SCM410 SCM410E -- Four-Channel Microphone Mixer

Safety Information

IMPORTANT SAFETY INSTRUCTIONS

1. READ these instructions.
2. KEEP these instructions.
3. HEED all warnings.
4. FOLLOW all instructions.
5. DO NOT use this apparatus near water.
6. CLEAN ONLY with dry cloth.
7. DO NOT block any ventilation openings. Allow sufficient distances for adequate ventilation and install in accordance with the manufacturer’s instructions.
8. DO NOT install near any heat sources such as open flames, radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat. Do not place any open flame sources on the product.
9. DO NOT defeat the safety purpose of the polarized or grounding type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wider blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. PROTECT the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. ONLY USE attachments/accessories specified by the manufacturer.
12. USE only with a cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

13. UNPLUG this apparatus during lightning storms or when unused for long periods of time.
14. REFER all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. DO NOT expose the apparatus to dripping and splashing. DO NOT put objects filled with liquids, such as vases, on the apparatus.
16. The MAINS plug or an appliance coupler shall remain readily operable.

17. The airborne noise of the Apparatus does not exceed 70dB (A).
18. Apparatus with CLASS I construction shall be connected to a MAINS socket outlet with a protective earthing connection.
19. To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
20. Do not attempt to modify this product. Doing so could result in personal injury and/or product failure.
21. Operate this product within its specified operating temperature range.

	This symbol indicates that dangerous voltage constituting a risk of electric shock is present within this unit.
	This symbol indicates that there are important operating and maintenance instructions in the literature accompanying this unit.

WARNING: Voltages in this equipment are hazardous to life. No user-serviceable parts inside. Refer all servicing to qualified service personnel. The safety certifications do not apply when the operating voltage is changed from the factory setting.

General Description

The Shure Model SCM410/E is a four-channel automatic microphone mixer for use in sound reinforcement, audio recording, and broadcast applications. The SCM410 dramatically improves audio quality in any application where multiple microphones are required. Any low-impedance dynamic or condenser microphone (including wireless) can be used with the SCM410. Multiple SCM410 mixers can be linked to other SCM410 mixers, as well as to Shure Models FP410, SCM810, and SCM800.

Each input channel has a two-band equalizer and three logic terminals. The equalizer reduces unwanted low-frequency audio pickup and makes different microphone types-lavaliers, boundary and handheldsound similar. The logic terminals can be used to control external devices.

The SCM410 operates on 100-120 Vac power and the SCM410E operates on 220-240 Vac power. Each mixer is supplied with a power cord, rack-mounting hardware, and a link cable.

Features

- Fast, noise-free microphone selection, which automatically adjusts to changes in background noise
- Automatic gain adjustment as additional microphones are activated- NOMA (Number of Open Microphones Attenuated)
- Last Mic Lock-On circuit maintains ambient sound
- Fits in half-rack space
- Adjustable EQ for each channel
- Active balanced microphone-level XLR inputs and an active balanced Mic/Line level XLR output
- Unbalanced auxiliary-level phono output

- Bi-color channel activation and clipping LEDs
- Peak-responding output limiter with LED indicator
- Peak-responding output level meter

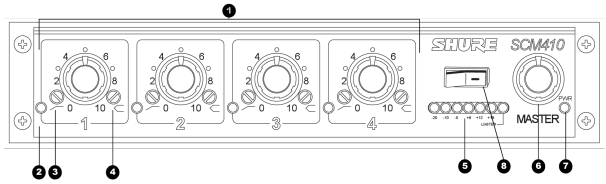
Operating Principles

The operating concept behind the SCM410 Automatic Mixer is Shure's proprietary IntelliMix® circuitry. Intellimix delivers seamless automatic mixing by combining three separate functions:

- Noise Adaptive Threshold. Distinguishes between constant background noise (such as air conditioning) and changing sound (such as speech) for each input channel. It continuously adjusts the activation threshold so that only speech levels louder than the background noise activate a channel.
- MaxBus. Controls the number of channels that may be activated for a single sound source. One talker activates only one channel, even if multiple microphones “hear” that talker.
- Last Mic Lock-On. Keeps the most recently activated microphone open until another microphone is activated. Without Last Mic Lock-On, a long pause in conversation would cause all microphones to turn off, which would sound as if the audio signal had been lost. Last Mic Lock-On ensures that background ambience is always present.

IntelliMix is a registered trademark of Shure Incorporated.

Front Panel



[1] Microphone Channel Gain Controls 1 - 4

Allows adjustment of microphone gain.

[2] Input LED 1 - 4

Lights green when channel is active; lights red at 6 dB below clipping level.

[3] Low-Cut Filter 1 - 4

Provides adjustable low-frequency rolloff (high pass), reducing presence of undesirable low-frequency signals.

[4] High-Frequency Shelving Filter 1 - 4

Provides level boost or cut in mid/high-frequency region for reduced sibilance from vocal microphones, or to compensate for off-axis coloration in lavalier microphones.

[5] Output Level Meter

Six-segment LED meter indicates peak output signal level in dBu (0 dBu = 0.775V). The red LED illuminates when the output is 6 dB below clipping. The last LED indicates limiter action.

[6] MASTER Level Control

Controls overall output level.

[7] POWER LED

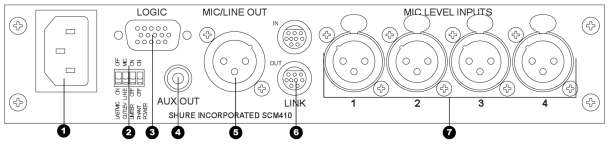
Lights green when mixer is plugged into a power source.

[8] POWER Switch

Turns the mixer on and off.

Note: Country dependant

Rear Panel



[1] Power Connector

Unit is energized when the power cord is plugged into a 100-120 Vac (SCM410) or 220-240 Vac (SCM410E) power source. NOTE: There is no power On/Off switch on this mixer.

[2] DIP Switch

The 4-position DIP switch provides additional functions. Refer to the “DIP Switch Functions”section.

