

AMX Integration for Bose® ControlSpace® EX Processors

INTRODUCTION

The AMX integration with a Bose® Engineered Sound Processor, is accomplished with the use of modules.

The modules are the modular pieces of code that parse and concatenate commands from and to the Engineered Sound Processor through the serial port.

The point of the modules is to provide transportability and connection ends to the Integrators user interface. This is accomplished through the use of virtual devices. This document will focus on describing the use of these blocks.

GETTING STARTED

The demo was created using a NI-2100 and a MVP-8400i Touchpanel.

Controlling of the different blocks in the EX is done through the use of modules. The modules will accept a series of parameters or variables that will provide communication to and from the EX.

The way to implement this is through the use of virtual devices. Each module is assigned a virtual device ID and the communications from a touch panel to the module is preformed using the COMBINE_CHANNEL and the COMBINE_LEVEL commands.

Block

Following is an explanation of the different blocks:

SerialComms:

Variables Passed:

cBlockNames: Array of names of all blocks used*

VIRTUAL DEVICE CHANNELS AND LEVELS

theDevice: device address P:S:C (Serial Port)

dvModules: Array of bosemModules(1..n)*

csTCPComms:

Variables Passed:

IP_ADDRESS: IP address of EX device

PORT: TCP Port of EX device

VIRTUAL DEVICE CHANNELS AND LEVELS

vDevice: virtual device address P:S:C for comms.

theDevice: device address P:S:C (TCP)

dvModules: Array of bosemModules(1..n)*

*Arrays should be ordered so modules are initialized with cBlockName[x] AND vBoseModule_x. where x is the same number.

Channels:

vDevice,1: On : Comms connected, Off : Comms disconnected.

AECModule:

Variables Passed:

dAMMGA: virtual device address P:S:C
 fStep: Step size for increment and decrement
 cBlockName: Name of the EX module
 dBoseMod: BoseModule device address P:S:C

Virtual Device Channels and Levels

Channels:

dAEC,1: Module Enable
 dAEC,2: Get Info
 dAEC,[n*3]: Toggles MUTE n State
 dAEC,[n*3+1]: NLP Up. Raises n Filter Level by fStep
 dAEC,[n*3+2]: NLP Down. Lowers n Filter Level by fStep
 dAEC,[n*3+3]: AEC Toggle
 dAEV,20: Toggle Comfort Noise

Levels:

dAEC,n: Filter n Level

AGCEnhancedModule:

Variables Passed:

dAMMGA: virtual device address P:S:C
 fStep: Step size for increment and decrement
 cBlockName: Name of the EX module
 dBoseMod: BoseModule device address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS

Channels:

dAGC,1: Module Enable
 dAGC,2: Get Info
 dAGC,3 + 3 * (n - 1) chan: Toggles BYPASS State

Levels:

dAGC,1 : MaxTotalGain
 dAGC,2 + 10 * (n - 1) :Activity Threshold

$dAGC,3 + 10 * (n - 1) : TargetLevelMin$
 $dAGC,4 + 10 * (n - 1) : TargetLevelMax$
 $dAGC,5 + 10 * (n - 1) : CutRate$
 $dAGC,6 + 10 * (n - 1) : CutRange$
 $dAGC,7 + 10 * (n - 1) : CutHold$
 $dAGC,8 + 10 * (n - 1) : BoostRate$
 $dAGC,9 + 10 * (n - 1) : BoostRange$
 $dAGC,10 + 10 * (n - 1) : BoostHold$

AMMGALegacyModule:

Variables Passed:

$dAMMGA$: virtual device address P:S:C
 $fStep$: Step size for increment and decrement
 $cBlockName$: Name of the EX module
 $dBoseMod$: BoseModule device address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS

Channels:

$dAMMGA,1$: Module Enable
 $dAMMGA,2$: Get Info
 $dAMMGA,3$: Output Mute
 $dAMMGA,4$: Nom
 $dAMMGA,(11*chan + 1)$: Priority
 $dAMMGA,(11*chan + 2)$: Detection : Threshold
 $dAMMGA,(11*chan + 3)$: Detection : LastOn
 $dAMMGA,(11*chan + 4)$: Detection : PushToTalk
 $dAMMGA,(11*chan + 5)$: Detection : Bypass
 $dAMMGA,(11*chan + 6)$: PushToTalk
 $dAMMGA,(11*chan + 7)$: Mute

Levels:

