “pin out” of the D-sub connector. The use of the insert sections will depend on the requirements of the specific installation. In certain cases the inserts sections won’t be required, and no connections will need to be made.

The insert sends are electronically balanced, have a nominal level of +4dBu, and are capable of driving balanced or unbalanced loads of 600 ohms or greater. While balanced operation is preferred, unbalanced operation is not a problem. To connect to an unbalanced load connect the + terminal of the D-sub as signal high, and both the – and shield as the signal low/shield. For optimal unbalanced operation, it is important to connect both – and shield together directly on the D-sub.

Note that the insert sends do not have level trim potentiometers associated with them. The output levels are nominally +4dBu, with channel-to-channel variation of up to ±0.5dB considered normal. It is anticipated that the equipment connected to the insert sends will have, if required for correct operation, input level adjustment controls.

The insert returns are electronically balanced, have a nominal input level of +4dBu, and are compatible with balanced or unbalanced sources. Connections should be made in the same fashion as the main inputs, described previously. A trim pot is associated with each insert return, allowing the input sensitivity to be adjusted over a ±2dB range. Refer to the Configuration section of this guide for details on using the trim pots.

Remote Control Connections

The remote control input circuitry is physically located in the Model 59 Control Console. Access to the remote control inputs is by way of the 9-conductor cable that links the Model 59 with one of the Model 58 Central Controllers. In fact, five of the nine connections in this cable are dedicated for use by the remote control inputs and have nothing directly to do with the Model 58 Central Controller. Since all pins of the Model 58’s 9-pin D-sub connectors are connected in parallel, access to the remote control inputs is made using any of the available 9-pin D-subs on any of the Model 58 units. Refer to Figure 10 for a detailed description of the 9-pin D-sub connections.

Contact input 1 and contact input 2 are +5V logic signals which are active when they are brought to the logic low state. While the inputs are protected from overcurrent and static (ESD) discharge care should be taken to prevent nasty signals from reaching them. To activate contact input 1 simply connect pin 5 to data common, pin 4. To activate contact input 2 connect pin 6 to pin 4. The contact inputs are active when held in the low state; they can’t be configured to change states (“latch”) in response to a logic pulse.

All that is required to add a remote level control is to connect a commonly available linear taper potentiometer. (Yes, use a linear pot! Software in the Model 59

Pin	Signal		Direction
1	Power Supply Common, Cable Shield		Model 58 units to Model 59
2	+15Vdc		Model 58 units to Model 59
3	Data		Model 59 to Model 58 units
4	Data Common		Model 59 to Model 58 units
5	Contact Input 1		Remote Contact to Model 59
6	Contact Input 2		Remote Contact to Model 59
7	CCW	Level Control	Remote Level Potentiometer to Model 59
8	Wiper		Remote Level Potentiometer to Model 59
9	CW		Remote Level Potentiometer to Model 59

Notes: 1) Connector type on Model 58 is 9-pin D-subminiature female. Connector uses 4-40 threaded inserts for locking with mating plug.

Figure 10. Connections for Control Console and Remote Control Inputs

Control Console converts its performance to logarithmic.) Any high-quality pot with a nominal “coil” resistance of between 1k and 25k ohms should work fine. Simply connect the D-sub to the pot in this fashion: Pin 7 to counterclockwise, pin 8 to wiper, and pin 9 to clockwise. As very little current (amps) travels through the wiring and pot, there is really no practical maximum cable length. Be aware that the longer the cable run, the more chance that an accidental short circuit could take place. This is a serious issue, as a short circuit could cause the monitor output level to go to maximum.

Warning: Connecting to the remote level control input requires very careful attention to wiring and potentiometer connections. Shorting pin 8 of the 9-pin D-sub connector to common will raise the monitor output level to maximum! To address hearing safety issues, the Model 59 is default configured to disable the remote level control input. A safe and reliable installation must be completed prior to enabling the input.

Connecting the Model 59 to a Model 58

A cable with 9-pin D-sub plugs (males) on each end is used to interconnect a Model 59 Control Console with a Model 58 Central Controller. A 20-foot (6.1m) cable is provided with each Model 58/Model 59 base configuration. Should a cable of different length be required it should be wired in a one-to-one fashion for all 9 pins. Pin 1 carries power supply common, and must be interconnected using a conductor. A cable shield connection should be connected to pin 1 at one, or both, ends.

For best performance the cable generally should not exceed 50 feet (15.3m) in length. The reality is that a cable much longer in length should work, as long as an excellent-quality cable is utilized. We define “excellent” as extensive shielding along with very low capacitance. The low cable capacitance limits the amount of data-signal waveform distortion. As far as the maximum length, go ahead and try it—if it works, it works!

Each Model 58 contains a 9-pin D-sub, labeled TO/FROM CONTROL CONSOLE. Select one of these for connection to the Model 59. While it doesn’t technically

matter which Model 58 is selected, it is often best for clarity to use the Model 58 that is going to be configured with unit ID 1.

AC Mains Power

The Model 58 is internally configured to operate from either 100, 120, or 220/240V, 50/60Hz. 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 58 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 than 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 58 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:

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

Safety Warning: The Model 58 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 power-present LED on each of the Model 58s will light. The Model 59 will go through its power-up sequence lighting each LED in a rapid sequence.

Note that any time a Model 58 configuration DIP switch is changed, mains power on **all** Model 58 units must be disconnected and reconnected. This ensures that the logic circuitry is fully reset to match the new operating parameters. (This is not a bug in software—we designed it this way to ensure that performance would always be correct!) Refer to the Configuration section of this guide for details on setting the DIP switches.

Configuration

After the physical installation has been completed, several configuration issues must be addressed. On the Model 58 Central Controllers, the unit ID and operating mode must be set. In addition, the main input, insert return, and monitor output signal levels must be calibrated using trim potentiometers. As a final step, the operating parameters of the system will be set using the Model 59 Control Console’s configuration mode.

Note that any time a Model 58 DIP switch is changed, the data LED (located to the right of the switches) will flash. This is normal, being provided for factory confirmation of switch operation.

Model 58 Unit Identification Numbers

A unique unit identification (ID) number must be assigned to each Model 58. This allows commands from the Model 59

Control Console to be correctly interpreted. The unit ID is configured using positions one through four of the front-panel-mounted 8-position DIP switch. The DIP switch positions are labeled 1-8, with position 1 on the left side. A switch in the off (down) position is considered to be in the 0 state. A switch in the on (up) position is considered to be in the 1 state.

Setting a unit ID is very simple: A Model 58 set for unit ID 1 supports monitor output channels 1 and 2 on the Model 59, a Model 58 set for unit ID 2 supports monitor output channels 3 and 4, etc. A system using three Model 58 Central Controllers to create a 6-channel system would have unit ID numbers 1, 2, and 3 assigned. Refer to Figure 11 for the exact DIP switch settings.

You curious types might wonder why four bits were reserved for unit IDs, rather than just two or three. In most cases, only the first four unit ID numbers will be used, allowing creation systems of up to 8-channels. But in some special applications up to eight Model 58 units can be used together, utilizing unit ID numbers 1-8. This is the single-channel mode that will be discussed in Appendix B. Unit ID numbers 9-16 are reserved for future applications, the likes of which even we haven't the foggiest idea about—hopefully smart users like you will come up with some cool ideas for us to implement!

Unit ID	DIP Switch 1-4
1	0000
2	1000
3	0100
4	1100
5	0010
6	1010
7	0110
8	1110
9	0001
10	1001
11	0101
12	1101
13	0011
14	1011
15	0111
16	1111

Figure 11. Model 58 Unit ID DIP Switch Settings

Model 58 Operating Mode

DIP switch position 5 is used to set the Model 58 Central Controller's operating mode. In the off (down) position, the unit operates in the normal 2-channel mode. In the on (up) position, the unit operates in a special single-channel mode. In the 2-channel mode each Model 58 supports two monitor output channels and four 2-channel main input pairs. This is correct for use with the standard Model 59 Control Console. If this is your application, ensure that DIP switch 5 is in the off (down) position.

The single-channel mode is provided for special applications where all eight Model 58 main inputs need to be routed to the first monitor output channel. Contact Studio Technologies for details.

After the Model 58 unit ID and operating mode configurations have been set, the AC mains power for all units must be simultaneously disconnected, then reconnected. This ensures that the previous configuration is completely erased and the new one is correctly implemented.

Level Calibration

Fourteen multi-turn trim potentiometers grace the front panel of the Model 58 Central Controller. Eight are provided for the main inputs, four for the insert returns, and two for the monitor outputs. Taking time to carefully adjust the trim pots will ensure that accurate monitoring can take place. Each trim pot allows an adjustment range of ±2dB, which is spread over the trim pot's 15 turns. Calibrating the levels down to a tenth of a dB is easily performed.

The meter outputs are used as the measuring point when adjusting 12 of the 14 trim pots. Unless calibrated level meters are already connected to the meter outputs, an external audio level meter is required. In addition, the audio sources connected to the main inputs must be configured to generate steady signals at nominal operating level. Those interested in where the trim pots are located in the circuitry, and why the meter outputs are specified as a measurement point, should refer to the Model 58 Block Diagram, located at the end of this guide.

Main Input Trim Pots

This first procedure will ensure that all Model 58 main inputs are level matched against each other. The audio sources connected to these inputs are normally arranged as four 2-channel pairs; 1 and 2, 3 and 4, 5 and 6, 7 and 8. The trim pots will be adjusted in pairs corresponding to the input sources. In this procedure it is assumed that calibrated metering devices are not already connected to the meter outputs.

1. On the first Model 58, connect the audio level meter to meter output 1.
2. Using the Model 59 Control console, select input 1 as the audio source. Be certain that inserts 1 and 2 are not enabled. Enable the mute all function, ensuring that you won't have to hear a steady tone during the entire procedure!
3. Confirm that the audio source connected to main inputs 1 and 2 is generating a steady signal at precisely its reference level. (This is assumed to be nominally +4dBu.)
4. Observing the level meter, adjust main input trim pot 1 to give a +4dBu level at meter output 1.
5. Disconnect the level meter from meter output 1 and reconnect it to meter output 2.
6. Observing the level meter, adjust main input trim pot 2 to give +4dBu.
7. Repeat steps 1-6 for inputs 2, 3, and 4. This will calibrate main inputs 3-8.

Once all eight main inputs on the first Model 58 have been calibrated, repeat the entire procedure for the additional Model 58 units.

Insert Return Trim Pots

Describing the calibration process for the insert returns is a bit more difficult as the exact implementation of the insert sections is dependent upon the specific installation. The goal is to have no unwanted level change occur when switching an insert section between disabled and enabled. Note that the insert sends are not calibrated for a precise +4dBu nominal level. Trim pots on the insert returns allow level inaccuracies in the insert sends, as well as the connected device's input and outputs, to be accounted for.

The following procedure would be appropriate when an insert section is configured to place another device in the audio path, replacing the original. A device commonly used in this type of application would be a surround sound encode/decode unit. This procedure assumes that main input calibration has already been performed. It is also assumed that calibrated metering devices are not connected to the meter outputs.