[3] Microphone Logic Connector

High density DB-15 male connector provides connection to GATE OUT, MUTE IN, and OVERRIDE IN logic terminals on each channel. Refer to the “Advanced Functions” section.

Note: This is not a VGA monitor port.

[4] AUX OUT Phono Connector

Feeds consumer-level audio equipment, such as a tape recorder, VCR, or video camera. Not affected by MIC/LINE switch.

[5] MIC/LINE XLR OUTPUT Connector

Can be set for microphone or line-level output via a DIP switch.

[6] LINK IN/OUT Connector

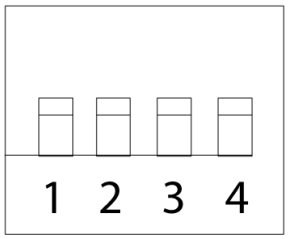
Permits multiple SCM410/E, FP410, SCM810, SCM800, or AMS8100 mixers to be linked, creating additional inputs.

[7] MIC LEVEL XLR INPUT Connectors

Active balanced microphone-level XLR inputs. For instructions on how to modify the level of these inputs, refer to the “Internal Modifications” Addendum.

DIP Switch Functions

The rear panel DIP switches, shown in Figure 1, provide the functions listed in the table below.



	Last Mic Lock-On	XLR Output Level	Limiter	12V Phantom Power
Switch Number	1	2	3	4
Switch Up	All mics off after hold time	Mic Level	ON	ON
Switch Down	ON*	Line Level	OFF*	OFF*

* Factory setting

Last Mic Lock-On

Keeps the most recently activated microphone turned on until another microphone is activated. When defeated, microphones turn off after their default hold time. XLR Output Level: Sets the level of the XLR output to line or microphone level. Make sure the output level matches the input level of the device connected to the SCM410.

Note: The output level does not affect the auxiliary output (AUX OUT) level.

Limiter

Activates the output limiter and sets it to a default threshold of +16 dBu (see *Internal Modifications* Addendum for other threshold settings).

12V Phantom Power

When this switch is in the ON position, the SCM410 provides 12Vdc phantom power to each XLR microphone input. This function is particularly useful when using condenser microphones, since most condenser microphones require phantom power.

Note: Phantom power does not affect the operation of balanced dynamic microphones. They can be connected to the SCM410 in combination with condenser microphones that use phantom power. For instructions on how to disable phantom power by channel, refer to the *Internal Modifications* Addendum.

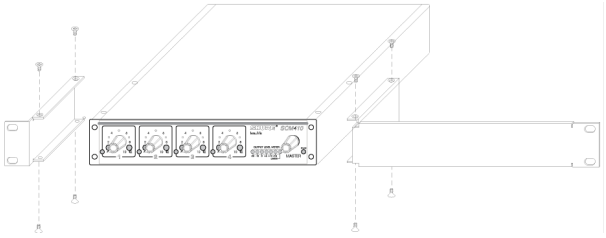
Installation

Rack Mounting

The SCM410 is supplied with hardware for mounting one or two units to a 19-inch audio equipment rack. The hardware can also be used to rack mount other Shure products, including the SCM268, SCM262, DFR11EQ, and the DP11EQ.

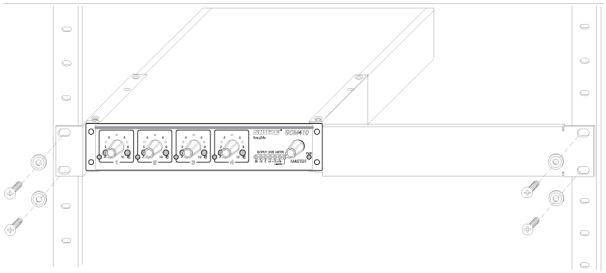
Single Mixer (Half Rack) Installation

1. Attach the short and long rack-mount brackets to the SCM410/E with eight (8) of the supplied bracket screws.



INSTALLING HALF RACK MOUNTING BRACKETS

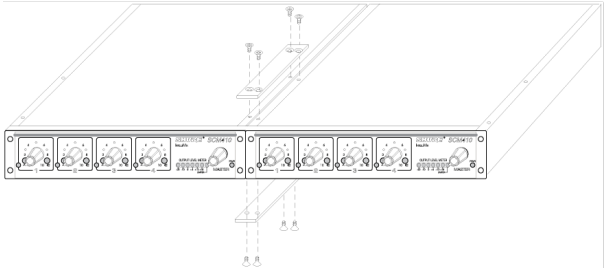
2. Place the mixer in an equipment rack and secure it with the supplied rack-mount screws and plastic washers.



RACK MOUNTING A SINGLE SCM410/E MIXER

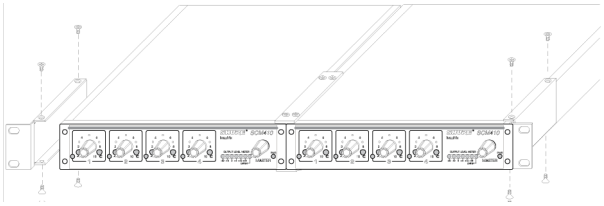
Dual Mixer (Full Rack) Installation

1. Place the two mixers side-by-side and connect them with two (2) straddle brackets. The brackets should straddle the recessed edges on the top and bottom of each mixer.



INSTALLING STRADDLE BRACKETS

2. Fasten the straddle brackets using eight (8) bracket screws.
3. Attach the short rack-mount brackets to the outsides of the combined mixers with eight (8) of the bracket screws.