$dAMMGA,3$: Output Gain
 $dAMMGA,4$: NOM Limit
 $dAMMGA,(11*chan + 1)$: Input Gain
 $dAMMGA,(11*chan + 2)$: Threshold
 $dAMMGA,(11*chan + 3)$: Gate Depth
 $dAMMGA,(11*chan + 4)$: Hold
 $dAMMGA,(11*chan + 5)$: Ducking Depth
 $dAMMGA,(11*chan + 6)$: Decay
 $dAMMGA,(11*chan + 7)$: HighPass
 $dAMMGA,(11*chan + 8)$: LowPass
 $dAMMGA,(11*chan + 9)$: RMS Avg
 $dAMMGA,(11*chan + 10)$: Attack

AMMGAModule:**Variables Passed:**

dAMMGA: virtual device address P:S:C
fStep: Step size for increment and decrement
cBlockName: Name of the EX module
dBoseMod: BoseModule device address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dAMMGA,1: Module Enable
dAMMGA,2: Get Info
dAMMGA,n*7-3: Level Up. Raises n Gain Level by fStep
dAMMGA,n*7-2: Level Down. Lowers n Gain Level by fStep
dAMMGA,n*7-1: Toggle Mute
dAMMGA,n*7: Toggle Bypass
dAMMGA,n*7+1: Level Up. Raises n Priority Level by fStep
dAMMGA,n*7+2: Level Down. Lowers n Priority Level by fStep
dAMMGA,32: Output Level Up. Raises n Gain Level by fStep
dAMMGA,33: Output Level Down. Lowers n Gain Level by fStep
dAMMGA,34: Output Toggle Mute

Levels:

dAMMGA,m: Mic Level m
dAMMGA,n+5: Priority Level n
dAMMGA, 5: Output Level

AMMGModule:**Variables Passed:**

dAMMGS: virtual device address P:S:C
fStep: Step size for increment and decrement
cBlockName: Name of the EX module
dBoseMod: BoseModule device address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dAMMGS,1: Module Enable
dAMMGS,2: Get Info
dAMMGS,n*7-3: Level Up. Raises n Gain Level by fStep
dAMMGS,n*7-2: Level Down. Lowers n Gain Level by fStep
dAMMGS,n*7-1: Toggle Mute
dAMMGS,n*7: Toggle Bypass
dAMMGS,n*7+1: Level Up. Raises n Priority Level by fStep
dAMMGS,n*7+2: Level Down. Lowers n Priority Level by fStep
dAMMGS,32: Output Level Up. Raises n Gain Level by fStep
dAMMGS,33: Output Level Down. Lowers n Gain Level by fStep
dAMMGS,34: Output Toggle Mute
dAMMGS,38: Output Bypass Mute

Levels:

dAMMGs,m: Mic Level m - (output m = 5)

dAMMGs,m+n: Priority Level n

ArrayEQModule:**Variables Passed:**

dAEQ: virtual device address P:S:C

nVerticalCoverageStep: Step size for V. Coverage increment and decrement

cBlockName: Name of the EX block

dBoseMod: EX device

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dAEQ,1: Module Enable

dAEQ,2: Get Info

dAEQ,3: Quantity Increment

dAEQ,4: Quantity decrement

dAEQ,5: Vertical Coverage Increment

dAEQ,6: Vertical Coverage decrement

dAEQ,7: Toggle Bypass

Levels:

dAEQ,1: Quantity

dAEQ,2: Vertical Coverage

dAEQ,3: Frequency

dAEQ,4: Tilt

dAEQ,5: Gain

CRRModule:**Variables Passed:**

dCRR: virtual device address P:S:C

fStep: Step Size

cBlockName: Name of the EX block

dBoseMod: EX device

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dCRR,1: Module Enable

dCRR,2: Get Info

dCRR,3: Master Level Up

dCRR,4: Master Level Down

dCRR,5: Master Mute

dCRR,6: Level Up

dCRR,7: Level Down

dCRR,8: Mic Mix Mute
dCRR,9: Level Up
dCRR,10: Level Down
dCRR,11: Non Mic Mic Mute
dCRR,12: Program Mute
dCRR,20+n: Far End Mute

Levels:

dCRR,1: Master Volume
dCRR,3: Mic Mix Level
dCRR,5: Non-Mic Mix Level
dCRR,6: Program level
dCRR,20+n : Far End level

CompressorModule:**Variables Passed:**

dCompressor: virtual device address P:S:C
cBlockName: Name of the EX block
dBoseMod: EX device