1. On the first Model 58, connect the audio level meter to meter output 1.
2. Using the Model 59 Control console, select input 1 as the audio source. Confirm that inserts 1 and 2 are disabled. Enable the mute all function, ensuring that you won't have to hear a steady tone during the entire procedure!
3. Confirm that the audio source connected to main inputs 1 and 2 is generating a steady signal at precisely its reference level.
4. Observing the level meter, confirm that the output level is exactly +4dBu. (If this is not the case, the main input trim pot must be re-calibrated.)
5. Using the Model 59 Control Console, enable insert 1.
6. Observing the level meter, adjust the trim pot associated with insert 1, return 1 to give a +4dBu level at meter output 1.
7. Disconnect the level meter from meter output 1 and reconnect it to meter output 2.
8. Repeat steps 4, 5, and 6 for insert 1, return 2.
9. If insert 2 is being utilized, repeat the procedure for its two return trim pots.

Once the insert returns on the first Model 58 have been calibrated, repeat the entire procedure for the additional Model 58 units.

Monitor Output Trim Pots

A trim potentiometer is associated with each of the two monitor output circuits. Note that while there are two 2-channel monitor output connections—A and B—there are only two output circuits. Relay contacts are used to switch the output circuits between the A and B connections. Installation-specific requirements will dictate how the monitor output trim pots need to be adjusted. In most cases the trim pots will be adjusted to give exactly the same output level on all the monitor output channels. Other installations may require the trim pots to be adjusted in reference to the outputs of the audio power amplifiers. For this discussion, we'll describe how to match the output levels of the monitor outputs. Note that this procedure assumes that input calibration has already been performed.

1. Start by turning off the AC mains power on all audio power amplifiers. If loudspeakers with integrated amplifiers are being used, turn them off too. This "power down" is critical, ensuring that high-level test signals do not get sent to the loudspeakers. Don't mess around—turn off the amps now!
2. Confirm that all channels associated with the source connected to input 1 are generating a steady signal at precisely its reference level.

3. Using the Model 59 Control Console, select input 1 as the audio source. Enable monitor output A. Confirm that inserts 1 and 2, as well as the mute all and dim functions are disabled. Slowly turn the rotary level control clockwise. If audio is heard, stop raising the level and turn off any active amplifiers. Turn the level control until it is fully clockwise, providing the maximum monitor output level.
4. Connect the precision audio level meter to channel 1 of monitor output A.
5. Observing the level meter, adjust monitor output trim pot 1 to give exactly +4dBu.
6. Disconnect the level meter and connect it to channel 2 of monitor output A.
7. Observing the level meter, adjust the monitor output 2 trim pot to give exactly +4dBu.
8. Once the monitor outputs on the first Model 58 have been calibrated, repeat steps 4-7 for the additional Model 58 units.
9. On the Model 59 Control Console, turn the output level control to the fully counterclockwise position.
10. After confirming that the level control is fully counterclockwise, activate AC mains power on the audio amplifiers or amplified speakers.

Model 59 Operating Parameters

Many StudioComm for Surround functions can be configured to meet the exact needs of your installation. Here's an overview of what you can configure:

- Input channels active for each of the inputs
- Monitor output channels active
- Insert operation
- Monitor output mode
- Power-up mute mode
- Channels selected for bypass and bypass mode
- Reference level
- Dim level
- Remote contact inputs and level control

The Model 59 Configuration Charts, located at the end of this section, give details on how each configuration parameter is set. An overview of the parameters is provided in the following paragraphs.

Entering the Configuration Mode

A small button is located on the back of the Model 59 Control Console, adjacent to the 9-pin D-sub connector. Pressing and holding this button for two seconds places the Model 59 into the configuration mode. In the configuration mode the buttons and LEDs no longer perform their normal function, but instead allow you to observe and change many of the operating parameters. The mute/solo mode LEDs light alternately to indicate that the configuration mode is active. Once again pressing and holding the configure button returns the Model 59 to normal operation. Note that configuration changes are stored only after the configuration mode is exited by pressing and holding the button.

Our apologies to those of you who find the configure button a pain to use, but it's supposed to be that way! Seriously, the top of the button is slightly recessed from

the back panel, making it harder to accidentally activate. We don't want normal operation to cease because someone pushes the Model 59 into a "rats nest" of track sheets!

When to Use the Configuration Mode

There is no problem frequently "tweaking" the Model 59's operating parameters to achieve the desired performance. The non-volatile memory chip used to store the configuration is rated for thousands of read and write cycles, and has a retention time rated in years.

Input Channels Active

This configuration is a bit tricky to understand, but is really quite simple—that is if we're clear on our explanation! The number of channels associated with each of the four inputs is dependent on the number of monitor output channels. As an example, a system that consists of one Model 59 Console and three Model 58 Central Controllers supports six monitor output channels, and four 6-channel input sources. The configuration parameter for the number of input channels active is provided for those special cases where a source has less channels than the number of monitor output channels.

Let's look further at our mythical example, the 6-channel system. Inputs 1 and 2 are connected to 6-channel sources, so everything is fine there. But the source for input 3 has only four channels. While the source for input 4 is stereo. This makes it not so "cool" for the operator to select input 3 or 4 for monitoring, as the unused input channels will get routed to the meter and monitor outputs. Will the unused input channels pick up lots of noise and hum? Unlikely, but why take the chance of having a problem. Simply use the input channels active configuration to disable the unused channels associated with inputs 3 and 4. Now when inputs 3 or 4 are selected, only the valid channels are monitored.

Note that when a channel associated with an input is disabled, the input routing circuitry, under software control, no longer selects it; the corresponding output channel does not mute. With our 6-channel example, when selecting input 4, the stereo source, all six monitor output channels remain active, but the input routing circuitry does not select the four unused inputs. While to some this might seem confusing, and a design fault, it was implemented in this fashion because multiple inputs can be selected for simultaneous monitoring. A 6-channel source might be selected at the same time as a stereo source. Having the output mute/solo mode LEDs going on and off in response to the selected input sources would be very annoying!

A special mode has been included to allow an input to be disabled from being accessed by the operator. This might be useful, for example, when input 4 is not connected to a source, and has no valid reason to be selected. This might also be useful when connecting a special source to input 4, such as a house "tie line" or router output that shouldn't normally be accessible. To disable an input is simple, just disable all eight channels associated with it. During configuration mode, all eight LEDs will flash to show that this function is active. Once the Model 59 is returned to the normal operating mode the disabled input simply cannot be selected.

Monitor Output Channels Active

The Model 59 hardware and software supports up to eight monitor output channels. From the factory, the Model 59 is configured to support all eight outputs. This would be correct for an installation that uses four Model 58 Central Controllers operating in their dual-output-channel mode. But there will often be cases where one, two, or three Model 58 Central Controllers will be installed, creating 2-, 4-, or 6-channel systems. By configuring the Model 59 to disable the unused output channels, operator clarity is enhanced. Specifically, the output mute/solo mode buttons and LEDs for the unused monitor output channels will be disabled, along with the underlying functionality. With the unused monitor output channels disabled, an operator can't accidentally select those channels for solo or mute operation.

Supported monitor output channels should always start at channel 1 and run consecutively to the last channel. For example, a 6-channel system should support output channels 1-6, with channels 7 and 8 disabled. A 4-channel system should have channels 1-4 active, and 5-8 disabled.

Insert Operation

Configuring the insert sections is an excellent test of your manual dexterity. If you have any doubts about your ability, don't chew gum at the same time! The insert sections are unique in their ability to be configured on a channel-by-channel basis. Each channel of each insert section can be independently set for one of four operating modes: Mute normal signal, maintain normal signal flow, replace the normal signal with the insert return signal, or mix the insert return signal with the normal signal. A detailed explanation of each mode follows:

Mode 1: Mute normal signal. In this mode no signal flows through the insert section. This is effectively a channel mute function. The insert send continues to be active, but the insert return is not active.

Mode 2: Maintain normal signal flow. In this mode the normal audio signal continues to flow through the insert section. This is effectively a "no-insert function" function! The insert send continues to be active, but the insert return is not active.

Mode 3: Replace the normal signal with the insert return signal. This is the conventional insert function that most audio consoles provide. The normal signal no longer flows through the insert section. The return signal is connected into the signal path. The insert send continues to be active.

Mode 4: Mix the insert return signal with the normal signal. In this mode the normal signal continues to flow through the insert section, with the insert return signal mixed (summed) with it. No level change is performed, they are mixed at nominal level. Any level reduction required to prevent "buildup" needs to be done externally. The insert send continues to be active.

A special mode has been included to allow an insert section to be disabled from operation. This is accomplished by configuring all eight channels associated with each insert section to mode 2, maintain normal signal flow. With this configuration an operator can press the associated insert button "till the cows come home" and the function will never activate. This is another attempt at making the Model 59 "idiot proof."

In many cases both insert sections won't be wired to external devices. This doesn't mean that both insert sections can't be used effectively. An unused insert section could be configured to perform a special mute. An example would be to configure insert 2 to mute the surround channels, leaving only the front channels active. This would give an operator a quick way of checking the effectiveness of the surround information on the overall mix.

Monitor Output Mode

While the Model 58 Central Controllers support the connection of two sets of monitor loudspeakers, often only the A output will be used. The monitor output A/B select button on the Model 59 Control Console can be disabled, preventing an operator from selecting output B. Only the A LED will be lit, and the button will be inactive.

Power-up Mute Mode

By default, upon application of AC mains power the monitor outputs remain muted until a power-up sequence has been performed. Then the monitor outputs are returned to their respective states as left at the time of the previous loss of AC mains power. There may be special uses where having the monitor output channels remain muted until an operator manually presses the mute all button is desired. Use the configuration button to select the desired power-up mute-all operation.

Channels Selected for Bypass

Each monitor output channel can be configured to either mute, or connect to its associated bypass input signal when the bypass function is active. How the channels are configured simply depends on which bypass input channels have signals connected to them.

A special mode has been included to allow the bypass function to be disabled from operation. To disable the bypass function, simply select all output channels to mute during bypass. The factory default configuration has the bypass function disabled.

Bypass Mode

The bypass mode can be configured to be operated in one of three modes: Monitor output A only, monitor output B only, or follow the state of the monitor output A/B button. The first two modes cause their respective monitor outputs to be active when in the bypass mode.

Note that even if the monitor output mode is configured for A only, setting the bypass mode to monitor output B only will cause monitor output B to become active when the bypass mode is active. Also, when the bypass mode is configured to follow the A/B button, the monitor output mode must be configured to allow A/B operation or only monitor output A will be enabled during bypass operation.

Reference Level

For audio-with-picture applications it's critical that mixing be done in reference to a known monitor loudspeaker level. This is often referred to as mixing to "85dB" on the monitors. The Model 59 Control Console allows a precise monitor output level to be stored, and then enabled by pressing the button labeled REF. Setting the reference level is very simple:

1. Set up a precision sound pressure level (SPL) measuring device at the desired listening location.

2. Place the StudioComm for Surround system in the normal operating mode, not the configuration mode. Be certain that the reference, mute all, dim, and insert functions are not active.
3. Use the Model 59 Control Console to select the reference signal source, e.g., pink noise, as the active input source.
4. Observing the SPL meter, adjust the Model 59's rotary level control until the desired reference level has been reached.
5. Being careful not to touch the position of the rotary level control, enter the configuration mode by pressing and holding the configure button, located on the Model 59's back panel.
6. Once the configuration mode has been entered, the monitor output signal will mute. Press and hold the reference button until its associated LED lights. This will take 5 seconds. The LED lights to indicate that a "snapshot" of the new reference level has been taken.
7. To store the new reference level in memory, exit the configuration mode by again pressing and holding the configure button.

