

## Description

This module allows 2-way control of the Gated Automatic Mixer object in the Bose EX-1280C. Output Volume, AMM Settings, and Mic Controls (up to 32 mics) are provided.

## Supported Processors

This module may be used with any 2-Series or 3-Series Crestron processor with Ethernet or Serial port capable of 115,200 baud.

## Communication setup

This module is intended to be used with the Bose\_EX-1280C\_Communication\_Manager\_v1. Please see the Communication Manager for communications setup.

## Module Setup and Unsolicited Changes

Each ControlSpace Designer object contains a Label property. This Label is used in the Crestron Module parameter to control that object. The Label for any object can be found by opening the properties for that object in ControlSpace Designer. When entering the label into the Crestron Module, you must surround the label in quotes. Additionally the label must be an exact match to the Label in ControlSpace Designer.

The recommended practice is to prefix the label with # in both ControlSpace Designer and in the Crestron Module to enable unsolicited feedback when the object's values change. If the label is not prefixed with a #, it will limit the functionality of the Crestron Modules. When prefixing a label with #, you must surround the label with quotes in SIMPL.

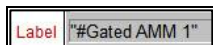


Image 1: Example Label Parameter in SIMPL Windows



Image 2: Example Label Property in ControlSpace Designer

## Inputs, Outputs, and Parameter Descriptions

### Digital Inputs

[output_volume_up]	Pulse or latch high this input to raise the output volume level. Pulsing the input will increment the level as defined in the <b>Step Size</b> parameter. Latching high will increment the level as defined in the <b>Step Size</b> parameter and then start auto incrementing every .25 seconds thereafter until the signal is low or has reached the <b>Output Volume Upper Limit</b> .
[output_volume_down]	Pulse or latch high this input to lower the output volume level. Pulsing the input will increment the level as defined in the <b>Step Size</b> parameter. Latching high will increment the level as defined in the <b>Step Size</b> parameter and then start auto incrementing every .25 seconds thereafter until the signal is low or has reached the <b>Output Volume Lower Limit</b> .
[output_mute_on]	Pulse to mute the output volume.
[output_mute_off]	Pulse to unmute the output volume.
[output_mute_toggle]	Pulse to toggle the output mute.
[amm_nom_enable_on]	Pulse to enable NOM attenuation.
[amm_nom_enable_off]	Pulse to disable NOM attenuation.
[amm_nom_enable_toggle]	Pulse to toggle NOM attenuation.
[amm_designated_mic_on_none]	Pulse to disable mic on hold.
[amm_designated_last_mic_hold]	Pulse to set the auto mixer to hold open the last used mic.
[amm_ats_source_input]	Pulse to set the ATS source to Input.
[amm_ats_source_ambient]	Pulse to set the ATS source to Ambient.
[amm_ats_slope_six]	Pulse to set the ATS slope to 6 dB/oct.
[amm_ats_slope_twelve]	Pulse to set the ATS slope to 12 dB/oct.
[amm_ats_filter_on]	Pulse to set the ATS filter to on.
[amm_ats_filter_off]	Pulse to set the ATS filter to off.
[amm_ats_filter_toggle]	Pulse to toggle the ATS filter.
[micx_volume_up]	Pulse or latch high this input to raise the mics volume level. Pulsing the input will increment the level as defined in the <b>Step Size</b> parameter. Latching high will increment the level as defined in the <b>Step Size</b> parameter and then start auto incrementing every .25 seconds thereafter until the signal is low or has reached the <b>Mic Volume Upper Limit</b> .
[micx_volume_down]	Pulse or latch high this input to lower the mics volume level. Pulsing the input will increment the level as defined in the <b>Step Size</b> parameter. Latching high will increment the level as defined in the <b>Step Size</b> parameter and then start auto incrementing every .25 seconds thereafter until the signal is low or has reached the <b>Mic Volume Lower Limit</b> .
[micx_mute_group_none]	Pulse to un-assign the Mic from the currently assigned mute group.
[micx_mute_on]	Pulse to mute the Mic.
[micx_mute_off]	Pulse to unmute the Mic.
[micx_mute_toggle]	Pulse to toggle mic mute.
[micx_bypass_on]	Pulse to force the channel to be open at all times, bypassing the automatic mixer gating circuit.
[micx_bypass_off]	Pulse to enable the automatic mixer gating circuit for the Mic.
[micx_bypass_toggle]	Pulse to toggle bypass for the Mic.
[micx_auto_threshold_on]	Pulse to enable the Mics auto threshold.
[micx_auto_threshold_off]	Pulse to disable the Mics auto threshold.
[micx_auto_threshold_toggle]	Pulse to toggle the Mics auto threshold.
[micx_direct_output_post]	Pulse to set the direct output to post.

