GALAXY Programming Guide

Meyer Sound Laboratories, Inc.
GALAXY Programming Guide, PN 05.230.008.01 Rev A

CONTENTS

CHAPTER 1: INTRODUCTION

The term *GALAXY* is used generically for the versions of the GALAXY Processors listed below:

- GALAXY 408
- GALAXY 816
- GALAXY 816 AES

This document explains the Control Plane server in Meyer Sound's GALAXY loudspeaker management system. GALAXY is the *server* in a *client/server* relationship that lets multiple clients control the hardware simultaneously. This can be several computers running Compass software, or other controllers using the protocols supported by GALAXY. Clients can subscribe to a GALAXY server and exchange control and status messages.

Both ASCII and Open Sound Control (OSC) network protocols are covered. Each control point available in the system is defined.

Disclaimer

This work has been compiled from many sources. It is not meant to replace those documents, or to supply documentation and education regarding networking. The GALAXY management system can provide very loud sound pressure levels to the audience, therefore proper network security, risk assessment, and discipline are strongly recommended before using remote control over a network with third-party software. The authors of this work shall not hold any responsibility for the misuse of this document, for improper implementation, or carelessness.

HOW TO USE THIS GUIDE

You will encounter the following icons for notes, tips, and cautions:

NOTE: A note identifies an important or useful piece of information relating to the topic under discussion.

TIP: A tip offers a helpful tip relevant to the topic at hand.

CAUTION: A caution gives notice that an action may have serious consequences and could cause harm to equipment or personnel, or could cause delays or other problems.

Information and specifications are subject to change. Updates and supplementary information are available at www.meyersound.com.

MEYER SOUND TECHNICAL SUPPORT

Meyer Sound Technical Support is available at:

- **Tel:** +1 510 486.1166
- **Tel:** +1 510 486.0657 (after hours support)
- **Web:** www.meyersound.com/contact

CHAPTER 2: NETWORKING

Networking is a crucial part of communication between machines. Most machines use a network rather than point-to-point communication. Network management and security are critical tasks because of actions that can be triggered remotely, sometimes unintentionally. It is beyond the scope of this guide to provide basic network instruction, but proper network management is essential.

GALAXY can use an IPv4, IPv6, or mDNS address. Their function is equivalent and they can be mixed within a network. The server can connect and control multiple clients simultaneously. GALAXY's OSC server listens to two different networking protocols, TCP/IP and UDP, each with its advantages and constraints.

Example: Telnet connection to IPv4 address and the ASCII port

telnet 192.168.71.146 25003

Example: Telnet connection to IPv6 address and the ASCII port

telnet fe80::21c:abff:fe00:584c%en12 25003

Example: Constructing a user-created mDNS address by combining **Device Name** and **Device Group Name** from Compass

From Compass we see the Device Name is "MyGALAXY," and the Device Group Name is "MyGroup."

Device Name.Device Group Name.local

telnet MyGalaxy.MyGroup.local 25003

Example: Generating an automatic mDNS address by combining the device type and serial number

A Meyer Galileo GALAXY module is a device type mslg-gx-nnn where nnn can be 408 or 816.

telnet mslg-gx-816-16342723.local 25003

TCP/IP

The *Transmission Control Protocol* is connection-oriented, which requires handshaking to set up end-to-end communication. Once a connection is set up, data can be sent bi-directionally.

- **Reliable** – TCP manages message acknowledgment, retransmission and timeout. Multiple attempts to deliver the message are made. If some part of the data is lost along the way, the server will re-request the lost part. There is either no missing data, or, in case of multiple timeouts, the connection is dropped.
- **Ordered** – If two messages are sent in sequence over a connection, the first message will reach the receiving application first. If data segments arrive in the wrong order, TCP buffers delay the out-of-order data until it is properly re-ordered and delivered to the application.
- **Heavyweight** – TCP requires three packets to set up a socket connection before any user data can be sent. TCP prevents data congestion.
- **Streaming** – Data is read as a continuous byte stream with nothing to distinguish signal message (segment) boundaries.

UDP

The *Universal Data Protocol* is a simpler message-based, connectionless protocol, which does not set up a dedicated end-to-end connection. Information is transmitted from source to destination without verifying the readiness or state of the receiver.