This level is now permanently stored as the reference level. Only by repeating the procedure can the value be changed.

Once the configuration mode has been exited, the monitor output will again become active. Confirm that the correct level has been stored by pressing the reference button. The SPL meter should again display the desired level. If not, repeat the calibration process.

You might wonder why you have to press and hold the reference button for 5 seconds before the value is stored. This is provided specifically so that some Bozo won't accidentally change the ref level while they are playing around in the configuration mode! You have to know the "secret" to be able to store a new value.

Dim Level

The dim function is used to reduce the monitor output level by a preset amount. The reduction is in dB relative to the monitor output's current level. Select the desired dim level from the four that are available: 10, 15, 20, or 25dB.

Contact Input 1

Three configuration choices are associated with contact input 1: Disabled, remote mute all, and remote dim. Select the desired operating configuration.

Contact Input 2

Four configuration choices are associated with contact input 2: Disabled, remote insert 1, remote insert 2, and remote bypass. Select the desired operating configuration.

Remote Level Control

Two configuration choices are associated with the remote level control function: Disabled and enabled. To utilize the function, simply configure it for enabled.

Warning: It is imperative that the wiring of the remote level control be carefully implemented before the function is enabled. To not do so risks damage to the monitor loudspeakers and, more importantly, the ears of listeners.

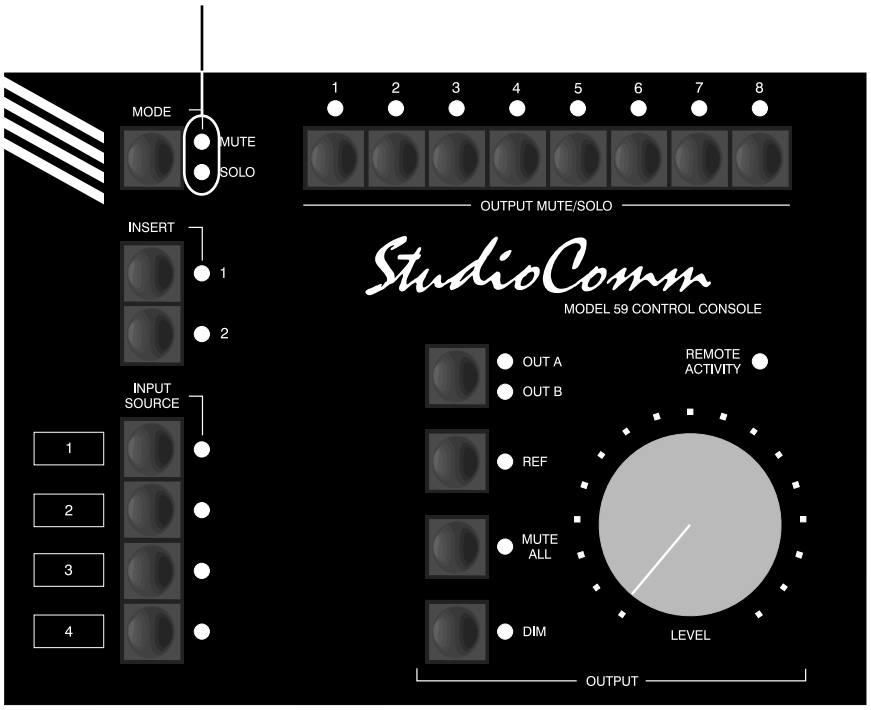
Restore Factory Defaults

The restore factory defaults function is provided primarily for factory use. In this way a system can be shipped with the default settings selected. While you are welcome to use this function, be careful that your configuration efforts may be wasted. Specifically, note that restoring the factory defaults configures the reference level to minimum level. All the other parameters are fairly easy to set up, but resetting the ref level would require getting out the SPL meter and a calibrated signal source. This is a hassle you may not need!

Model 59 Configuration—Entering and Exiting Configuration Mode

Press and hold the configure button for 2 seconds to enter or exit the configuration mode.

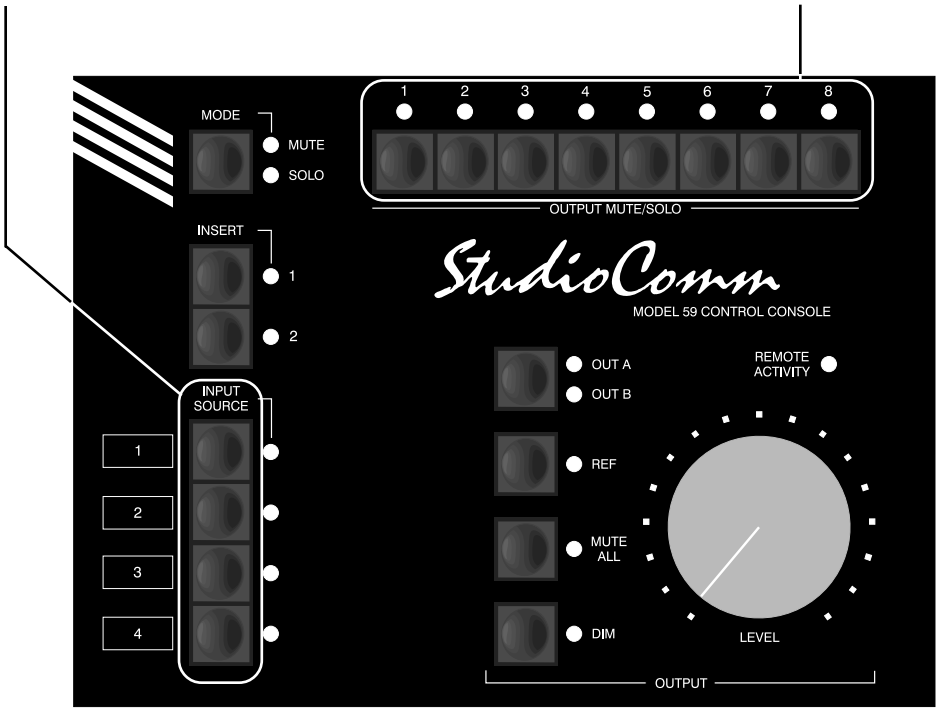
These LEDs will light alternately when the configuration mode is active.



Model 59 Configuration—Input Channels Active

Press and hold an input button (one at a time) to display and select which channels associated with that input are active.

When an input button is pressed, these LEDs display which input channels are active for that input. A lit LED indicates that the channel is active. Use the buttons to change the configuration. All LEDs flash when all input channels are configured for inactive.



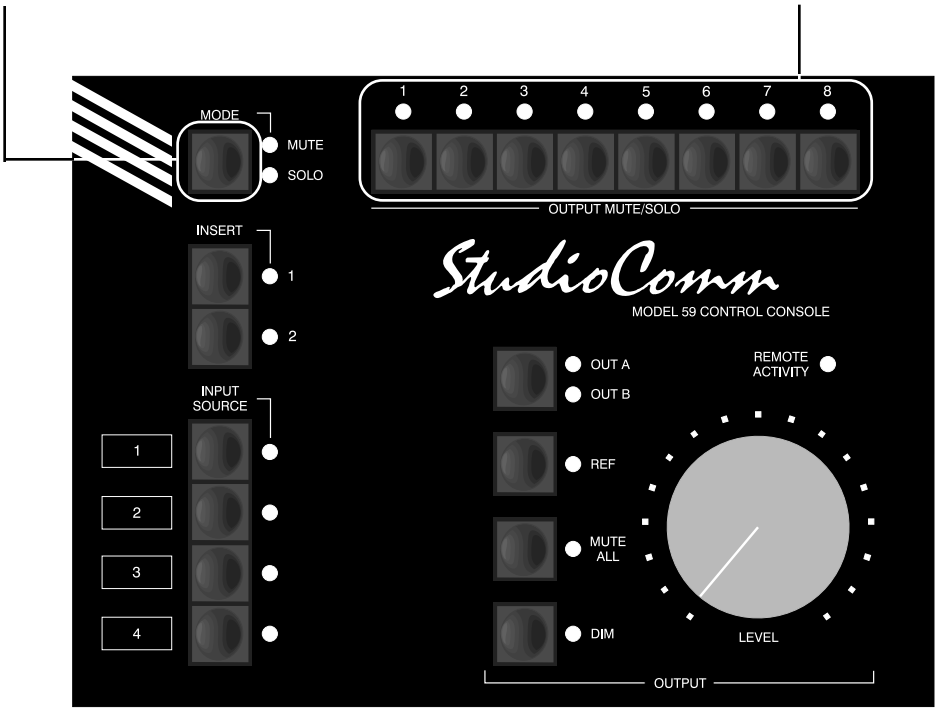
Default: For all four inputs, all eight channels are active.

Note: A special input disable function is available. By disabling all channels associated with a specific input, that input will no longer be available during normal operation. While in the configuration mode, all 8 mute/solo mode LEDs associated with an input will flash to indicate that the input has been disabled. This function is useful if an input is not going to have a source associated with it. During normal operation a disabled input cannot be selected, minimizing user confusion that could be caused by selecting an invalid input source.

Model 59 Configuration—Monitor Output Channels Active

Press and hold the mode button to display and configure which monitor output channels are active.

When the mode button is pressed, these LEDs display which monitor output channels are to be active. A lit LED indicates that the channel is active. Use the buttons to change the configuration.



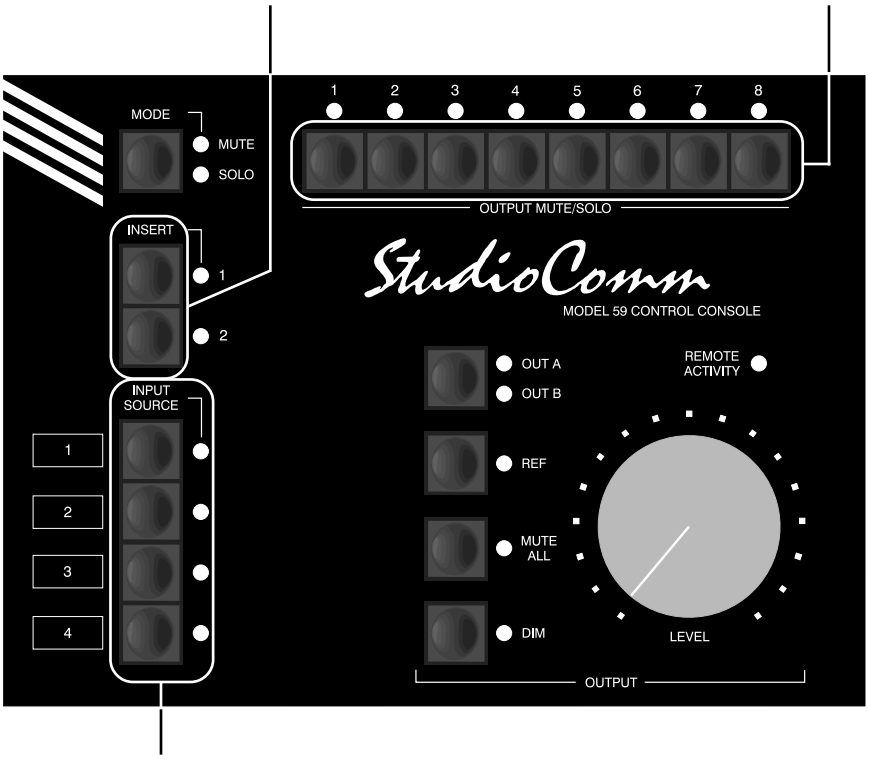
Default: All eight monitor output channels active.