[micx_direct_output_pre]	Pulse to set the direct output to pre.
[micx_nom_gain_on]	Pulse to turn on NOM attenuation for the corresponding mic.
[micx_nom_gain_off]	Pulse to turn off NOM attenuation for the corresponding mic.
[micx_nom_gain_toggle]	Pulse to toggle NOM attenuation for the corresponding mic.
[request_settings]	Pulse to query all values for the Gated Automatic Mic Mixer.

### Analog Inputs

[output_volume_set(dB)]	Analog input to set the output volume to specific level. Valid ranges are -605d to 120d in tenths of a db. Half steps are only valid, thus the tenths digit may only be 0d or 5d. Example: 65d = 6.5 dB and -340d = -34.0 dB. Use with an analog initialize symbol.
[amm_nom_limit]	Analog in input to initialize the NOM Limit. Valid values are 1d-32d.
[amm_designated_mic_on]	Analog in input to set the designed mic on. Valid values are 1d-32d. Used in conjunction with [amm_designated_mic_on_none] and [amm_designated_last_mic_hold].
[amm_ats_attack_time]	Initialize to an attack time. Valid ranges are 100d-10000d in ms. Use with an analog initialize symbol.
[amm_ats_release_time]	Initialize to a release time. Valid ranges are 10d-1000d in ms. Use with an analog initialize symbol.
[amm_ats_margin]	Initialize to a margin. Valid ranges are -180d - 180d in tenths of a dB. Use with an analog initialize symbol. The tenths place should always be 0d since half steps are not valid. Example: 60d = 6.0 dB and -180d = -18.0 dB. Use with an analog initialize symbol.
[amm_ats_sensitivity]	Initialize to a sensitivity level. Valid ranges are -205d - 205d in tenths of a dB. Half steps are only valid, thus the tenths digit may only be 0d or 5d. Example: 65d = 6.5 dB and -200d = -20.0 dB. Use with an analog initialize symbol.
[amm_ats_low_pass_frequency]	Initialize to a low pass frequency. Valid values are 20d-20000d in Hz. Use with an analog initialize symbol.
[amm_ats_high_pass_frequency]	Initialize to a high pass frequency. Valid values are 20d-20000d in Hz. Use with an analog initialize symbol.
[micx_volume_set(dB)]	Analog input to set the incoming volume to specific level. Valid ranges are -605d to +120d in tenths of a db. Half steps are only valid, thus the tenths digit may only be 0d or 5d. Example: 65d = 6.5 dB and -340d = -34.0 dB Use with an analog initialize symbol. Range is -605d to 120d in 0.5 dB increments.
[micx_mute_group]	Initialize to a mute group. Valid ranges are 1d-31d. Use with an analog initialize symbol.
[micx_priority_set]	Initialize to a priority. Valid ranges are 1d-5d with 1 being the highest priority. Use with an analog initialize symbol.
[micx_manual_threshold_set]	Initialize to a manual threshold. Valid ranges are -800d-0d in tenths of a dB. Half steps are only valid, thus the tenths digit may only be 0d or 5d. Example: 0d = 0 dB and -200d = -20.0 dB. Use with an analog initialize symbol.
[micx_low_pass_frequency]	Initialize to a low pass frequency. Valid values are 20d-20000d in Hz. Use with an analog initialize symbol.
[micx_high_pass_frequency]	Initialize to a high pass frequency. Valid values are 20d-20000d in Hz. Use with an analog initialize symbol.
[micx_rms_average_time]	Initialize to an RMS average time. Valid ranges are 1d-1000d in ms. Use with an analog initialize symbol.