UDP is more reliable for isolated networks. On a totally isolated network, statistics show high reliability, but this drops when the network is shared with additional clients that consume bandwidth.

UDP has less latency and jitter than TCP, which is an advantage when communicating with meters or other functions that require real-time updates.

- **Unreliable** – When a message is sent, it cannot be known if it will reach its destination. There is no concept of acknowledgment, retransmission, or timeout.
- **Not ordered** – If two messages are sent to the same recipient, the order in which they arrive cannot be predicted.
- **Lightweight** – There is no ordering of messages or tracking connections. It is a small transport layer designed on top of IP.

- **Datagrams** – Packets are sent individually and checked for integrity only if they arrive. Packets have definite boundaries which are honored upon receipt, meaning a read operation at the receiver socket will yield an entire message as it was originally sent.
- **No congestion control** – UDP does not avoid congestion, unless congestion control measures are implemented at the application level. Confirmation messages can also be implemented at the application level.

CHAPTER 3: THE GALAXY SERVER

This chapter describes how to interact with the GALAXY server for ASCII and OSC protocols. Most commands involve managing snapshots and communicating with control points. A snapshot contains all GALAXY settings.

The snapshot management system uses a proprietary protocol to access and store snapshot names. To manage snapshots, the GALAXY server uses only the snapshot number, even if it has been named in GALAXY. Additional commands for snapshot management are also available (i.e., **update**, **create**, and **delete**).

All GALAXY parameters can be addressed as Control Points in OSC or ASCII formats. You can set and query Control Points. To set a single Control Point, you need just one Address.

NOTE: The examples in this section are ASCII commands.

For example, the following commands show how to query the mute status of input 1 and the response returned that it is unmuted:

query: **/processing/input/1/mute**

response: **/processing/input/1/mute='false'**

REGULAR EXPRESSIONS

Regular expressions are an efficient way to quickly configure and query a GALAXY system. For example, to set multiple Control Points, use a regular expression to denote the range or number of Addresses.

The table below shows the most commonly used regular expressions and their functions.

RegX Character	Function
.	Regular Expression match any single character value
*	Regular Expression Wildcard
\d	Regular Expression Integer Wildcard
\d+	Regular Expression Integer Greedy Wildcard

Regular Expression Examples

For example, to mute all single digit inputs, use the following command:

/processing/input/\d/mute=’true’

To confirm that these inputs are muted, use the following query:

/processing/input/\d/mute

The following information is returned showing that inputs 1–8 are muted:

/processing/input/1/mute='true'

/processing/input/2/mute='true'

/processing/input/3/mute='true'

/processing/input/4/mute='true'

/processing/input/5/mute='true'

/processing/input/6/mute='true'

/processing/input/7/mute='true'

/processing/input/8/mute='true'

You can use a regular expression to return data from a Control Point.

To query the data in snapshot 7:

/project/snapshot/7/.*

To following responses return all data for snapshot 7:

/project/snapshot/7/comment='hello'

/project/snapshot/7/created='2017-09-10 22:09:00'

/project/snapshot/7/last_updated='2017-09-10 22:09:00'

/project/snapshot/7/locked='false'

/project/snapshot/7/modified='false'

/project/snapshot/7/name='7'

TIP: See Appendix C, “Regular Expression Commands” for more examples.

USING THE GALAXY SERVER FOR OSC

OSC is often used as an alternative to the 1983 MIDI standard, where higher resolution and a richer musical parameter space is desired. OSC messages are commonly transported over Ethernet protocols. It gives users more flexibility and facility in addressing and interacting with remote machines.

OSC features an open-ended symbolic naming scheme, high resolution argument data, high resolution time tags, and more. It can pack messages into bundles whose effects must occur simultaneously.

OSC should work out of the box on most small-scale routers and network infrastructures. For large or administered networks, proper settings and bandwidth allocation will be needed.

The GALAXY server is always listening to port 25004 for OSC messages, unless you are addressing a virtual GALAXY, which starts at port 50504. Increment the port address by 100 for each additional virtual GALAXY. Check the **Log** tab in Compass to determine the port address of any given GALAXY device.

When the OSC message asks for a response, the GALAXY will reply within the established connection to the client's address for TCP, and to the port of emission for UDP.