Note: When no monitor output channels are selected to be active, all the LEDs flash to indicate an error condition.

Model 59 Configuration—Insert 1 and 2

Press and hold one of the insert buttons to allow the display and selection of the insert mode.

When an insert button is pressed, pressing the output channel buttons (one at a time) allows the display and selection of the insert mode for that specific channel.



When an insert button and an output channel button are pressed at the same time, the insert mode is displayed.

LED 1 lit means mode 1: Mute normal signal flow;
LED 2 lit means mode 2: Maintain the normal signal flow;
LED 3 lit means mode 3: Replace the normal signal with the return signal;
LED 4 lit means mode 4: Sum (combine) the return signal with the normal signal.

Use the buttons to select the mode.

Default: All channels associated with both inserts are in mode 3: Replace the normal signal with the return signal.

Note 1: This is the hardest configuration to understand and perform! Two buttons must be simultaneously pressed to display the mode; three buttons must be simultaneously pressed to change the mode. A little practice and it will become easy.

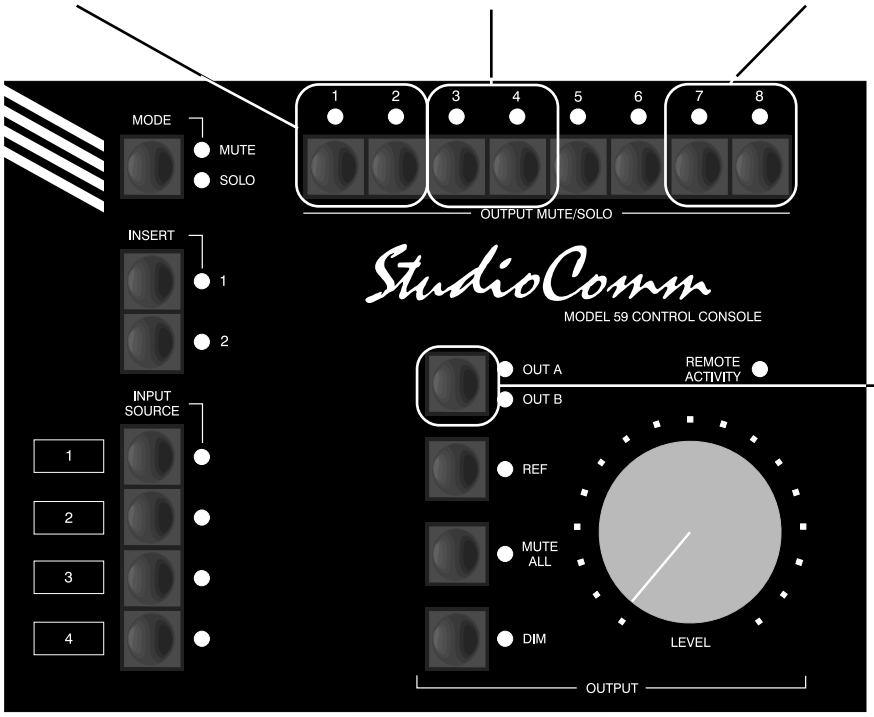
Note 2: If all channels associated with an insert section are set for mode 2, that insert section will be set for disabled. This feature is provided so that the operator won't attempt to enable an unused insert, hopefully minimizing confusion.

Model 59 Configuration—Monitor Output Mode, Power-Up Mute Mode, and Remote Level Control Input

When the monitor output A/B select button is pressed, these LEDs display the monitor output mode. When LED 1 is lit the mode is A only. When LED 2 is lit the mode is A/B select. Use the buttons to select the monitor output mode.

When the monitor output A/B select button is pressed, these LEDs display the power-up mute mode. When LED 3 is lit power-up mute mode is disabled. When LED 4 is lit power-up mute mode is enabled. Use the buttons to select the mode.

When the monitor output A/B select button is pressed, these LEDs display the status of the remote level control input. LED 7 lit means that the remote level control input is disabled. LED 8 lit means that the remote level control input is enabled. Use the buttons to select the status.

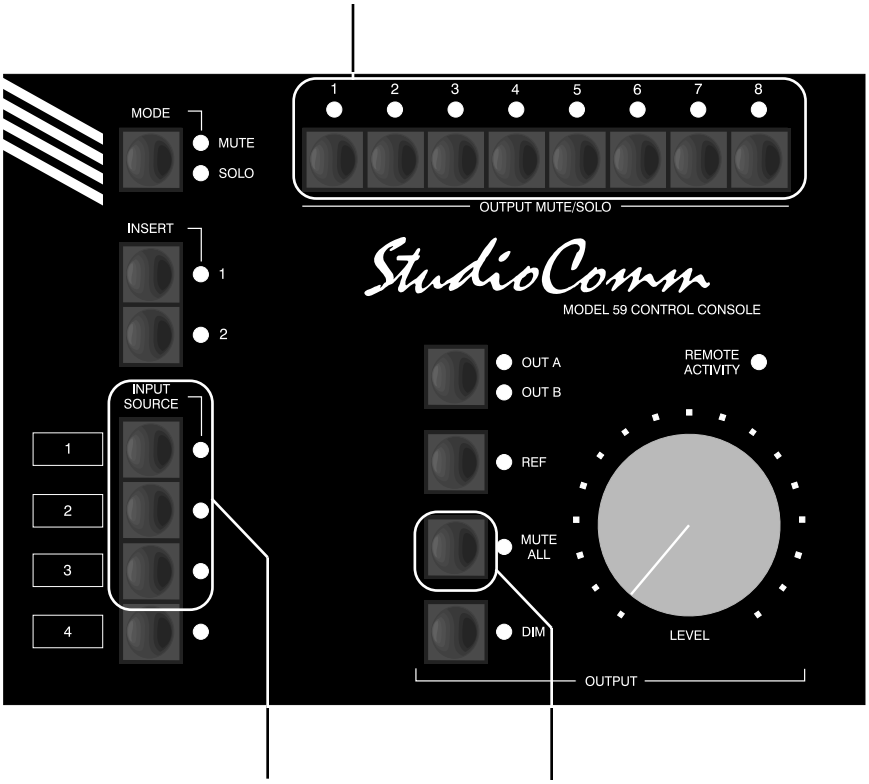


Press and hold the monitor output A/B select button to display and select the monitor output mode, power-up mute mode, and remote level control input.

Default: Monitor output mode is A/B select.
Power-up mute mode disabled.
Remote level control input disabled.

Model 59 Configuration—Channels Selected for Bypass and Bypass Mode

When the mute all button is pressed, these LEDs display the monitor output channels selected for bypass. A lit LED indicates that the channel is selected for bypass. Use the buttons to change the configuration. All LEDs flash to indicate no channels are selected for bypass; bypass function disabled.



When the mute all button is pressed, these LEDs display the bypass mode. The bypass mode indicates which monitor output will be active when the bypass function is enabled.

LED 1 lit means monitor output A;
LED 2 lit means monitor output B;
LED 3 lit means follow monitor output A/B select button.

Use the buttons to select the mode.

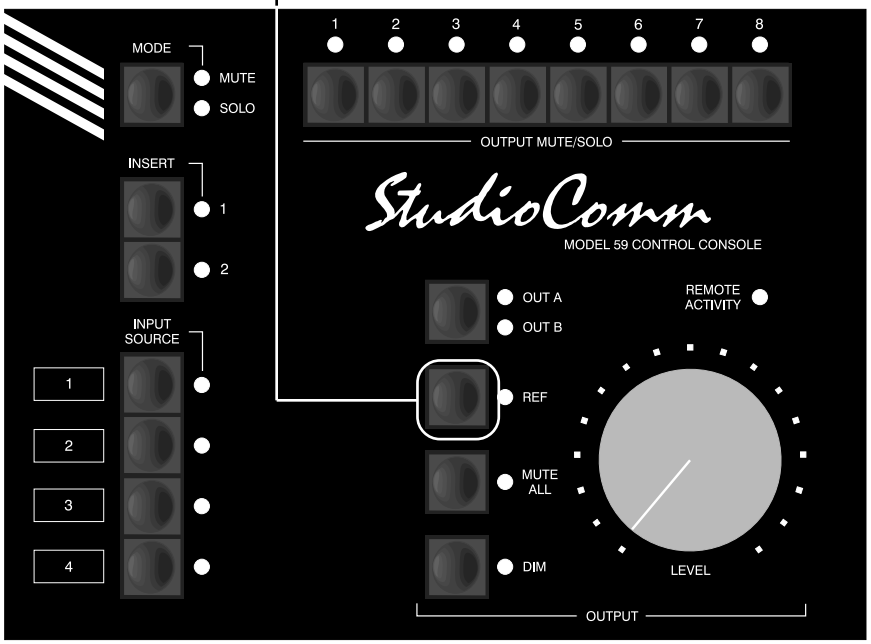
Press and hold the mute all button to display and select the channels selected for bypass and the bypass mode.

Default: No channels selected for bypass; function disabled.
Bypass mode is follow monitor output A/B select button.

Note: A special bypass mode is available. By selecting no channels to be associated with bypass, the bypass function will no longer be available during normal operation.

Model 59 Configuration—Reference Level

Press and hold the Ref button for 5 seconds to take a “snapshot” of the rotary level control’s present setting. The reference LED will light when the “snapshot” has been taken.