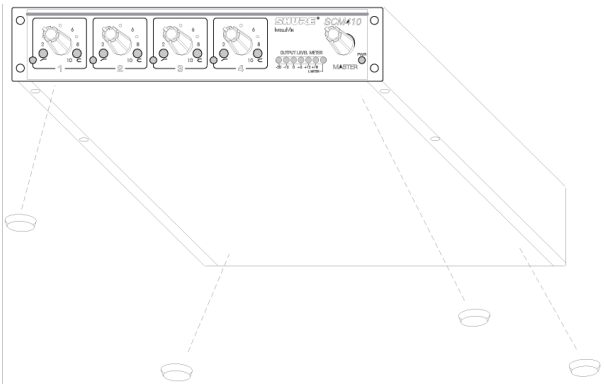
INSTALLING FULL RACK MOUNTING BRACKETS

4. Place the mixer in an equipment rack, using the supplied rack-mount screws and plastic washers.

RACK MOUNTING DUAL SCM410/E MIXERS

Table-Top Mounting

Adhere the four (4) supplied rubber feet to the bottom of the mixer at each corner. This will keep it from sliding and protect the table surface.

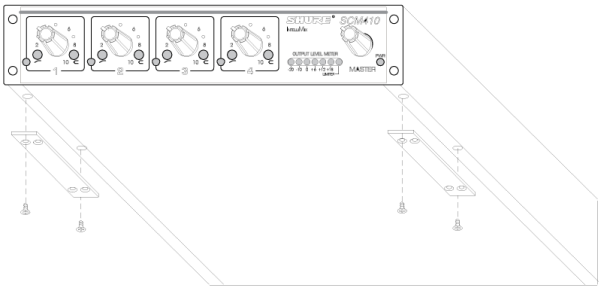


ATTACHING RUBBER FEET FOR TABLE-TOP MOUNTING

Fixed Mounting

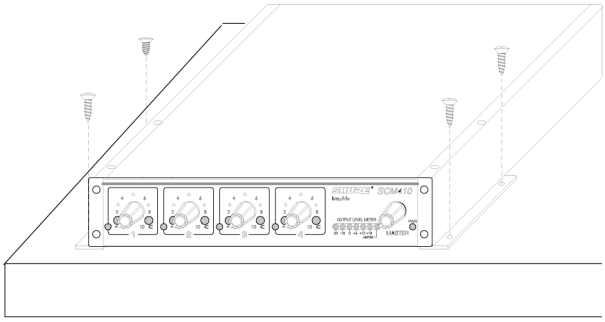
Top Mount

1. Fasten the straddle brackets to the recessed edges of the chassis, using four (4) bracket screws.



INSTALLING STRADDLE BRACKETS FOR TOP MOUNTING

2. Fasten the straddle brackets to the top of the mounting surface, using the four (4) supplied wood screws.

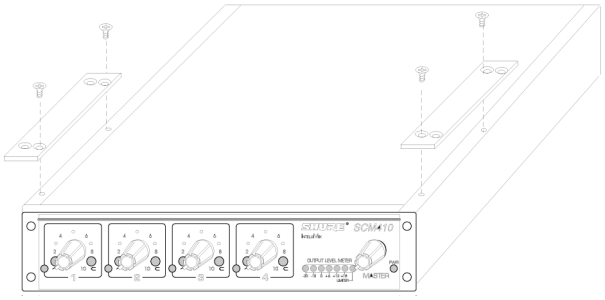


SECURING MIXER TO TOP MOUNTING SURFACE

Hanging Mount

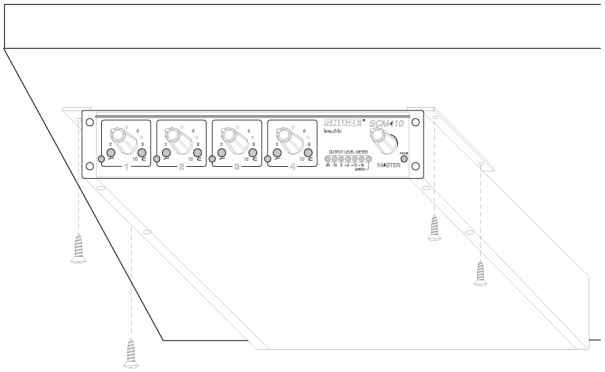
Note: The hardware provided is for attachment to wood. Other surfaces require the use of appropriate hardware rated for 15 lbs. or more.

1. Fasten the straddle brackets to the top of the mixer.



INSTALLING STRADDLE BRACKETS FOR HANG MOUNTING

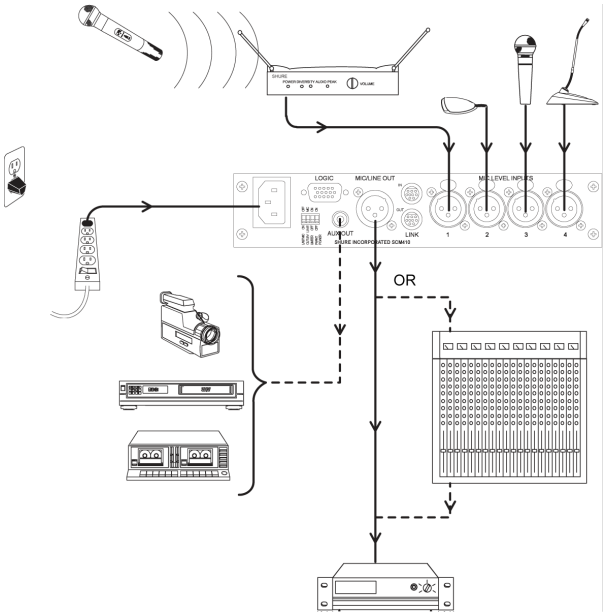
2. Fasten the straddle brackets to the bottom of the mounting surface, using the four (4) supplied wood screws.



SECURING MIXER TO BOTTOM MOUNTING SURFACE

SCM410 Connections

1. Connect microphone signal sources to the Channel Input connectors. Use conventional 2-conductor shielded audio cables.
2. If any condenser microphones are connected, set the +12V phantom power DIP switch to ON.
3. Connect the SCM410 Mic/Line Level Output to the input of mixers, EQs, amplifiers, or recorders.
4. Connect the power cord to 100-120 Vac (SCM410) or 220-240 Vac (SCM410E)



Linking Multiple Mixers

If more than four inputs are needed, multiple Shure SCM410, FP410, or SCM810 mixers can be linked by connecting the LINK OUT of the first mixer to the LINK IN of the next mixer, and so on. See Figure 2. Leave the LINK IN jack of the first mixer and the LINK OUT jack of the last mixer unconnected.