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dCompressor,1: Module Enable
dCompressor,2: Get Info
dCompressor,3: Toggle Bypass
dCompressor,4: Left
dCompressor,5: Right
dCompressor,6: Mix
dCompressor,7: Sidechain

Levels:

dCompressor,2: Threshold
dCompressor,3: Ratio
dCompressor,4: Attack
dCompressor,5: Release

CombineModule:**Variables Passed:**

dCombine: virtual device address P:S:C
dBoseMod: EX device

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dCombine,1: Module Enable
 dCombine,2: Get Info
 dCombine,3: Combine Rooms 1 and 2
 dCombine,4: Combine Rooms 2 and 3
 dCombine,5: Split Rooms

CrossoverModule**Variables Passed:**

dXOver: virtual device address P:S:C
 fFreqStep: Frequency step size
 cBlockName: Name of the EX block
 dBoseMod: EX device

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dXOver,1: Module Enable
 dXOver,2: Get Info
 dXOver,3, 9, 15, 21: Level Up. Increment Frequency
 dXOver,4,10, 16, 22: Level Down. Decrement Frequency
 dXOver,5,11, 17, 23: Level Up. Increment Type
 dXOver,6,12, 18, 24: Level Down. Decrement Type
 dXOver,7,19, 25 : Toggle Mute
 dXOver,8,20, 26 : Toggle Polarity
 dXOver,50: Link Low and Mid
 dXOver,51: Link High and Mid

Levels:

dXOver,n+1: Frequency n
 dXOver,n+5: Type n

DelayModule**Variables Passed:**

dDelay: virtual device address P:S:C
 nSampleStep: Step Size for Delay Sample Level
 NUM_DELAYS: Number of delays modules to poll
 cBlockName: Name of the EX block
 dBoseMod: EX device

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dDelay,1: Module Enable
 dDelay,2: Get Info
 dDelay,n*3+1: Level Up. Raises n Delay Level by fStep

dDelay,n*3+2: Level Down. Lowers n Delay Level by fStep
 dDelay,n*3+3: Toggle Bypass

Levels:

dDelay,n: Delay Level n

DuckerModule**Variables Passed:**

dDucker: virtual device address P:S:C
 nSampleStep: Step Size for Delay Sample Level
 NUM_DELAYS: Number of delays modules to poll
 cBlockName: Name of the EX block
 dBoseMod: EX device

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dDucker,1: Module Enable
 dDucker,2: Get Info
 dDucker,3: Toggle Bypass
 dDucker,4: Toggle Ducker Engage

Levels:

dDucker,2: Threshold
 dDucker,3: Range
 dDucker,4: Attack
 dDucker,5: Hold
 dDucker,6: Decay

EX-8ML:**Variables Passed:**

vdvEx8ML: virtual device address P:S:C
 dvEx8ML : Port on master for IP comms P:S:C i.e. 0:10:0
 dvEx8MLServer : This port is used to create a UDP server for Event notifications back from the EX-8ML. P:S:C i.e. 0:11:0
 ipAddress : IP Address of EX-8ML

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

vdvEx8ML,n : Input Gain 0.0
 vdvEx8ML,n+10: Input Gain 15.0
 vdvEx8ML,n+20 : Input Gain 30.0
 vdvEx8ML,n+30 : Input Gain 45.0
 vdvEx8ML,n+40 : Phantom Power Toggle
 vdvEx8ML,n+50 : GPI Feedback
 vdvEx8ML,n+60 : GPO Control
 vdvEx8ML,255 : Turn on for debugging

Commands:

(To virtual device)

'SAVE=n' : Where n is the preset number you want to save

'LOAD=n' : Where n is the preset you want to load.

'NOTIFICATION-ADDRESS=xxx.xxx.xxx.xxx:ppppp' : This is used to send UDP GPI input updates to a 3rd party controller. Where xxx.xxx.xxx.xxx is the IP address of the 3rd party and ppppp is the port to send on. (Please see additional notes below)

'SET-LOGIC-EVENT=n:xxxx' : This is used along side the notification-address command. N is the GPI number. Xxxx can be the following: RISE,FALL,BOTH or OFF.

NOTE

This AMX module sets up a UDP server on port 49495 and registers its self using the NOTIFICATION-ADDRESS command to receive GPI updates from the EX-8ML. Use the SET-LOGIC-EVENT command to change the notification settings for the GPI's.