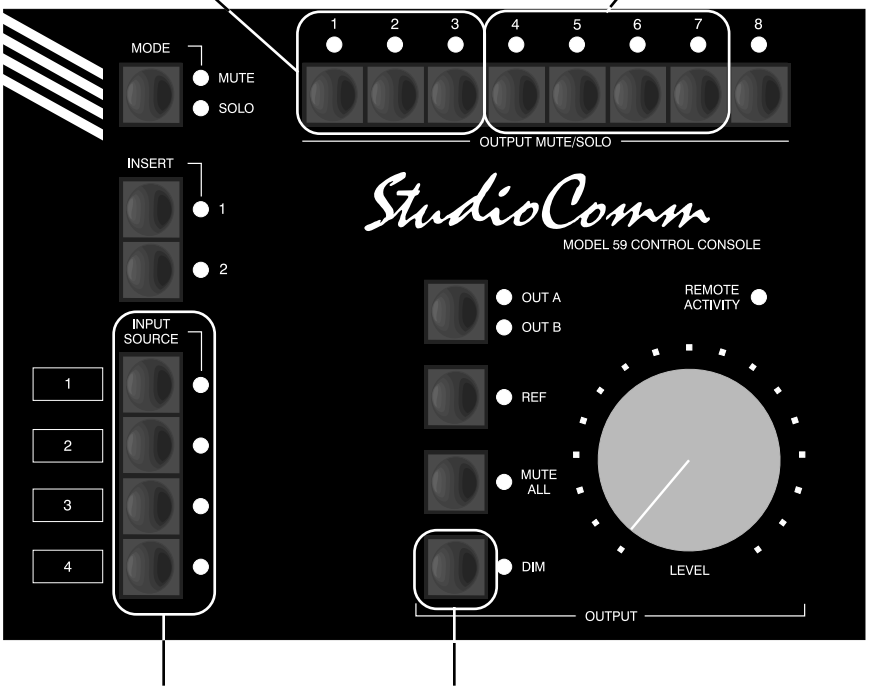
Default: Fully attenuated (minimum) monitor output level.

Note: The 5-second delay is a safety feature, ensuring that the reference level will not be accidently changed. To permanently store the new value, you must still exit the configuration mode.

Model 59 Configuration—Dim Level and Contact Inputs

When the dim button is pressed, these LEDs display the status of contact input 1. LED 1 lit means that the input is disabled. LED 2 lit means that the input provides a remote mute all function. LED 3 lit means that the input provides a remote dim function. Use the buttons to change status.

When the dim button is pressed, these LEDs display the status of contact input 2. LED 4 lit means that the input is disabled. LED 5 lit means that the input provides a remote insert 1 function. LED 6 lit means that the input provides a remote insert 2 function. LED 7 lit means that the input provides a remote bypass function. Use the buttons to change status.



When the dim button is pressed, these LEDs display the selected dim level:

LED 1 lit means 25dB dim;
LED 2 lit means 20dB dim;
LED 3 lit means 15dB dim;
LED 4 lit means 10dB dim.

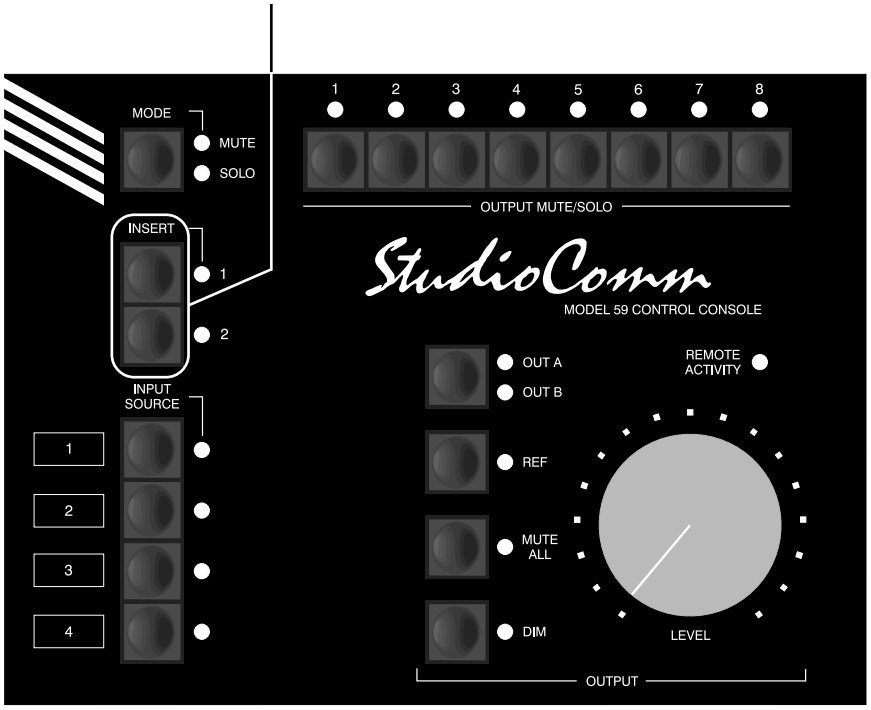
Use the buttons to select the dim level.

Press and hold the dim button to display and select the dim level and contact inputs.

Default: 20dB dim level.
Contact input 1 disabled.
Contact input 2 disabled.

Model 59 Configuration—Restore Factory Defaults

Press and hold both insert buttons for 5 seconds to restore Model 59 factory defaults. Once defaults have been restored, the LEDs will light. After buttons are released, configuration mode will be maintained.



Factory Defaults: For all four inputs, all eight channels are active.
All eight monitor output channels are active.
All channels associated with both inserts are in mode 3, return audio replaces normal audio.
Monitor output mode is A/B select.
Power-up mute mode is disabled.
Remote level control input disabled.
No channels selected for bypass; function disabled.
Bypass mode is follow monitor output A/B select button.
Reference level is set for fully attenuated (minimum) monitor output level.
20dB dim level.
Contact input 1 disabled.
Contact input 2 disabled.

Note: The 5-second delay is a safety feature, ensuring that the factory defaults will not be accidently restored.

Operation

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

Model 58 Central Controller

The Model 58 front panel contains two LEDs. The power LED should be lit whenever AC mains power is connected. The data LED will light whenever a MIDI system-exclusive message matching the Model 58's configuration is received. With multiple Model 58s installed, you'll notice that sometimes all the data LEDs will light simultaneously, and sometimes they'll light independently. The patterns you'll see are simply responses to the commands coming from the Model 59. For example, if an operator presses the mute all button, the command generated is applicable to all Model 58s, so all the data LEDs will light. If an operator mutes an individual channel, only one Model 58 will respond to the command.

Model 59 Control Console

The StudioComm for Surround functions are controlled using the Model 59 Control Console and, if installed, the contact inputs and remote level control. To make things easy to describe, we've divided the StudioComm for Surround functions into six main groups: Input source selection, inserts, monitor output general functions, mute/solo, bypass function, and remote controls.

Input Source Selection

Input source selection is simple. To select an input source for routing to the insert, meter, and monitor outputs press one of the four input source buttons. The corresponding LED will light to let you know that the input has been selected. You can select more than one input source simultaneously; up to all four. The selected inputs will be summed (combined). Start by pressing and holding the button associated with your first input source. While the button is still pressed, add the extra inputs by momentarily pressing the buttons associated with them. The LEDs will light to tell you which inputs have been selected.

A recall feature is an integral part of the input selection process. It's a bit confusing to explain, but simple once you experience it in "real time." A one sentence explanation would describe the input recall feature as allowing the system to return to the previously selected input (or inputs) by simply pressing one button. It was included specifically for film-post applications where it's important to be able to change quickly between a combination of inputs, such as two "stems," and a single input.

Let's begin the explanation with an example: A film-post facility where the usual monitoring setup has both input 1 and input 2 simultaneously selected, while input 3 is occasionally selected to monitor a cue track. To select both inputs, press and hold the button associated with input 1, then press input 2's button, then release both buttons. Inputs 1 and 2 are now selected for monitoring. To monitor input 3 press the button associated with it. To return to monitoring inputs 1 and 2, simply press input 3's button again. The recall feature returns the system to the previously selected inputs. That's all there is to it!

A special configuration mode allows an input to be disabled. This would be appropriate if an input has not been connected to an audio source. If you press an input source button and its associated LED does not light, the input has been disabled.

Inserts

Activating the two insert sections is as simple as pressing the desired insert button. When an insert function is active, its associated LED will be lit. Because of the flexibility that is built into the insert functions, it may be important for an operator to understand how each insert function is configured. An insert may be configured to operate in the usual manner (substituting a processing device into the audio path) or may be used for a summing, routing, or muting function.

A special configuration mode allows an insert to be disabled. This would be appropriate if an insert section was not going to be used. In this case, pressing that insert button would result in no action.

Monitor Output General Functions

Four buttons and one rotary control are associated with the monitor output function. The buttons are A/B output select, reference level, mute all, and dim. The rotary level control is used to set the monitor output level.

A/B Output Select

The A/B button is used to select the monitor output to be connected to the Model 58s' output circuitry. Two LEDs are associated with the button, displaying the active output. Pressing the button "toggles" between the A and B outputs. There is a special configuration that allows this button to be disabled. This would be appropriate if connections were made only to output A. If this configuration has been selected, pressing the A/B will result in no action occurring.

Reference Level

The reference level button, labeled REF, sets the monitor output level to a preset value. This level is normally set, at the time of system installation, by a technician, using a sound-pressure-level (SPL) meter. The LED associated with the reference level function lights steadily whenever the function is active. When reference level mode is active the rotary level control is disabled, as is the remote level control input function.

The reference LED also serves as a calibration aid. If the reference level mode is not active, and the rotary level control is set at precisely the same level as that stored for the reference value, the reference LED will flash. This also holds true for the remote level control, if configured.

Mute All

The mute all function is highly complicated to operate—not! Pressing the mute all button causes the active monitor output (A or B) to mute. The LED associated with the mute all button will light whenever mute all is active. Note that if mute all is enabled via the remote mute all function, the mute all LED will flash, along with the remote activity LED.

Dim

The dim function is quite self-explanatory. Press the dim button to enable the dim mode, which will reduce the monitor output

level by a preset amount. The dim button is always set to “latch” the function on and off. Dim activity applies no matter whether the monitor output level is being set by the rotary control, the reference button, or, if configured, the remote level control. The dim level can be configured for 10, 15, 20, or 25dB, so one of those values will apply when dim is active. The LED associated with the dim button will light whenever dim is active. Note that if dim is enabled via the remote dim function, the dim LED will flash, along with the remote activity LED.

What’s not so self-explanatory is the auto-dim-off function. Whenever dim is enabled due to the dim button being pressed, and reference mode is not active, changing the rotary level control or, if configured, the remote level control, will automatically turn off dim. The auto dim off function is a unique attempt at protecting the health of audio engineers. No longer will there be a heart-stopping blast of audio when the dim button is pressed, supposedly to enable dim, but actually turning it off because dim was already enabled. It’s hard to explain unless you’ve used an audio console and experienced this in person—trust us, this situation does happen! Auto dim off is a wonderful “real-world” function.

Note that the auto dim off function is not active whenever dim is on due to the remote dim function being active. This allows remote control equipment, such as a talkback system, to reliably dim the monitor outputs.

Rotary Level Control

The rotary level control is used to manually adjust the monitor output level. It is active any time the reference level function is not active. When the rotary level control is set to give the same output level as the preset reference level, the reference LED will flash. Note that when the level control is set to its fully counterclockwise position, maximum attenuation is achieved, but don’t expect a full mute. The mute all function should be used to fully mute the monitor outputs.

The rotary level control and, if configured, the remote level control work together in an interesting fashion. The control which is turned last sets the monitor output level. This makes it very simple to move from using one control to the other, with no remote enable/disable buttons or switches to activate.