When properly linked, the mixers will operate as a system. Automatic mixing functions will be shared by all units. All input signals appear at all linked mixer outputs. Each mixer's Master level control only controls its own output. However, actual off-attenuation will increase as more mixers are linked. This reduces excessive noise and reverberation contributed by the increased number of microphones.

Important: When using logic terminals on linked mixers, connect the LOGIC GROUND terminals of each unit together.

Note: SCM410 link connections are unbalanced. To minimize hum and noise, avoid using longer link cables. Use high quality, shielded cable, and keep them away from sources of magnetic or electrical noise, such as power transformers or light dimmers. To minimize ground currents, make sure linked mixers are connected to the same AC power mains.

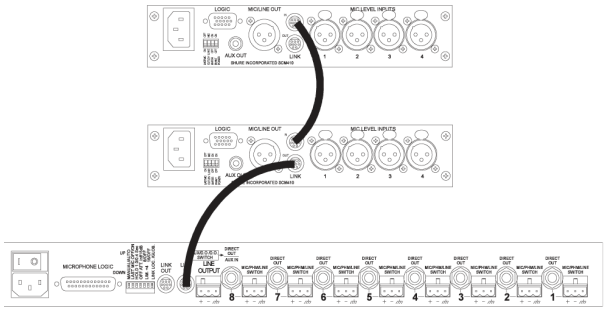


FIGURE 1: LINKED SCM410 AND SCM810 MIXERS

Basic Mixer Operation

1. Adjust each channel level so that its Overload LED flickers only during very loud speech or noise.
2. Adjust the Low-Cut and High-Frequency controls adjacent to each Input Gain control so that the microphones sound similar.
3. Adjust the Master level control for the required output level, as indicated by the output peak meter. The SCM410 is now ready for use.

Limiter

Output limiters prevent distortion during loud program peaks without affecting normal program levels. This keeps the devices connected to the SCM410 output from becoming overloaded. Increasing individual or Master controls on the SCM410 increases average output and, in turn, the amount of limiting.

The limiter may be turned on via the rear panel DIP switch. The default limiter threshold is +16 dBu. As supplied, the limiter is defeated.

Note: Limiter thresholds can be changed from their factory settings. Refer to the *Internal Modifications* Addendum.

Equalizer Functions

Low Cut Filter (High-Pass)

Low-cut filters are used to reduce unwanted low frequency sounds such as footsteps, motorized traffic, and to control proximity effect. The SCM410 has a one-pole, low-cut (high-pass) filter of 6 dB per octave. The low-cut filter allows all frequencies above its cutoff point to pass through unchanged. Frequencies below the cutoff are attenuated (see Figure 2). The cutoff point is defined as the frequency where the signal has dropped 3 dB relative to the flat, or bandpass, region. Below the cutoff point, the filter exhibits increasingly more attenuation as the frequency diminishes.

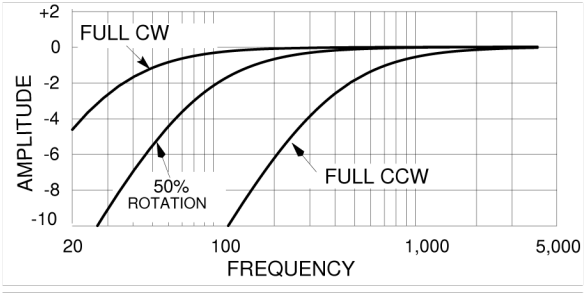


FIGURE 2: LOW-CUT FILTER EFFECTS

High-Frequency Shelving

The fixed-frequency equalizer produces a 6 dB boost or cut at 5 kHz and above (see Figure 3). High-frequency shelving is extremely useful for boosting flat frequency response and tempering sibilant vocal microphones or enhancing the sound of off-axis lavalier microphones.

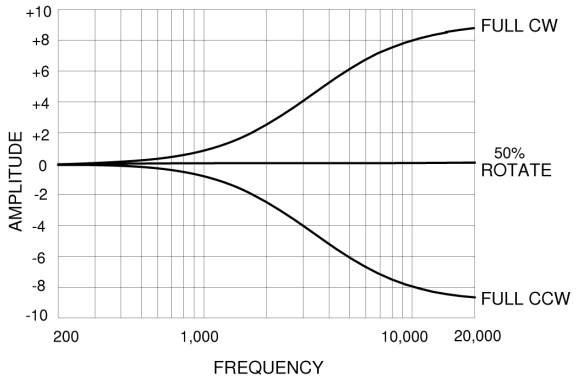


FIGURE 3: HIGH-FREQUENCY SHELVING EFFECTS

Specifications

Measurement Conditions (unless otherwise specified): Line voltage 120 Vac, 60 Hz (SCM410) or 230 Vac, 50 Hz (SCM410E); full gain; 1 kHz, one channel activated; source impedances: Mic 150Ω ; terminations: Line/Mic Aux 10 kΩ

Voltage Gain (typical, controls full clockwise)

	Output		
Input	**Line**	**Mic**	**Aux**
Low-impedance mic (150 Ω)	80 dB	40 dB	68 dB

Inputs

	Impedance		
Input	**Designed for use with**	**Actual (typical)**	**Input Clipping Level**
Mic	19-600 Ω	1.4 kΩ	-14 dBV

Outputs

	Impedance		
Output	**Designed for use with**	**Actual (typical)**	**Output Clipping Level**
Line	≥5k Ω	300 Ω	+22 dBV
Mic	≥600 Ω	3 Ω	-20 dBV
Aux	≥10k Ω	1.5 k Ω	+12 dBV

Frequency Response (at 1 kHz , channel controls centered)

50 Hz to 20 kHz ± 2 dB ; −3 dB Corner at 25 kHz

Total Harmonic Distortion

<0.1% at +4 dBu out , 50 Hz to 20 kHz (through 22 Hz to 20 kHz filter; Input at 12 o'clock and Master at 12 o'clock, all other controls full counterclockwise)