GainModule:**Variables Passed:**

dGain: virtual device address P:S:C

fStep: Step size for increment and decrement

nFilters: Maximum number of filters on the module

cBlockName: Name of the module

dESP: bosemodule address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dGain,1: Module Enable

dGain,2: Get Info

dGain,3: Toggles MUTE State

dGain,4: Level Up. Raises n Filter Level by fStep

dGain,5: Level Down. Lowers n Filter Level by fStep

Levels:

dGain,n: Filter n Level

GateModule**Variables Passed:**

dGate: virtual device address P:S:C

cBlockName: Name of the EX block

dBoseMod: EX device

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dGate,1: Module Enable
dGate,2: Get Info
dGate,3: Toggle Bypass
dGate,4: Left
dGate,5: Right
dGate,6: Mix
dGate,7: Sidechain

Levels:

dGate,1: Threshold
dGate,2: Range
dGate,3: Attack
dGate,4: Hold
dGate,5: Decay

GEQModule:**Variables Passed:**

dGEQ: virtual device address P:S:C
fStep: Step size for increment and decrement
cBlockName: Name of the ESP block
dESP: bosemodule address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dGEQ,1: Module Enable
dGEQ,2: Get Info
dGEQ,3: Bypass All

Levels:

dGEQ,n: GEQ Level n=1~31

GPOModule:**Variables Passed:**

dGPO: virtual device address P:S:C
fStep: Step size for increment and decrement
cBlockName: Name of the ESP block
dESP: bosemodule address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dGPO,1: Module Enable
dGPO,2: Get Info
dGPO,n+2: Toggle Output n

GroupLevels:**Requirement:**

This module requires version 5.8 or higher of control space and associated firmware.

Variables Passed:

vdvGroupLevels: virtual device address P:S:C
noGroupLevels: Max Group level used (Used for polling)
refresh: Poll Time in seconds
dESP: bosemodule address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

vdvGroupLevels,1: Module Enable
vdvGroupLevels,n+2: Mute Control

Levels:

vdvGroupLevels,n: Group level control and feedback.

InputModule:**Variables Passed:**

dInput: virtual device address P:S:C
fStep: Step size for increment and decrement
nFilters: Maximum number of filters on the module
cBlockName: Name of the module
dESP: bosemodule address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dInput,1: Module Enable
dInput,2: Get Info
dInput,3: Toggles MUTE State
dInput,4: Level Up. Raises n Filter Level by fStep
dInput,5: Level Down. Lowers n Filter Level by fStep

Levels:

dInput,n: Filter n Level

InputPEQModule:**Variables Passed:**

dIPEQ: virtual device address P:S:C
dPMAEQ: virtual device address P:S:C
nRate: Poll Rate in seconds
cBlockName: Name of the ESP block
dESP: bosemodule address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS : dIPEQ**Virtual Device****Channels:**

dIPEQ,1: Module Enable
 dIPEQ,2: Get Info
 dIPEQ,n (n * 5) - 2: Toggle Bypass
 dIPEQ,n (n * 5) - 2: Slope Up
 dIPEQ,n (n * 5) - 2: Slope Down
 dIPEQ,n (n * 5) - 2: Type Up
 dIPEQ,n (n * 5) - 2: Type Down

Levels:

dIPEQ,n: Frequency
 dIPEQ,n + 5: Q
 dIPEQ,n + 5*(n - 1): Gain
 dIPEQ,n + 5*(n - 1): Type
 dIPEQ,n + 5*(n - 1): Slope

VIRTUAL DEVICE CHANNELS AND LEVELS : dPMAEQ**Channels:**

dPMAEQ,1 : Enable Poll
 dPMAEQ,2 : Poll
 dPMAEQ,3 : Bypass
 dPMAEQ,4 : Array[1] Up
 dPMAEQ,5 : Array[1] Down
 dPMAEQ,6 : Array[2] Up
 dPMAEQ,7 : Array[2] Down

Levels:

dPMAEQ,1 : Frequency
 dPMAEQ,2 : Tilt
 dPMAEQ,3 : Gain
 dPMAEQ,4 : Array[1]
 dPMAEQ,5 : Array[2]

LinkModule:**Variables Passed:**

dLinker: virtual device address P:S:C
 nRate: Poll Rate in seconds
 cBlockName: Name of the ESP block
 dESP: bosemodule address P:S:C