As a visual aid, if the monitor output level is changed using the remote level control, the remote activity LED on the Model 59 will flash. This LED will continue to flash until a monitor-output-level-related parameter on the Model 59 changes. Level-related parameters include turning the rotary level control, or enabling the reference level, mute all, or dim function. The remote activity LED flashes in this manner as a warning, preventing an operator from wondering why the level has “mysteriously” changed. A change in monitor level can have serious consequences to an audio mix, so this LED serves as an alert that something has changed. Remember, if you are worried about the monitor level being changed remotely during an important mix, use the reference level function to “lock out” the local and remote level controls.

Mute/Solo

The mute/solo mode button and the eight monitor output channel buttons, along with

associated LEDs, work together to provide excellent flexibility. The mute/solo mode button allows the operator to select between industry-standard mute and solo functions. The mute and solo functions use the mute relays in the Model 58 units to enable or disable output channels. Going from mute mode to solo mode, or vice-versa, clears all active mutes or solos. Pressing the mode button twice is a legitimate means of quickly clearing muted or soloed channels.

In the mute mode, multiple channels can be muted simultaneously. A channel that is muted has its associated LED turned on. In the solo mode multiple channels can be soloed simultaneously. A channel that is soloed has its associated LED flash on and off, while the LEDs of the non-soloed channels are not lit.

Note that output channels which have been configured to be disabled cannot be muted or soloed. This ensures that an operator only has access to the available monitor output channels. Unsupported channels will have their LEDs permanently off.

Bypass Function

To enter the bypass mode, press and hold the mute all button for 2 seconds. All LEDs will stop lighting, except those associated with mute all and A/B output select. The mute all LED will activate with a “double flash” pattern to indicate that bypass is active. Depending on how the system was configured, the A/B output button may, or may not, function during bypass mode. Note if the bypass function has been disabled, pressing and holding the mute all button will have no effect.

To exit the bypass mode, press and hold the mute all button for 2 seconds. Normal operation will then resume.

Remote Controls

Two contact signals and a potentiometer can be connected to the system and configured for the desired operating characteristics. Contact input 1 can be configured for remote mute all or remote dim. Contact input 2 can be configured for remote insert 1, remote insert 2, or remote bypass. The remote level control function allows a way of remotely controlling the monitor output level.

When remote mute all is activated the LED on the Model 59 associated with mute all will flash. If mute all was already active when the remote mute all function is activated, the LED will change from being lit to flashing. The remote activity LED on the Model 59 will flash simultaneously as confirmation of a remote control signal being active.

When remote dim is activated the LED on the Model 59 associated with the dim function will flash. If dim was already active when remote dim is activated, the LED will change from being lit to flashing. The remote activity LED on the Model 59 will flash simultaneously as confirmation of a remote control signal being active.

When remote insert 1 is activated the LED on the Model 59 associated with insert 1 will flash. The remote activity LED on the Model 59 will flash simultaneously as confirmation of a remote control signal being active.

When remote insert 2 is activated the LED on the Model 59 associated with insert 2 will flash. The remote activity LED on the

Model 59 will flash simultaneously as confirmation of a remote control signal being active.

When remote bypass is activated, the mute all LED on the Model 59 will flash, as will the remote activity LED. The A/B output select LED will light, indicating the active monitor output. If configured to do so, the A/B button will continue to function during remote bypass.

Technical Notes

Monitor Output Gain Structure

The Model 58 Central Controller's monitor outputs are configured for unity gain. When the rotary level control on the Model 59 Control Console is set for maximum level (fully clockwise) the output level is essentially the same as the main input level. Trim potentiometers allow precise adjustment of the monitor output level. This was provided so that slight level variations caused by the Model 58's circuitry and the associated power amplifiers could be "trimmed out."

Linking Multiple Model 58 Units

Included with each Model 58/Model 59 base configuration is a ribbon-cable bus assembly that includes four 9-pin D-sub plugs (males). This allows the interconnection of up to four Model 58 units, creating, in the 2-channel mode configuration, an 8-channel monitoring system. Should a special application require the interconnection of more than four Model 58s, there is no problem in creating a custom bus assembly. All pins of the 9-pin D-subs are simply connected one-to-one. There is no practical limit to the number of D-subs that can be part of the bus assembly.

If rack space or other considerations prevent the Model 58 units from being directly adjacent to each other, there is no problem creating an extended bus assembly. Note also that the two 9-pin D-subs on the Model 58 are internally connected in parallel. Clarity for the user is the only reason that the connectors are labeled differently. This means that a ribbon-cable bus assembly, such as provided by Studio Technologies, isn't the only means of interconnecting Model 58s. Individual 9-pin to 9-pin D-sub cables can be used to link Model 58s, utilizing both the to/from control console and loop thru connectors.

Input and Output Levels

The main inputs, inserts, and outputs were designed for a +4dBu nominal operating level. It was anticipated that signals with lower operating levels may also get connected. While it was not practical to directly support multiple operating levels the circuitry was specifically designed so that operating level changes could easily be performed by a qualified technician. The Model 58/Model 59 schematic diagrams are available upon request from the factory. Checking the "fine print" on the Model 58 schematic pages, you'll find the resistor identification numbers and corresponding values to change the main input nominal level to –10dBu operation. (The Model 58's designer is well aware that "–10" signals are supposed to be referenced to dBV, but finds from experience that a nominal level of –10dBu interfaces better!)

Definition of Level—dBu

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.

"Hot" Disconnection of the Model 59 Control Console

Should you need to relocate the Model 59 while your StudioComm for Surround system is operating, there is no reason why you can't disconnect the cable, move the unit, and then connect it again. If the Model 59 is disconnected while it is operating, the current operating parameters are saved in nonvolatile memory and the Model 58 Central Controllers will continue to operate as they were when the link was broken. No clicks, pops, or other noises will occur when the Model 59 is again connected. The Model 59 will go through its standard power-up sequence, send a message to reset power-up defaults, then send the operating parameters as stored in its memory. You may notice a brief interval of silence while the Model 58s respond to the reset defaults and operating parameter messages.

Power Amplifier Input Sensitivity

Optimum StudioComm for Surround performance is obtained when the input sensitivity of the associated audio power amplifiers are adjusted to match the Model 58s monitor output level. With normal, but loud, listening levels you should find the level potentiometer on the Model 59 set to about the "2-'clock" position. If you find that you don't have to turn up the Model 59's control that high, reduce the input sensitivity of the power amplifiers until you get to the 2-o'clock position. Most power amplifiers have controls on their inputs to allow easy adjustment of the input sensitivity.

Monitor Output Transient Protection

The Model 58 Central Controller contains a power-up/power-down transient protection feature. This limits the chance of damage to the monitor loudspeakers during the time when AC mains voltage is connected, disconnected, or has significantly changed from nominal. A combination of hardware and software is used to monitor one of the power supply "rails." Until the power supply exceeds 81% of its nominal voltage, electromechanical relays maintain a short circuit condition on the A and B outputs. After a short delay the relays are allowed to function normally. Whenever the power supply drops below 79% of its nominal voltage, the relays immediately go to their mute state. During testing it was found that upon power-up the outputs remained very quiet; during power down a moderate "tick" was the worst that was heard.

Specifications

Model 58 Central Controller

General Audio:

Frequency Response: 20Hz-20kHz ±0.1dB (down 1dB @ 85kHz), monitor out

Distortion (THD+N): 0.01%, measured at 1kHz, +4dBu, monitor out

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

Crosstalk: 78dB, ref +4dBu in

Main Inputs: 8 (normally used as four 2-channel pairs)

Type: electronically balanced

Impedance: 24k ohms

Nominal Level: +4dBu, adjustable ±2dB

Bypass Inputs: 1, 2-channel

Type: balanced, passive, no circuitry associated with input

Switching: bypass inputs switched to monitor outputs using sealed, bifurcated relay contacts

Inserts: 2, 2-channel

Send Type: electronically balanced

Send Nominal Level: +4dBu

Send Maximum Level: +27dBu into 10k ohms, +26dBu into 600 ohms

Return Type: electronically balanced

Return Impedance: 24k ohms

Return Nominal Level: +4dBu, adjustable ±2dB

Monitor Outputs: 2, 2-channel

Type: electronically balanced

A/B Switching: sealed, electromechanical relays, output circuitry shared by both outputs

Nominal Level: unity gain, adjustable ±2dB

Maximum Output Level: +27dBu into 10k ohms, +26dBu into 600 ohms

Meter Output: 1, 2-channel

Type: unbalanced

Nominal Level: +4dBu

Maximum Level: +21dBu into 10k ohms, +20dBu into 600 ohms

Connectors:

Audio: 3, 25-pin D-subminiature female

Control: 2, 9-pin D-subminiature female

AC Mains: 3-blade IEC-type

AC Mains Requirement:

100, 120, or 220/240V, ±10%, factory configured, 50/60Hz

Dimensions (Overall):

19.00 inches wide (48.3cm)
1.72 inches high (4.4cm)
8.75 inches deep (22.2cm)
(1 standard rack space)

Weight: 8.0 pounds (3.6kg)

Model 59 Control Console

Application: supports up to four Model 58 Central Controllers. (Special mode supports up to eight Model 58s.)

Power: provided by Model 58 units

Output Data: generates MIDI system-exclusive messages

Remote Control Inputs: 2 contact, 1 potentiometer

Connector: 1, 9-pin D-subminiature female

Dimensions (Overall):
7.2 inches wide (18.3cm)
2.2 inches high (5.6cm)
5.4 inches deep (13.7cm)

Weight: 2.0 pounds (0.9kg)

Specifications subject to change without notice.

Appendix A

Controlling the Model 58

The Model 58 Central Controller uses MIDI system-exclusive messages to control all functions. The Model 59 Control Console is programmed to generate a subset of what the Model 58 is capable of doing. By using standard MIDI messages, the Model 58 can be used for a wide range of special applications. Any device that can be programmed to send system-exclusive MIDI messages can be used to control the Model 58.

While it is perfectly acceptable for devices other than the Model 59 Control Console to generate the MIDI system-exclusive codes to “drive” the Model 58 Central Controller units, a hardware detail must be noted. The architecture of the Model 58 was created so that up to 8 units could be connected together. A standard MIDI hardware implementation would not allow an output to drive this number of inputs. To solve this problem the input impedance of the Model 58’s MIDI input was raised from the normal 220 ohms to 2000 ohms, while on the Model 59 a more sophisticated output circuit was implemented. The output circuit is essentially a current source that can easily drive up to eight of the modified inputs.

From our very limited tests, connecting one or two Model 58 units to a standard MIDI output works correctly. However, connecting more than one or two will not work reliably, or at all. Several solutions to this problem are available. A custom hardware implementation can duplicate the Model 59’s output circuit, which consists of a few low-cost components. Alternately, the Model 58’s MIDI input impedance can be changed to 220 ohms by simply changing one resistor. This will again limit the number of Model 58 units that can be driven by a standard MIDI output, but three or four should function correctly. Schematic diagrams, included as part of the Service Guide, are available to purchasers of StudioComm for Surround systems. Contact the factory for details.

General Notes:

All MIDI messages to be acted upon are system-exclusive type (F0H). No channel mode, system common, or system real time messages are utilized.

Studio Technologies, Inc. manufacturer’s ID number is 00H 00H 56H

The Model 58’s product device ID number is 03H.