Equivalent Input Noise: (150 Ωsource; A-Weighted)

-127 dBV maximum, -129 dBV typical

Output Noise (channel controls full counterclockwise A-Weighted)

Master full counterclockwise:	-101 dBV
Master full clockwise:	-67 dBV

Common Mode Rejection

> 70 dBV at 1 kHz

Polarity

All inputs to all outputs are non-inverting

Input Channel Activation

Attack Time	4 ms
Hold Time	0.4 s
Decay Time	0.5 s

Off-Attenuation

13 dB

Overload and Shorting Protection

Shorting outputs, even for prolonged periods, causes no damage. Microphone inputs are not damaged by signals up to +10 dBV (3V)

Equalization

Low-frequency	6 dB/octave cut, adjustable corner from 25 to 320 Hz
High-Frequency	shelving filter, ±6 dB at 5 kHz, rising to ±8 dB at 10 kHz

Limiter

Type	Peak
Threshold	±16 dBu (at output)
Attack Time	2 ms
Recovery Time	300 ms
Indicator	Lights red when limiting occurs

Input LEDs

Green on channel activation, red at 6 dB below clipping

Phantom Power

12 V DC open-circuit through 680 Ω resistors

Operating Voltage

SCM410	100-120 V AC rated nominal, 50/60 Hz, 100 mA (maximum)
SCM410E	220-240 V AC rated nominal, 50/60 Hz, 50 mA (maximum)

Mains Inrush Current (230 V AC, SCM410E only)

0.7 A Peak

Temperature Range

Operating Temperature	-7° to 49° C (20° to 120° F)
Storage Temperature	-29° to 74° C (-20° to 165° F)

Dimensions

44 x 219 x 267 mm (1 ¾ x 8 5/8 x 10 ½ in.), H x W x D

Net Weight

1.75 kg (3.86 lbs)

Certifications

SCM410: UL LISTED to UL 60065 and cUL LISTED to CAN/CSAC22.2 No. 60065-3 Canada.

SCM410E: Conforms to applicable European Union Directives. Low Voltage Directive, 2006/95/EC: Certified to EN 60065. Eligible to bear CE marking. Conforms to European EMC Directive 2004/108/EC. Meets Harmonized Standards EN55103-1:1996 and EN55103-2:1996 for residential (E1) and light industrial (E2) environments.

- Conforms to European Regulation (EC) No. 1275/2008, as amended.

The CE Declaration of Conformity can be obtained from Shure Incorporated or any of its European representatives. For contact information please visit www.shure.com

The CE Declaration of Conformity can be obtained from: www.shure.com/europe/compliance

Authorized European representative:

Shure Europe GmbH

Headquarters Europe, Middle East & Africa

Department: EMEA Approval

Jakob-Dieffenbacher-Str. 12

75031 Eppingen, Germany

Phone: +49-7262-92 49 0

Fax: +49-7262-92 49 11 4

Email: info@shure.de

Replacement Parts

Knob, Channel Gain and Phones (white)	95A8238
Knob, Channel Gain (blue)	95B8238
Line (Power) Cord (SCM800)	95B8389
Line (Power) Cords: SCM262E: 220-240 Vac (EU)	95B8778
Link Cable	95B8889
Fuse, SCM410 (5x20 mm, T 125mA L, 250V, time delay)	80AA730
Fuse, SCM410E (5x20 mm, T 50mA L, 250V, time lag)	80J380
Single Mount Bracket	53A8484
Dual Mount Bracket	53E8484
Link Bars (Bracket)	53B8443
Hardware Kit	90AW8100

Optional Accessories

Line (Power) Cord, 230-240 Vac (UK)	95A8713
Line Adapter–Converts Balanced Line Level Signals to Microphone Level (50dB Attenuation)	A15LA

For additional service or parts information, please contact Shure's Service department at 1-800-516-2525. Outside the United States, please contact your authorized Shure Service Center.

Advanced Functions

WARNING: Battery packs shall not be exposed to excessive heat such as sunshine, fire, or the like.

Logic Connection Specifications

The SCM410 logic functions expand the range of installation and control options. Logic can be used for everything from simple cough switches to elaborate computer-controlled room systems. (Shure's *AMS Update* publication contains additional applications of advanced logic. This publication is available by contacting the Shure Applications Department.) The following logic functions are available for each channel:

GATE OUT

Follows channel gating and goes to logic “low” (sinks current) when microphone is gated on. 500 mA of current sinking ability is provided (see Figure 4A).

MUTE IN

Applying logic “low” (from GATE OUT or a switch closure to logic ground) gates channel off (see Figure 4B). Channel output drops to -∞.

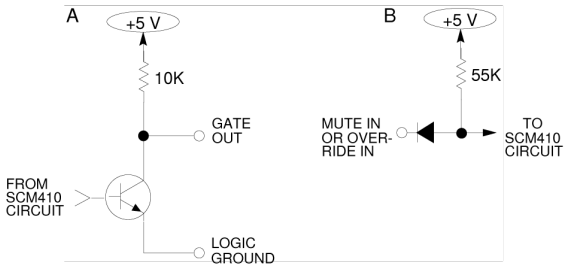


FIGURE 4: LOGIC EQUIVALENT CIRCUIT DIAGRAM

OVERRIDE IN

Applying logic “low” (from GATE OUT or a switch closure to logic ground) forces channel on (see Figure 4B). When both Mute and Override are activated, Mute takes precedence (see Internal Modifications Addendum for Override precedence).

LOGIC GROUND

Logic ground is distinct from audio ground. Make all logic ground connections to this pin, including power supply ground of external logic circuitry. To avoid switching clicks, do not connect logic ground to audio, chassis or rack grounds. Logic controls are accessed through the high density DB-15 multi-pin connector on the rear panel (Figure 5). Pin connections are shown in the following table.