Virtual Device Channels and Levels**Channels:**

dLinker,1: Module Enable

dLinker,2: Get Info
dLinker,3: Toggles Mute State
dLinker,4: Toggles Polarity State
dLinker,5: Level Up. Raises n Filter Level by fStep
dLinker,6: Level Down. Lowers n Filter Level by fStep

Levels:

dInput,n: Gain n Level

LogicBlockModule:**Variables Passed:**

dLogicBlock: virtual device address P:S:C
cBlockName: Name of the ESP block
dESP: bosemodule address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dLogicBlock,1: Module Enable
dLogicBlock,2: Get Info
dLogicBlock,n+2: Inputs (Read Only)
dLogicBlock,n+18: Outputs (Read Only)

LogicInputModule:**Variables Passed:**

dLogicInput: virtual device address P:S:C
cBlockName: Name of the ESP block
dESP: bosemodule address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dLogicInput,1: Module Enable
dLogicInput,2: Get Info
dLogicInput,n+2: Toggle Input n

NoiseModule:**Variables Passed:**

vNoise: virtual device address P:S:C
fStep: Step size for increment and decrement
cBlockName: Name of the ESP block
dESP: bosemodule address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

vNoise,1: Module Enable
 vNoise,2: Get Info
 vNoise,3: Toggles Pink or White Noise
 vNoise,4: Toggles Mute
 vNoise,5: Level Up. Raises Gain Level by fStep
 vNoise,6: Level Down. Lowers Gain Level by fStep

Levels:

dNoise,1: Gain Level

MMixerModule:**Variables Passed:**

dMMixer: virtual device address P:S:C
 Outputs=Maximum # of Outputs
 Inputs=Maximum # of Outputs
 cBlockName: Name of the ESP block
 dESP: ESP device

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dMMixer,1: Module Enable
 dMMixer,2: Get Info
 dMMixer,((m-1)*Outputs+N)+2: Mutes for the M input and N output of the Matrix Mixer.

Levels:

dMMixer,(m-1)*Outputs+N: Level for the M input and N output of the Matrix Mixer.

OutputModule**Variables Passed:**

dOutput: virtual device address P:S:C
 fStep: Step size for increment and decrement
 nFilters: Maximum number of filters on the module
 cBlockName: Name of the module
 dESP: bosemodule address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dOutput,1: Module Enable

dOutput,2: Get Info
 dOutput,3: Toggles MUTE State
 dOutput,4: Level Up. Raises n Filter Level by fStep
 dOutput,5: Level Down. Lowers n Filter Level by fStep

Levels:

dOutput,n: Filter n Level

ParameterSetModule**Variables Passed:**

dParameterSets: Array of DEVCHAN with the location for each button<-
 ParameterSet P:S:C
 nRate: Polling Rate
 dESP: bosemodule address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dParameterSet,1: Module Enable
 dParameterSet,2: Get Info
 dParameterSet,[2+n]: ParameterSet State

PEQModule**Variables Passed:**

dPEQ: virtual device address P:S:C
 fStep: Step size for increment and decrement
 nFilters: Maximum number of filters on the module
 cBlockName: Name of the module
 dESP: bosemodule address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dPEQ,1: Module Enable
 dPEQ,2: Get Info
 dPEQ,n*3: Toggles Band n Bypass State
 dPEQ,n*3+1: Band n Level Up. Raises n Filter Level by fStep
 dPEQ,n*3+2: Band n Level Down. Lowers n Filter Level by fStep

Levels:

dPEQ,n: Filter n Level

PkRMSLimModule**Variables Passed:**

dPkRMS: virtual device address P:S:C
 cBlockName: Name of the module
 dESP: bosemodule address P:S:C

Virtual Device

Channels:

dPkRMS,1: Module Enable
dPkRMS,2: Get Info
dPkRMS,3: Toggle Bypass
dPkRMS,4: Toggle Left
dPkRMS,5: Right
dPkRMS,6: Mix
dPkRMS,7: Side Chain

Levels:

dPkRMS,1: Pk Threshold
dPkRMS,2: RMS Threshold
dPkRMS,3: RMS Attack
dPkRMS,4: RMS Release

PMBandPassModule

Variables Passed:

dPMBandPass: virtual device address P:S:C
nRate: Polling Rate In Seconds
cBlockName: Name of the module
dESP: bosemodule address P:S:C