Function: Reset to Power-Up Default Configuration

Byte	Value	Description
1	F0H	System-Exclusive Message
2	00H	1st Byte of Studio Tech ID
3	00H	2nd Byte of Studio Tech ID
4	56H	3rd Byte of Studio Tech ID
5	03H	Product ID (Model 58)
6	00H	Function, Restore Power-Up Default Configuration
7	F7H	EOX, End of System Exclusive

Notes: Action taken after message is received:
Set all input sources to off.
Set all monitor output channels to off.
Set monitor output level to minimum.
Set monitor output A/B to both off.
Set insert 1 to all normal.
Set insert 2 to all normal.
Bypass set to normal.

Function: Input Source and Associated Channels

Byte	Value	Description
1	F0H	System-Exclusive Message
2	00H	1st Byte of Studio Tech ID
3	00H	2nd Byte of Studio Tech ID
4	56H	3rd Byte of Studio Tech ID
5	03H	Product ID (Model 58)
6	01H	Function, Input Source and Associated Channels
7	0nH	Input Source, range 1-8, 1=input source 1, 2=input source 2, etc.
8	nnH	Input Channel Status Bit Map (sum values from all seven channels): Channel 1: off=00; on=01 Channel 2: off=00; on=02 Channel 3: off=00; on=04 Channel 4: off=00; on=08 Channel 5: off=00; on=10 Channel 6: off=00; on=20 Channel 7: off=00; on=40
9	0nH	Input Channel Status Channel 8: off=0; on=1
10	F7H	EOX, End of System Exclusive

Function: Monitor Output Channel Status

Byte	Value	Description
1	F0H	System-Exclusive Message
2	00H	1st Byte of Studio Tech ID
3	00H	2nd Byte of Studio Tech ID
4	56H	3rd Byte of Studio Tech ID
5	03H	Product ID (Model 58)
6	02H	Function, Output Channel Status
7	nnH	Monitor Output Channel Status Bit Map (sum values from all seven channels): Channel 1: off=00; on=01 Channel 2: off=00; on=02 Channel 3: off=00; on=04 Channel 4: off=00; on=08 Channel 5: off=00; on=10 Channel 6: off=00; on=20 Channel 7: off=00; on=40
8	0nH	Monitor Output Channel Status Channel 8: off=0; on=1
9	F7H	EOX, End of System Exclusive

Notes: Mute all function is implemented using the output A/B status command, not the monitor output channel status command.

Bypass status takes priority over monitor output channel status.

Function: Monitor Output Level - Normal

Byte	Value	Description
1	F0H	System-Exclusive Message
2	00H	1st Byte of Studio Tech ID
3	00H	2nd Byte of Studio Tech ID
4	56H	3rd Byte of Studio Tech ID
5	03H	Product ID (Model 58)
6	03H	Function, Monitor Output Level - Normal
7	nnH	Monitor Output Level, MSB, range 00-7F
8	0nH	Monitor Output Level, LSB, range 0-1
9	F7H	EOX, End of System Exclusive

Notes: Control console sends new value each time monitor output level is changed.

Monitor output level is 8-bit precision, spread over two MIDI bytes: 00H 00H lowest; 7FH 01H highest. MIDI byte 7 is monitor output level bits 2-8; MIDI byte 8 is monitor output level bit 1.

Dim function is performed by control console and is sent using monitor output level command.

This function is in effect only when monitor output channel status is on and bypass status is normal.

Function: Monitor Output Level - Reverse

Byte	Value	Description
1	F0H	System-Exclusive Message
2	00H	1st Byte of Studio Tech ID
3	00H	2nd Byte of Studio Tech ID
4	56H	3rd Byte of Studio Tech ID
5	03H	Product ID (Model 58)
6	04H	Function, Monitor Output Level - Reverse
7	nnH	Monitor Output Level, MSB, range 00-7F
8	0nH	Monitor Output Level, LSB, range 0-1
9	F7H	EOX, End of System Exclusive

Notes: Not sent by control console. Provided for special applications.

Output level is 8-bit precision, spread over two MIDI bytes: 00H 00H highest; 7FH 01H lowest. MIDI byte 7 is monitor output level bits 2-8; MIDI byte 8 is monitor output level bit 1.

This function is in effect only when monitor output channel status is on and bypass status is normal.

Function: Monitor Output A/B Status

Byte	Value	Description
1	F0H	System-Exclusive Message
2	00H	1st Byte of Studio Tech ID
3	00H	2nd Byte of Studio Tech ID
4	56H	3rd Byte of Studio Tech ID
5	03H	Product ID (Model 58)
6	05H	Function, Monitor Output A/B Status
7	0nH	Monitor Output A/B Bit Map (sum values from both channels): A: off=0; on=1 B: off=0; on=2
8	F7H	EOX, End of System Exclusive

Notes: This function is used by monitor output channel status and bypass status. Output A/B status is used to mute all channels by setting byte 7 to 0.

Function: Insert 1 Status

Byte	Value	Description
1	F0H	System-Exclusive Message
2	00H	1st Byte of Studio Tech ID
3	00H	2nd Byte of Studio Tech ID
4	56H	3rd Byte of Studio Tech ID
5	03H	Product ID (Model 58)
6	06H	Function, Insert 1 Status
7	nnH	Insert Bit Map (sum values from all three channels): Channel 1: mute=00; normal=01; replace=02; sum=03 Channel 2: mute=00; normal=04; replace=08; sum=0C Channel 3: mute=00; normal=10; replace=20; sum=30
8	nnH	Insert Bit Map (sum values from all three channels): Channel 4: mute=00; normal=01; replace=02; sum=03 Channel 5: mute=00; normal=04; replace=08; sum=0C Channel 6: mute=00; normal=10; replace=20; sum=30
9	nnH	Insert Bit Map (sum values from both channels): Channel 7: mute=00; normal=01; replace=02; sum=03 Channel 8: mute=00; normal=04; replace=08; sum=0C
10	F7H	EOX, End of System Exclusive

Function: Insert 2 Status

Byte	Value	Description
1	F0H	System-Exclusive Message
2	00H	1st Byte of Studio Tech ID
3	00H	2nd Byte of Studio Tech ID
4	56H	3rd Byte of Studio Tech ID
5	03H	Product ID (Model 58)
6	07H	Function, Insert 2 Status
7	nnH	Insert Bit Map (sum values from all three channels): Channel 1: mute=00; normal=01; replace=02; sum=03 Channel 2: mute=00; normal=04; replace=08; sum=0C Channel 3: mute=00; normal=10; replace=20; sum=30
8	nnH	Insert Bit Map (sum values from all three channels): Channel 4: mute=00; normal=01; replace=02; sum=03 Channel 5: mute=00; normal=04; replace=08; sum=0C Channel 6: mute=00; normal=10; replace=20; sum=30
9	nnH	Insert Bit Map (sum values from both channels): Channel 7: mute=00; normal=01; replace=02; sum=03 Channel 8: mute=00; normal=04; replace=08; sum=0C
10	F7H	EOX, End of System Exclusive

Function: Bypass Status

Byte	Value	Description
1	F0H	System-Exclusive Message
2	00H	1st Byte of Studio Tech ID
3	00H	2nd Byte of Studio Tech ID
4	56H	3rd Byte of Studio Tech ID
5	03H	Product ID (Model 58)
6	08H	Function, Bypass Channel Status
7	nnH	Bypass Channel Status Bit Map (sum values from all seven channels): Channel 1: normal=00; bypass=01 Channel 2: normal=00; bypass=02 Channel 3: normal=00; bypass=04 Channel 4: normal=00; bypass=08 Channel 5: normal=00; bypass=10 Channel 6: normal=00; bypass=20 Channel 7: normal=00; bypass=40
8	0nH	Bypass Channel Status Channel 8: normal=0; bypass=1
9	F7H	EOX, End of System Exclusive

Notes: Normal indicates that channel follows monitor output channel status.

Bypass status takes priority over monitor output channel status.

Function: Input Source to Output 2

Byte	Value	Description
1	F0H	System-Exclusive Message
2	00H	1st Byte of Studio Tech ID
3	00H	2nd Byte of Studio Tech ID
4	56H	3rd Byte of Studio Tech ID
5	03H	Product ID (Model 58)
6	09H	Function, Right Input Source
7	0nH	Input Source, range 1-8, 1=input source 1, 2=input source 2, etc.
8	nnH	Input Source Channel Status Bitmap (sum values from all seven channels): Channel 1: off=00; on=01 Channel 2: off=00; on=02 Channel 3: off=00; on=04 Channel 4: off=00; on=08 Channel 5: off=00; on=10 Channel 6: off=00; on=20 Channel 7: off=00; on=40
9	0nH	Input Source Channel Status Channel 8: off=0; on=1
10	F7H	EOX, End of System Exclusive

Note: Using this function requires the Model 58's front-panel-mounted DIP switches to be set as follows: Switch 5 to off (down) and switch 6 to on (up).

Appendix B

Model 58 Single-Channel Mode

DIP switch 5 on the Model 58's front panel allows the operating mode to be set. Installations that utilize a Model 59 Control Console will use the two-channel mode, configured by setting DIP switch 5 to the off (down) position. In this mode, a Model 58 supports two output channels and four 2-channel input pairs. Special applications can use the Model 58's single-channel operating mode, configured by setting DIP switch 5 to the on (up) position. Figures 12, 13, and 14 provide detailed connection information for the inputs, outputs, and inserts when a Model 58 is operating in the single-channel mode.

The concept of the single-channel mode is simple: The signal flow is organized so that any of the eight main inputs can be routed to one monitor and meter output. (This is in contrast to the two-channel mode where the eight main inputs are organized as four pairs.) In the single-channel mode, a maximum of four of the 8 inputs can be simultaneously routed to one output channel. Specifically, monitor output 1 (A and B), meter output 1, insert 1/channel 1, insert 2/channel 1 are active in the single-channel mode. Monitor output 2 (A and B), meter output 2, insert 1/channel 2, and insert 2/channel 2 are disabled.

It is expected that a number of applications for the single-channel mode will arise. A special version of the Model 59 Control Console can be created at the factory to allow up to eight 8-channel sources to be connected to eight Model 58 units. It is also anticipated that custom installations will be created that generate MIDI system-exclusive messages to "drive" Model 58 units. Contact the factory for additional information.

Connection	Signal High (+)	Signal Low (–)	Shield
MAIN IN 1	24	12	25
MAIN IN 2	10	23	11
MAIN IN 3	21	9	22
MAIN IN 4	7	20	8
MAIN IN 5	18	6	19
MAIN IN 6	4	17	5
MAIN IN 7	15	3	16
MAIN IN 8	1	14	2

Notes: 1) Connector type on Model 58 is 25-pin D-subminiature female. Installer must provide plug (male). Connector uses 4-40 threaded inserts for locking with mating plug.

2) Wiring scheme follows Tascam DA-88 convention. Standard DA-88-type wiring harnesses are directly compatible, with the exception of 4-40 screw threads being required.