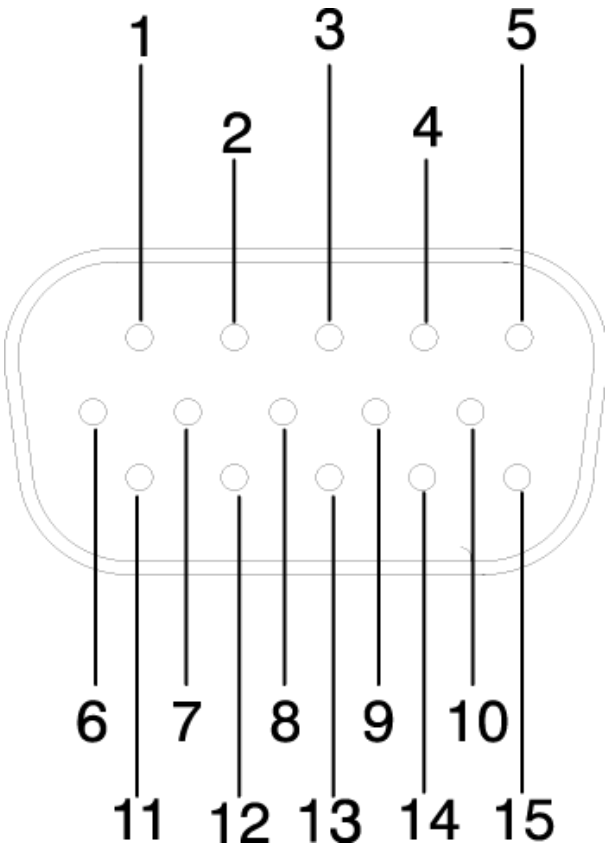


FIGURE 5: LOGIC CONNECTOR

Pin No.	Logic Function
1	OVERRIDE IN 1
2	OVERRIDE IN 2
3	OVERRIDE IN 3
4	GATE OUT 4
5	LOGIC GROUND
6	GATE OUT 1
7	GATE OUT 2
8	GATE OUT 3
9	NO CONNECTION

Pin No.	Logic Function
10	MUTE IN 4
11	MUTE IN 1
12	MUTE IN 2
13	MUTE IN 3
14	OVERRIDE IN 4
15	NO CONNECTION

Logic Function	Pin No.
GATE OUT 1	6
GATE OUT 2	7
GATE OUT 3	8
GATE OUT 4	4
OVERRIDE IN 1	1
OVERRIDE IN 2	2
OVERRIDE IN 3	3
OVERRIDE IN 4	14
MUTE IN 1	11
MUTE IN 2	12
MUTE IN 3	13
MUTE IN 4	10
LOGIC GROUND	5
NO CONNECTION	15
NO CONNECTION	9

Suggested Logic Applications

This section contains suggestions on the uses of the SCM410's logic capabilities. Note that uses of these functions are not limited to the listed applications. The user is limited only by imagination and creativity. For additional suggestions and solutions to installation problems, contact the Shure Applications Department.

Cough Button

The talker can turn off his or her microphone during coughing or private conversations by installing an SPST push button switch between the MUTE IN and Logic Ground pins for each channel to be modified (see Figure 6). When a channel is muted, no audio is passed. (See *Dead Zone on MUTE IN Defeat* paragraph in the *Internal Modifications* Addendum for more information on MUTE IN logic.)

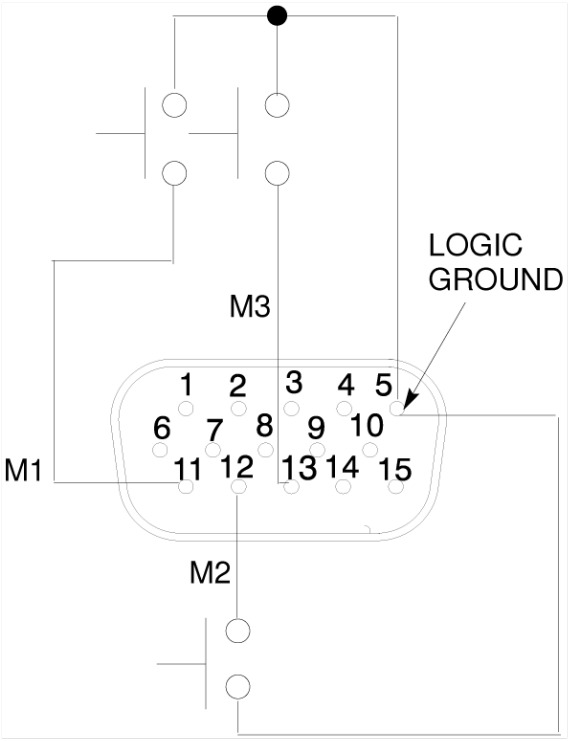


FIGURE 6: COUGH BUTTONS

Chairperson-Controlled Muting

The chairperson can, by activating a switch, silence all other microphones and be heard without interruption. For operation in this mode, connect all the MUTE IN pins together except that of the chairperson's channel, and wire an SPST pushbutton or toggle switch between those MUTE IN and Logic Ground pins (see Figure 7). An alternative to a switch is to connect the chairperson's GATE OUT to the MUTE IN of other channels. When the chairperson's microphone activates, all other microphones mute.

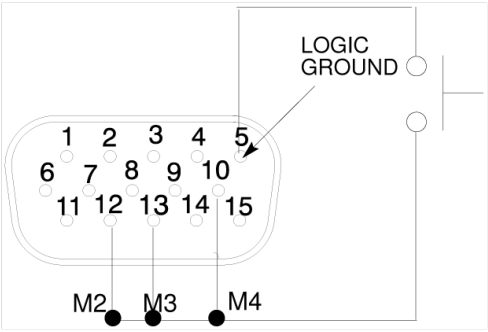


FIGURE 7: CHAIRPERSON-CONTROLLED MUTING

Remote Channel-On Indicators

Remote indicators can be used to indicate when a talker's microphone is on. Connect the LEDs and a 5-volt supply to the GATE OUT pins (See Figure 8). To avoid switching clicks in the audio output, do not ground the power supply negative terminal in the audio system or rack ground.
Important: If a single cable is used for the microphone audio signal and the LED dc power, separate shielded pairs must be used. Failure to carry the dc power on a shielded pair may result in audible clicking due to capacitive coupling between the dc power lines and microphone lines.