[micx_ducker_depth]	Initialize to a ducker depth. Valid ranges are -600d-0d in tenths of a dB. Half steps are only valid, thus the tenths digit may only be 0d or 5d. Example: 0d = 0 dB and -200d = -20.0 dB. Use with an analog initialize symbol.
[micx_gate_depth]	Initialize to a gate depth. Valid ranges are -700d-0d in tenths of a dB. Half steps are only valid, thus the tenths digit may only be 0d or 5d. Example: 0d = 0 dB and -200d = -20.0 dB. Use with an analog initialize symbol.
[micx_gate_attack_time]	Initialize to a gate attack time. Valid ranges are 5d-500d in ms. Half steps are only valid, thus the tenths digit may only be 0d or 5d. Use with an analog initialize symbol.
[micx_gate_hold_time]	Initialize to a gate hold time. Valid ranges are 1d-50000d in ms. Use with an analog initialize symbol.
[micx_gate_decay_time]	Initialize to a gate release time. Valid ranges are 1d-50000d in ms. Use with an analog initialize symbol.

### Serial Inputs

from_communications_manager \$	Tie to Bose EX-1280C Communications manager output.
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### Digital Outputs

[output_mute_on_fb]	High when the output volume is muted.
[output_mute_off_fb]	High when the output volume is unmuted.
[amm_nom_enable_on_fb]	High when the AMM NOM attenuation is on.
[amm_nom_enable_off_fb]	High when the AMM NOM attenuation is off.
[amm_designated_mic_none_fb]	High when the designated mic is set to none.
[amm_designated_mic_hold_last_fb]	High when the designated mic is set to hold last on.
[amm_ats_source_input_fb]	High when the ATS source is input.
[amm_ats_source_ambient_fb]	High when the ATS source is ambient.
[amm_ats_slope_minus_six_fb]	High when the ATS slope is six dB
[amm_ats_source_minus_twelve_fb]	High when the ATS slope is twelve dB
[amm_ats_filter_on_fb]	High when the ATS filter is on.
[amm_ats_filter_off_fb]	High when the ATS filter is off.
[micx_mute_group_none_fb]	High when the corresponding mics mute group is set to none.
[micx_mute_on_fb]	High when the mic is muted.
[micx_mute_off_fb]	High when the mic is not muted.
[micx_bypass_on_fb]	High when the mic is bypassed from the AMM.
[micx_bypass_off_fb]	High when the mic is not bypassed from the AMM.
[micx_auto_threshold_on_fb]	High when the corresponding mics auto threshold is enabled.
[micx_auto_threshold_off_fb]	High when the corresponding mics auto threshold is disabled.
[micx_direct_output_post_fb]	High when the corresponding mics output is post.
[micx_direct_output_pre_fb]	High when the corresponding mics output is pre.
[micx_nom_gain_on_fb]	High when the corresponding mics NOM attenuation is on.
[micx_nom_gain_off_fb]	High when the corresponding mics NOM attenuation is off.