Virtual Device

Channels:

dPMBandPass,1: Module Enable
dPMBandPass,2: Get Info
dPMBandPass,3: Increment LPF Type
dPMBandPass,4: Decrement LPF Type
dPMBandPass,5: Toggle HP Bypass
dPMBandPass,6: Increment HPF Type
dPMBandPass,7: Decrement HPF Type
dPMBandPass,8: Toggle LP Bypass

Levels:

dPMBandPass,1: HPF Type
dPMBandPass,2: HPF Frequency
dPMBandPass,3: LPF Type
dPMBandPass,4: LPF Frequency

PMDelayModule**Variables Passed:**

dPMDelay: virtual device address P:S:C
nRate: Polling Rate in Seconds
cBlockName: Name of the module
dESP: bosemodule address P:S:C

Virtual Device**Channels:**

dPMDelay,1: Module Enable
dPMDelay,2: Get Info
dPMDelay,n*3+1: Level Up. Raises n Delay Level by fStep
dPMDelay,n*3+2: Level Down. Lowers n Delay Level by fStep
dPMDelay,n*3+3: Toggle Bypass

Levels:

dPMDelay,1 : Delay Level 1
dPMDelay,2 : Align Delay

PMInputModule**Variables Passed:**

dPMInput: virtual device address P:S:C
cBlockName: Name of the module
dESP: bosemodule address P:S:C

Virtual Device Channels and Levels**Channels:**

dPMInput,1: Module Enable
dPMInput,2: Get Info
dPMInput,4: Toggles Mute State
dPMInput,5: Level Up. Raises Sensitivity Level
dPMInput,6: Level Down. Lowers Sensitivity Level
dPMInput,7: Toggles Source

Levels:

dPMInput,1: Sensitivity Level

PMLimiterModule**Variables Passed:**

dPMLimiter: virtual device address P:S:C

cBlockName: Name of the module
dESP: bosemodule address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS

Channels:

dPMLimiter,1: Module Enable
dPMLimiter,2: Get Info
dPMLimiter,3: Link Group Up
dPMLimiter,4: Link Group Down

Levels:

dPMLimiter,1: Pk Threshold
dPMLimiter,2: RMS Threshold
dPMLimiter,3: RMS Attack
dPMLimiter,4: RMS Release
dPMLimiter,5: Link Group

PMMixerModule

Variables Passed:

dMMixer: virtual device address P:S:C
cBlockName: Name of the module
dESP: bosemodule address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS

Channels:

dMMixer,1: Module Enable
dMMixer,2: Get Info
dMMixer,((m-1)*Outputs+N)+2: Mutes for the M input and N output of the Matrix Mixer.

Levels:

dMMixer,(m-1)*Outputs+N: Level for the M input and N output of the Matrix Mixer.

PMOutputModule

Variables Passed:

dPMOutput: virtual device address P:S:C
cBlockName: Name of the module
dESP: bosemodule address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS

Channels:

dPMOutput,1: Module Enable
dPMOutput,2: Get Info
dPMOutput,4: Toggles Mute State
dPMOutput,5: Level Up. Raises Sensitivity Level
dPMOutput,6: Level Down. Lowers Sensitivity Level

dPMOutput,7: Toggles POLARITY

Levels:

dPMOutput,1: Sensitivity Level

PMSigGenModule

Variables Passed:

dPMSigGen: virtual device address P:S:C

nRate: Polling Rate in Seconds

cBlockName: Name of the module

dESP: bosemodule address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS

Channels:

dPMSigGen,1: Module Enable

dPMSigGen,2: Get Info

dPMSigGen,3: Toggle Repeat

dPMSigGen,4: Toggle Mute

dPMSigGen,5: Increment Duration

dPMSigGen,6: Decrement Duration

dPMSigGen,7: Increment Type

dPMSigGen,8: Decrement Type

Levels:

dPMSigGen,1: Gain

dPMSigGen,4: Type

dPMSigGen,5: Tone Freq

dPMSigGen,6: Start Freq

dPMSigGen,7: End Freq

dPMSigGen,8: Duration

PMSPEQModule

Variables Passed:

dPMSPEQ: virtual device address P:S:C

nRate: Polling Rate in Seconds

cBlockName: Name of the module

dESP: bosemodule address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS

Channels:

dPMSPEQ,1: Module Enable

dPMSPEQ,2: Get Info

dPMSPEQ,[n*3]: Toggles MUTE n State

dPMSPEQ,[n*3+1]: Level Up. Raises n Filter Level by fStep

dPMSPEQ,[n*3+2]: Level Down. Lowers n Filter Level by fStep

Levels:

dPMSPEQ,n: Filter n Level

dPMSPEQ,28+n: Type

PSTNInModule**Variables Passed:**

dPSTN: virtual device address P:S:C

fVolumeStep: Step size for increment and decrement

cBlockName: Name of the EX module

dBoseMod: EX device address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dPSTN,1: Module Enable

dPSTN,2: Get Info

dPSTN,7: Level Up. Raises n Auto Answer

dPSTN,8: Level Down. Lowers n Auto Answer

dPSTN,9: Level Up. Raises n Country Code Level

dPSTN,10: Level Down. Lowers n Country Code

dPSTN,11: Level Up. Raises n Volume Level by fStep

dPSTN,12: Level Down. Lowers n Volume by fStep

dPSTN,13: Toggle Mute

dPSTN,21: Call Active

dPSTN,22: Ringing

Levels:

dPSTN,1: Volume Level

dPSTN,2: Auto Answer Level

dPSTN,3: Country Code Level

Send Commands to Module

`DIAL=<Number to Dial>': Dial number

`HANGUP': Hangup call

`ANSWER': Answer Call

`TRANSFER=<Number to Transfer to>': Transfer call to number

Strings from Module

`STATUS' : Call Status

`ID' : Caller ID

[See UiDialer Module](#)

PSTNOutModule

[See Gain Module](#)

PresetModule**Variables Passed:**

dPresets: Array of DEVCHAN with the location for each button<->preset P:S:C
nRate: Polling Rate
dESP: ESP device

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dPreset,1: Module Enable
dPreset,2: Get Info
dPreset,[2+n]: Preset State

RouterModule**Variables Passed:**

dRouter: virtual device address P:S:C
cBlockName: Name of the ESP block
dESP: ESP device
dcRouterInput[Inputs][Outputs]: Two Dimensional Array with Router Assignments.

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dRouter,1: Module Enable
dRouter,2: Get Info

SelectorModule**Variables Passed:**

dSelector: virtual device address P:S:C
cBlockName: Name of the ESP block
dESP: ESP device

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dSelector,1: Module Enable
dSelector,2: Get Info
dSelector[2+n]:Selector Source n

Levels:

dSelector,1: Selector Level

SlotMeterModule**Variables Passed:**

nSlotNumber: Slot Number
nTopScale: Highest number for the Level display
nRate: Polling Rate
dESP: ESP device

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dSlotMeter,1: Module Enable
dSlotMeter,2: Get Info

Levels:

dSlotMeter,n: Channel n n=1~8

SMixerModule**Variables Passed:**

dSMixer: virtual device address P:S:C
fStep: Step size for increment and decrement
cBlockName: Name of the ESP block
dESP: ESP device

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dSMixer,1: Module Enable
dSMixer,2: Get Info
dPEQ,m: Toggles m Input Mute State
dPEQ,n+nInputs: Toggles n Output Mute State
dPEQ,((m-1)*nOutputs+N)+nInputs+nOutputs): Crosspoint (m,n) mute state

Levels:

dSMixer,m+n: (n,m) Levels for the Matrix Mixer. n=Input, m=Output

n = 1 to nInputs

m = 1 to nOutputs

SpeakerPEQModule**Variables Passed:**

dSMixer: virtual device address P:S:C
fStep: Step size for increment and decrement
cBlockName: Name of the ESP block
dESP: ESP device

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dSPEQ,1: Module Enable

dSPEQ,2: Get Info
 dSPEQ,n*3: Bypass
 dSPEQ,n*3 + 1: Type Up
 dSPEQ,n*3 + 2: Type Down
 dSPEQ,30: Bypass Low
 dSPEQ,31: Bypass High
 dSPEQ,31: Priority
 dSPEQ,31: Type Up Low
 dSPEQ,31: Type Down Low
 dSPEQ,31: Type Up High
 dSPEQ,31: Type Down High
 dSPEQ,31: EQ Gain Up
 dSPEQ,31: EQ Gain Down

Levels:

dSPEQ,10 : Frequency Low
 dSPEQ,11 : Frequency High
 dSPEQ,n + 11 : Q
 dSPEQ,n + (11*n): Gain
 dSPEQ,n + (11*n): Type
 dSPEQ,32 : EQ Gain Freq

SurroundInputModule**Variables Passed:**

dTone: virtual device address P:S:C
 fStep: Step size for increment and decrement
 nFilters: Maximum number of filters on the module
 cBlockName: Name of the module
 dESP: bosemodule address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dSUR,1: Module Enable
 dSUR,2: Get Info
 dSUR,3: Input