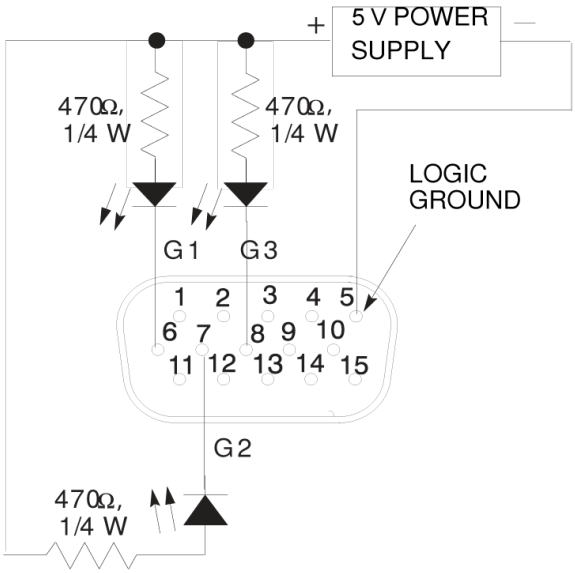


FIGURE 8: REMOTE CHANNEL-ON INDICATORS

Disabling the Gating Function (Bypass)

To keep certain microphones on at all times, wire the desired microphone channel's OVERRIDE IN pins together to the Logic Ground pin. The selected channels now function as they would in a non-automatic mixer (see Figure 9). To perform this modification internally on the mixer, refer to the *Shorting Override In to Logic Ground Internally* paragraph in the *Internal Modifications* Addendum.

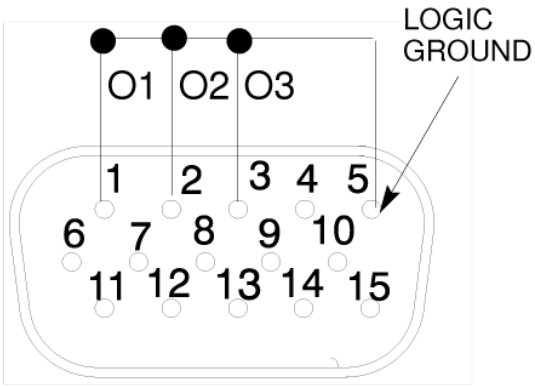


FIGURE 9: GATING BYPASS

Inhibiting Gating for Unwanted Sounds

MaxBus attempts to activate only one microphone per sound source.

Muting a microphone channel prevents its audio from appearing at the mixer's output. However, the muted microphone still communicates with other mic channels via MaxBus. A sound source picked up by a muted microphone will not activate other microphones.

Sound sources that may cause unwanted microphone channel activation include:

- Heating, ventilation, or air conditioning systems
- A noisy fax machine or printer
- A squeaky door
- A paging system loudspeaker
- An audio teleconferencing return signal loudspeaker

The SCM410 can prevent these and similar sounds from activating microphones as follows:

1. Place one microphone near the unwanted sound source. Connect that microphone's signal to a channel input, -or- connect the unwanted sound source directly into a channel input.
2. Mute that channel using the logic terminal (see Figure 10). To perform this modification internally on the mixer, refer to the *Shorting Mute In to Logic Ground Internally* paragraph in the *Internal Modifications* Addendum.
3. Adjust the channel gain control just past the level where unwanted sounds do not activate other microphones in the system. If the channel gain is set too high, the other microphones may not be activated by the desired sounds. If set too low, unwanted sounds will continue to activate other microphones.

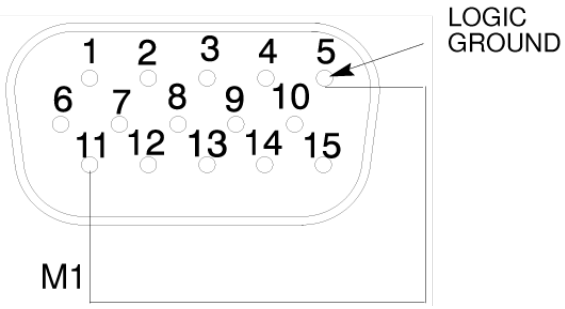


FIGURE 10: INHIBITING GATING FOR UNWANTED SOUNDS

Loudspeaker Muting

Some applications require a loudspeaker to be placed near each talker to provide audio reinforcement, or to permit telephone conversation or conference monitoring. Each loudspeaker can cause feedback unless it is automatically switched off when the talker near it speaks. To provide this function, connect the GATE OUT terminal of each channel to a separate loudspeaker muting relay (See Figure 11). Recommended relays are Radio Shack 275-248, Omron G2R-14-DC12 (Digi-Key number Z745-ND), Potter & Brumfield R10-E1Y2-V185 (Newark number 45F106), or equivalent.

Note: A diode across each relay coil is required to suppress inductive voltage spikes which may damage the SCM410. An existing sound system using 24-volt relays can be used with the SCM410 without modification if the relay coil current draw is under 500 mA.

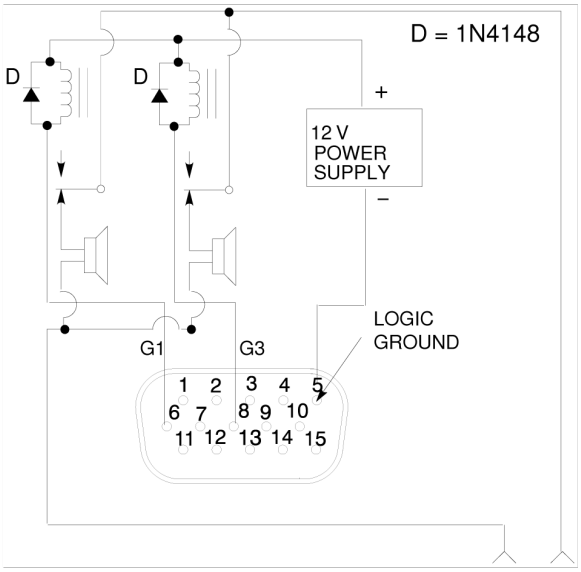


FIGURE 11: LOUDSPEAKER MUTING

Filibuster Mode

Normally, when several people talk, each microphone gates on so that no speech is missed. In “filibuster” mode, a microphone remains gated on until the talker pauses long enough for that microphone to gate off. No other microphone can gate on until that microphone gates off. This prevents talkers from being interrupted.