### Analog Outputs

[output_volume_fb(dB)]	Analog output indicating the output volume level in dB Range is -605d to 120d in 0.5 dB increments.
[output_volume_fb(0%-100%)]	Analog output indicating the incoming call volume level in percent. Output values are calculated with the <b>Output Volume Upper Limit</b> and <b>Output Volume Lower Limit</b> .
[amm_nom_limit_fb]	Analog output indicating the NOM limit.
[amm_designated_mic_on_fb]	Analog output indicating the designated mic number.
[amm_ats_attack_time_fb(ms)]	Analog output indicating the ATS attack time in ms.
[amm_ats_release_time_fb(ms)]	Analog output indicating the release time in ms.
[amm_ats_margin_fb(dB)]	Analog output indicating the ATS margin in tenths of a dB.
[amm_ats_sensitivity_fb(dB)]	Analog output indicating the ATS sensitivity in tenths of a dB.
[amm_ats_low_pass_frequency_fb(Hz)]	Analog output indicating the ATS low pass frequency in Hz.
[amm_ats_high_pass_frequency_fb(Hz)]	Analog output indicating the ATS low pass frequency in Hz.
[micx_volume_fb(dB)]	Analog output indicating the incoming call volume level in dB Range is -605d to 120d in 0.5 dB increments.
[micx_volume_fb(0%-100%)]	Analog output indicating the incoming call volume level in percent. Output values are calculated with the <b>Mic Volume Upper Limit</b> and <b>Mic Volume Lower Limit</b> .
[micx_mute_group_fb]	Analog output indicating the assigned mute group. Range is 0-31. The value will be 0d is mute group is set to none using <a href="#">[micx_mute_group_none]</a> .
[micx_priority_fb(1-5)]	Analog output indicating the mics priority in the AMM. Range is 1-5.
[micx_manual_threshold_fb(dB)]	Analog output indicating the corresponding mics threshold in dB.
[micx_low_pass_frequency_fb(Hz)]	Analog output indicating the corresponding mics low pass frequency in Hz.
[micx_high_pass_frequency_fb(Hz)]	Analog output indicating the corresponding mics low pass frequency in Hz.
[micx_rms_average_time_fb(ms)]	Analog output indicating the corresponding mics RMS average time in ms.
[micx_ducker_depth_fb(dB)]	Analog output indicating the corresponding mics ducker depth in dB.
[micx_gate_depth_fb(dB)]	Analog output indicating the corresponding mics gate depth in dB.
[micx_gate_attack_time_fb(ms)]	Analog output indicating the corresponding mics attack time in ms.
[micx_gate_hold_time_fb(ms)]	Analog output indicating the corresponding mics hold time in ms.
[micx_gate_release_time_fb(ms)]	Analog output indicating the corresponding mics release time in ms.

### Serial Outputs

to_communications_manager\$	Tie to Bose EX-1280C Communications manager output.
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### Paramaters

Label	Enter in the Label of the AMM object as defined in ControlSpace Designer properties. This parameter must be enclosed in quotes. Use a # before the label name in both ControlSpace Designer and the module to enable unsolicited feedback.
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Number of Mics	Enter the number of Mics that are being used on the AMM object. This number enables the corresponding digital inputs and outputs, and controls polling for the mics being used.
Step Size	Select a step size to increment the volume by when holding a volume up or down digital input. Available step sizes range from 0.5dB to 6.0dB in 0.5dB increments.
Output Volume Lower Limit	Set the output volume upper limit. This input is used to limit the user's ability to raise the volume past a certain value. Range is -605d to 120d in 0.5 dB increments. Example: 65d = 6.5 dB and -340d = -34.0 dB
Output Volume Upper Limit	Set the output volume lower limit. This input is used to limit the user's ability to lower the volume past a certain value. Range is -605d to 120d in 0.5 dB increments. Example: 65d = 6.5 dB and -340d = -34.0 dB
Mic Volume Lower Limit	Set the mic volume upper limit. This input is used to limit the user's ability to raise the volume past a certain value. Range is -605d to 120d in 0.5 dB increments. Example: 65d = 6.5 dB and -340d = -34.0 dB
Mic Volume Upper Limit	Set the mic volume lower limit. This input is used to limit the user's ability to lower the volume past a certain value. Range is -605d to 120d in 0.5 dB increments Example: 65d = 6.5 dB and -340d = -34.0 dB

## Testing Environment

EX-1280C	v0.201_build4
EX-8ML	v1.000
ControlSpace Designer	v5.0.0.805
Crestron AV3	v1.501.2867.26681
SIMPL Windows	4.07.03
Device Database	86.05.003.00
Crestron Database	63.06.002.00

## Distribution Files

Bose_EX-1280C_Gain_Sharing_Automatic_Mic_Mixer_v1.0.umc	User module containing the Virtual GPI logic.
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## Revision History

V1.0 – Initial Release