Figure 12. Single-Channel Mode Connections for Main Inputs

Connections	Signal High (+)	Signal Low (–)	Shield
MONITOR OUT A	24	12	25
NOT USED	10	23	11
MONITOR OUT B	21	9	22
NOT USED	7	20	8
METER OUT	18	6 (See Note 3)	19
NOT USED	4	17	5
BYPASS IN	15	3	16
NOT USED	1	14	2

Notes: 1) Connector type on Model 58 is 25-pin D-subminiature female. Installer must provide plug (male). Connector uses 4-40 threaded inserts for locking with mating plug.

2) Wiring scheme loosely follows Tascam DA-88 convention. Modified DA-88-type wiring harnesses are required, along with 4-40 screw threads.

3) Meter output is unbalanced. Pin 6 is internally connected to Model 58 shield.

Figure 13. Single-Channel Mode Connections for Monitor Outputs, Meter Output, and Bypass Input

Connections	Signal High (+)	Signal Low (–)	Shield
SEND 1	24	12	25
RETURN 1	10	23	11
NOT USED	21	9	22
NOT USED	7	20	8
SEND 2	18	6	19
RETURN 2	4	17	5
NOT USED	15	3	16
NOT USED	1	14	2

Notes: 1) Connector type on Model 58 is 25-pin D-subminiature female. Installer must provide plug (male). Connector uses 4-40 threaded inserts for locking with mating plug.

2) Wiring scheme loosely follows Tascam DA-88 convention. Modified DA-88-type wiring harnesses are required, along with 4-40 screw threads.

Figure 14. Single-Channel Mode Connections for Inserts

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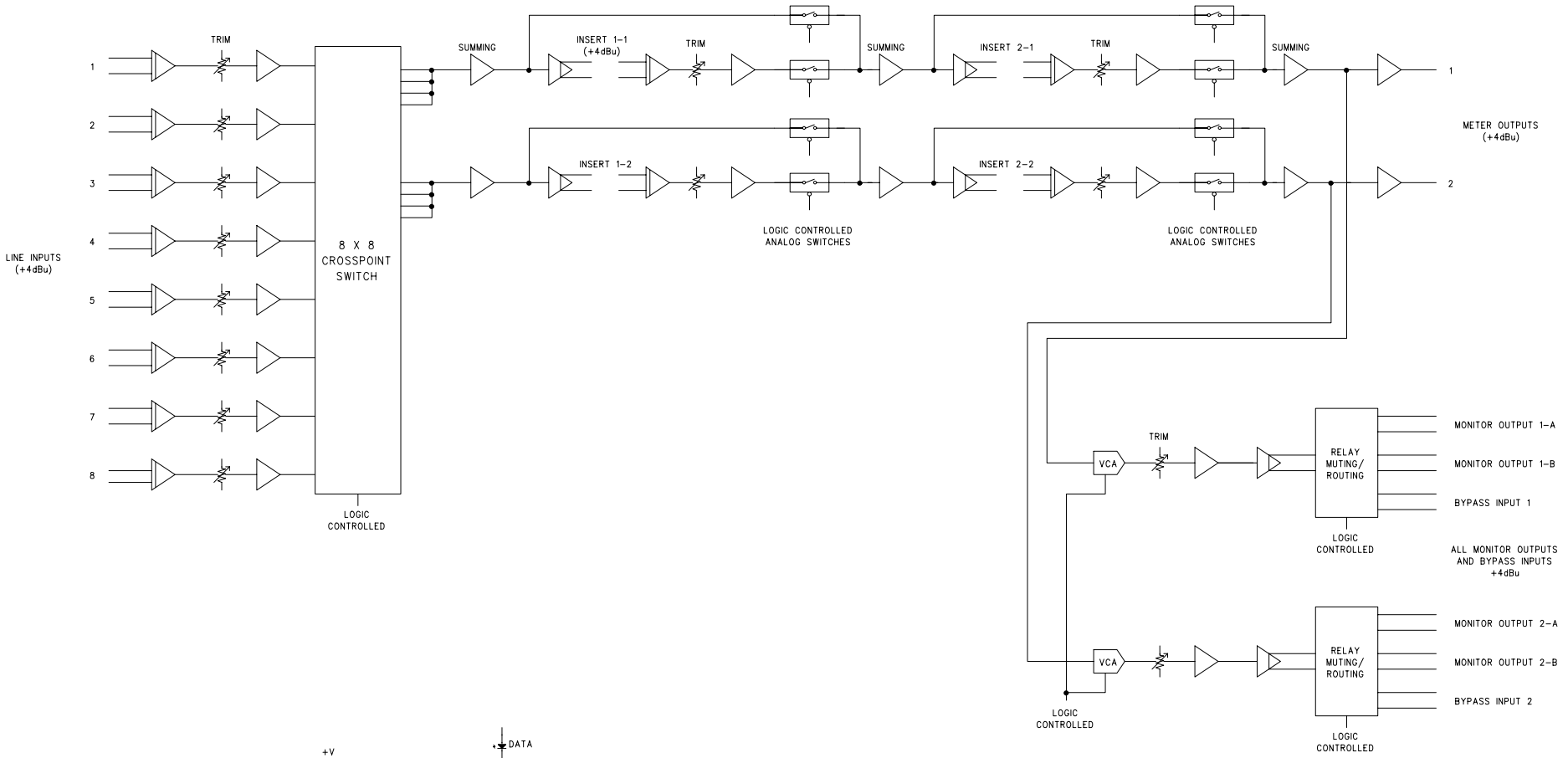

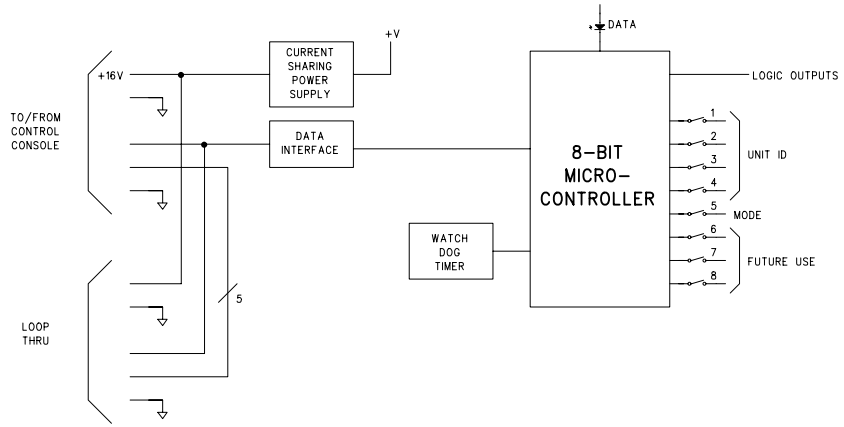

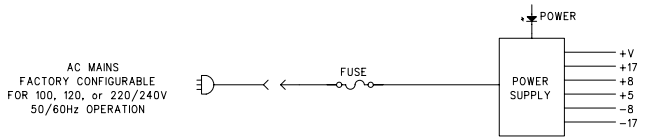

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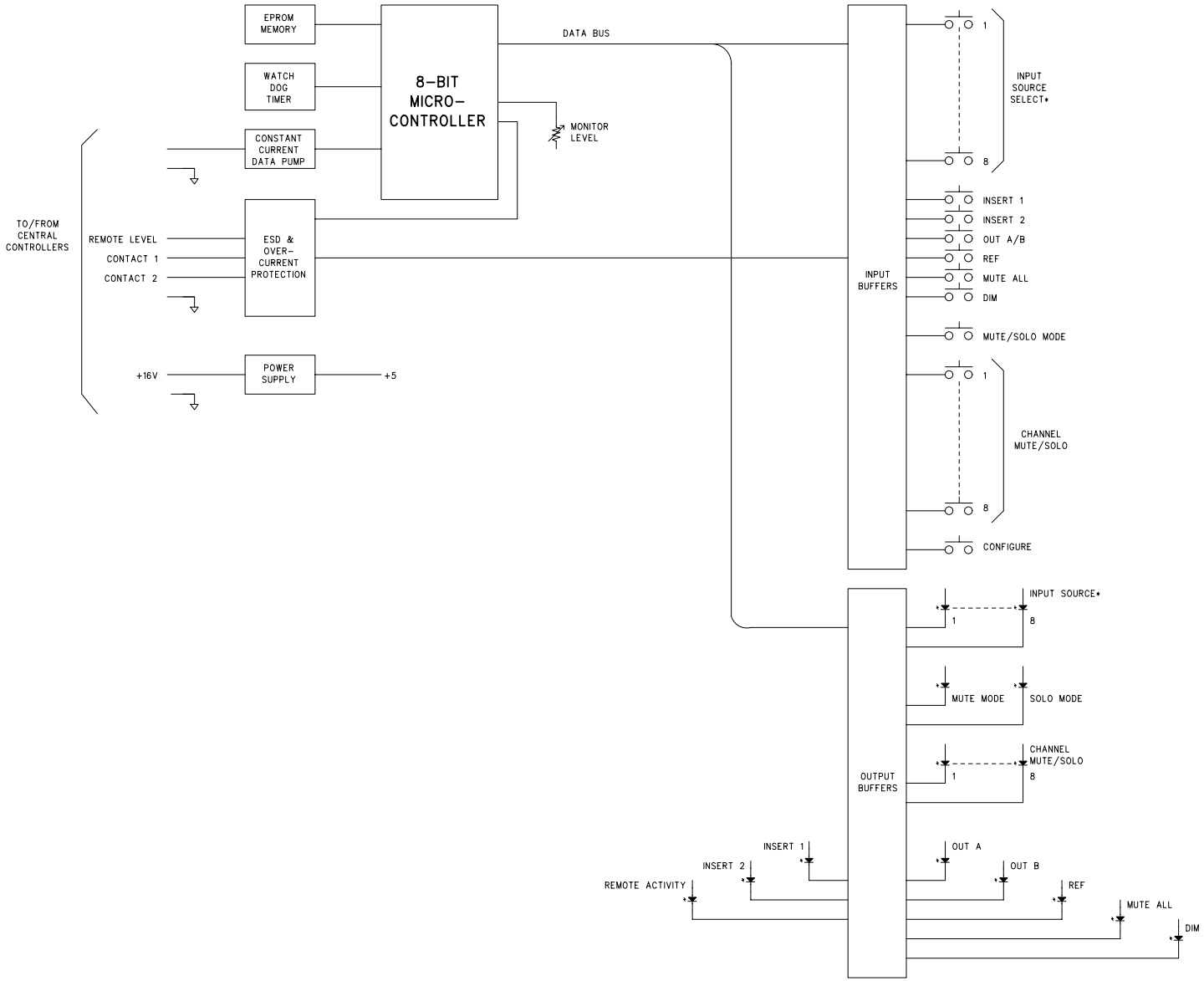
MODEL 58 CENTRAL CONTROLLER BLOCK DIAGRAM		
DRAWING NO. 30755	DATE 06/02/99	PAGE 01 OF 01

THIS BLOCK DIAGRAM APPLICABLE FOR SN 00351 AND LATER



M59BD_B

THIS BLOCK DIAGRAM APPLICABLE FOR SN 00231 AND LATER

* 5-8 NOT INCLUDED IN STANDARD VERSION

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MODEL 59
CONTROL CONSOLE
BLOCK DIAGRAM

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30756	06/02/99	01 OF 01