To establish filibuster mode, refer to Figure 12 and proceed as follows:

1. Perform the *Mute to Inhibit* modification as presented in the *Internal Modifications* Addendum.
2. Connect all the MUTE IN pins together on the modified channels.
3. Connect all the GATE OUT pins together on the modified channels.
4. Connect the GATE OUT pin of one modified channel to the MUTE IN pin of another modified channel .
5. Turn the Last Mic Lock-On switch to OFF.

Note: To prevent high-frequency oscillation, do not wire a GATE OUT pin to a MUTE IN pin on the same channel unless the *Mute to Inhibit* modification has been made.

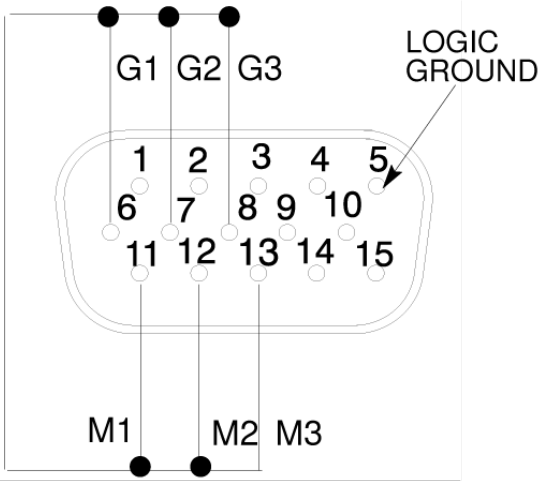


FIGURE 12: FILIBUSTER MODE

Inhibit Function

For information on the inhibit function, refer to the *Internal Modifications* Addendum.

Remote Volume Control

The level of the Aux or Master output can be controlled from an external VCA (Voltage Controlled Amplifier) such as the RU-VCA1 from Radio Design Labs (Tel. 1-800-281-2683, or www.rdlnet.com). To connect a VCA to the SCM410, proceed as follows:

1. Connect the SCM410 Line output to the VCA line input.
2. Connect the VCA line output to the external device.
3. For remote Master level control, set the SCM410 Master control to 5.

Diode Isolation of Logic Controls

Two or more control functions that use the same logic pins can be isolated with diodes, as shown in Figure 13. With this modification, a channel can be muted by an overall group mute switch, or by its own cough button.

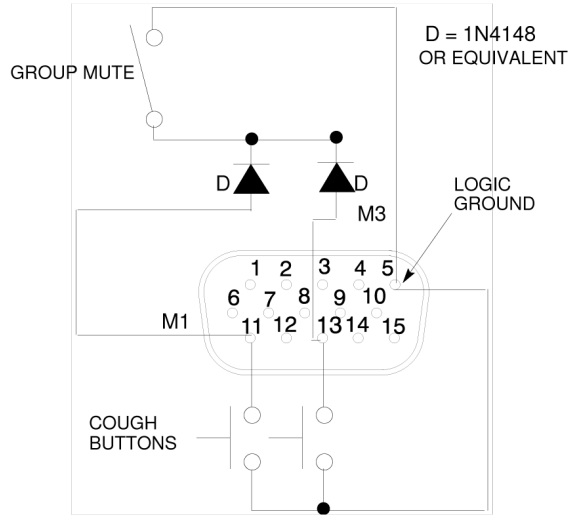


FIGURE 13: DIODE ISOLATION OF LOGIC CONTROLS

External Logic Devices

SCM410 logic levels are directly compatible with TTL and 5V CMOS logic families. Mixer logic may be used with 15V CMOS logic if a pull-up resistor is used with each GATE output. See Figure 14.

Note: For information on logic gate use, refer to the *TTL Cookbook* and *CMOS Cookbook*, both by D. Lancaster, Howard Sams Publishing Co.

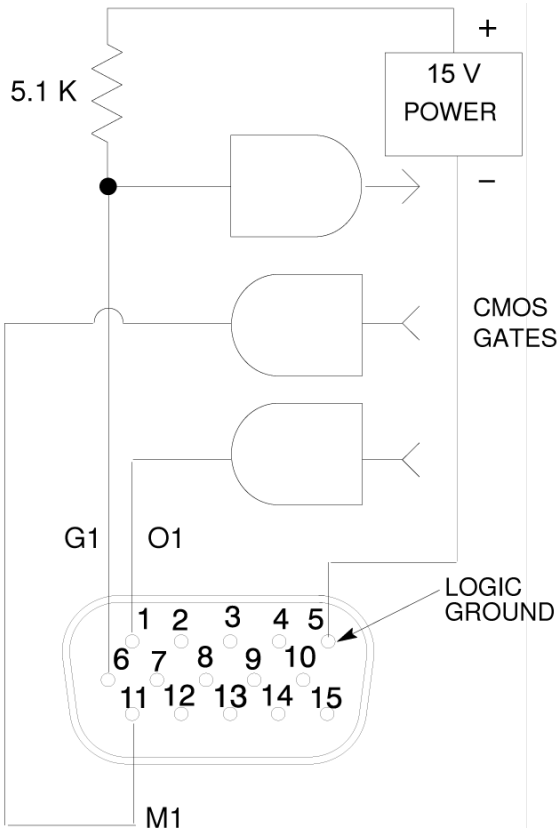


FIGURE 14: 15V CMOS

Digital Controls or Microcomputers

The SCM410 logic pins can interface with custom-designed digital control circuitry or microcomputers for unlimited possibilities of system control functions.