Levels:

dSUR,1 : Left Front Level
 dSUR,2 : Right Front Level
 dSUR,3 : Left Surround Front Level
 dSUR,4 : Right Surround Front Level
 dSUR,5 : Center Level
 dSUR,6 : LFE (SUB) Level
 dSUR,7 : Back Surround Left Level
 dSUR,8 : Back Surround Right Level

SweepModule**Variables Passed:**

dTone: virtual device address P:S:C
fStep: Step size for increment and decrement
nFilters: Maximum number of filters on the module
cBlockName: Name of the module
dESP: bosemodule address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dSweep,1: Module Enable
dSweep,2: Get Info
dSweep,3: Toggles Slow or Fast
dSweep,4: Toggles Start/Stop
dSweep,5: Toggles Repeat
dSweep,6: Level Up. Raises Gain Level by fStep
dSweep,7: Level Down. Lowers Gain Level by fStep

Levels:

dSweep,1: Gain Level

ToneModule**Variables Passed:**

dTone: virtual device address P:S:C
fStep: Step size for increment and decrement
nFilters: Maximum number of filters on the module
cBlockName: Name of the module
dESP: bosemodule address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dTone,1: Module Enable
dTone,2: Get Info
dTone,n*3: Toggles Band n Bypass State
dTone,n*3+1: Band n Level Up. Raises n Filter Level by fStep
dTone,n*3+2: Band n Level Down. Lowers n Filter Level by fStep

Levels:

dTone,n: Filter n Level

n=1 Low Freq Filter
n=2 Mid Freq Filter
n=3 High Freq Filter

UiDialer**Variables Passed:**

dVoIP: virtual device address P:S:C

dTP: Device for touch panel

DialButtons : Array of dial buttons on touch panel

Status : Array of status addresses on touch screen

Arrays

dialButtons[1] = 1

dialButtons[2] = 2

dialButtons[3] = 3

dialButtons[4] = 4

dialButtons[5] = 5

dialButtons[6] = 6

dialButtons[7] = 7

dialButtons[8] = 8

dialButtons[9] = 9

dialButtons[10] = 0

dialButtons[11] = *

dialButtons[12] = #

dialButtons[13] = Clear

dialButtons[14] = Dial

dialButtons[15] = Answer

dialButtons[16] = End

dialButtons[17] = Transfer

dialButtons[18] = BackSpace

Status[1] = Dial Number

Status[2] = CallerID

Status[3] = Status

Status[4] = Caller Number

Status[5] = Volume

Status[6] = AutoAnswer

Status[7] = Country Code

USBModule**Variables Passed:**

dTone: virtual device address P:S:C

fStep: Step size for increment and decrement

nFilters: Maximum number of filters on the module

cBlockName: Name of the module

dESP: bosemodule address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS**Channels:**

dUSB,1: Module Enable

dUSB,2: Get Info

dUSB,[n*3]: Toggles MUTE n State

dUSB,[n*3+1]: Level Up. Raises n Filter Level by fStep

dUSB,[n*3+2]: Level Down. Lowers n Filter Level by fStep

Levels

dUSB,n: n Level

VoIPInputModule

Variables Passed:

dVoIP: virtual device address P:S:C

fVolumeStep: Step size for increment and decrement

cBlockName: Name of the EX module

dBoseMod: EX device address P:S:C

VIRTUAL DEVICE CHANNELS AND LEVELS

Channels:

dVoIP,1: Module Enable

dVoIP,2: Get Info

dVoIP,7: Level Up. Raises n Auto Answer

dVoIP,8: Level Down. Lowers n Auto Answer

dVoIP,11: Level Up. Raises n Volume Level by fStep

dVoIP,12: Level Down. Lowers n Volume by fStep

dVoIP,13: Toggle Mute

dVoIP,14: Transfer Call

dVoIP,21: Call Active

dVoIP,22: Ringing

Levels:

dVoIP,1: Volume Level

dVoIP,2: Auto Answer Level

Send Commands to Module

'DIAL=<Number to Dial>': Dial number

'HANGUP': Hangup call

'ANSWER': Answer Call

'TRANSFER=<Number to Transfer to>': Transfer call to number

Strings From Module

'STATUS' : Call Status

'ID' : Caller ID

[See UiDialer Module](#)

VoIPOutputModule

[See Gain Module](#)