Subscriptions for TCP clients remain active until they are countermanded by an unsubscribe command, or until the client's TCP connection is broken.

A UDP subscription remains active until it is countermanded by an unsubscribe command, or the server does not receive any UDP packets from the client for at least 30 seconds. To keep a UDP subscription active in the absence of GALAXY activity, use the *keepalive* tactic by sending an empty **ping** OSC message to the server.

OSC Message Syntax

An OSC message consists of an Address, Type Tag string, and OSC Argument(s). A Type Tag is a one-letter string that tells the server how to interpret the OSC Argument(s).

OSC messages are sometimes compacted into bundles to conserve bandwidth. GALAXY accepts bundles or individual messages.

OSC Arguments

OSC Arguments may be any of the following types:

i	32-bit integer
f	32-bit floating point
s	OSC string
F	Boolean false
T	Boolean true
h	64-bit integer

NOTE: Since some clients do not adhere to the OSC protocol governing argument types, GALAXY is programmed to type cast between different value types. For example, Boolean False is interpreted as 0 or 0.0, Boolean True is any positive non-zero number (1 or 1.0).

USING THE GALAXY SERVER FOR ASCII

The GALAXY ASCII server is always listening to port 25003. When the message asks for a response, GALAXY will reply within the established connection to the client's address.

Subscriptions for TCP clients remain active until they are countermanded by an unsubscribe command, or until the client's TCP connection is broken.

ASCII text messages are sent to port 25003 unless you are addressing a virtual GALAXY, which starts at port 50503. Increment the port address by 100 for each virtual GALAXY.

All ASCII built-in functions are preceded by ":" as shown below:

:recall_snapshot 3

All ASCII text commands must end with the newline character, which consists of a carriage return (CR) and line feed (LF): 0d 0a

CHAPTER 4: GALAXY PROGRAMMING

This chapter describes how to:

- construct built-in commands;
- query and set Control Points.

BUILT-IN FUNCTIONS

All of GALAXY's built-in, external control functions manipulate snapshots (except **ping**), and assume the specified snapshot already exists (except **create_snapshot**). Each function explanation includes ASCII and OSC examples.

recall_snapshot

Recalls the snapshot specified by the integer argument.

For example, to recall snapshot 3 on a GALAXY module:

ASCII MSG	:recall_snapshot 3
ASCII Hex	3a 72 65 63 61 6c 6c 5f 73 6e 61 70 73 68 6f 74 20 33 0d 0a
OSC MSG	/recall_snapshot,i 3
UDP OSC	2f 72 65 63 61 6c 6c 5f 73 6e 61 70 73 68 6f 74 00 00 00 00 2c 69 00 00 00 00 00 03
TCP OSC	00 00 00 1c 2f 72 65 63 61 6c 6c 5f 73 6e 61 70 73 68 6f 74 00 00 00 00 2c 69 00 00 00 00 00 03

Excluding Snapshot Settings

It is possible to exclude some settings when recalling a snapshot. This is done by appending a second integer argument after the snapshot ID. A value of *1* enables exclusion. Add 1 to each exclusion code shown in the table below to exclude that entity.

For example:

- If the second integer argument is 1, exclusion is *enabled* but nothing is excluded. The snapshot is recalled with all settings.

- If the second integer argument is *9*, mute information is excluded. *1* signifies that exclusion is active, and *8* is the exclusion code. To recall snapshot 3 without mute settings:

ASCII MSG	:recall_snapshot 3 9
ASCII Hex	3a 72 65 63 61 6c 6c 5f 73 6e 61 70 73 68 6f 74 20 33 20 39 20 0d 0a
OSC MSG	/recall_snapshot, ii 3 9
UDP OSC	2f 72 65 63 61 6c 6c 5f 73 6e 61 70 73 68 6f 74 00 00 00 00 2c 69 69 00 00 00 00 03 00 00 00 09
TCP OSC	00 00 00 20 2f 72 65 63 61 6c 6c 5f 73 6e 61 70 73 68 6f 74 00 00 00 00 2c 69 69 00 00 00 00 03 00 00 00 09

The following table shows the exclusion codes to use for each setting.

Exclusion Code	Excluded Setting
1	Nothing excluded, loads all control point settings
2	Input Channel Types
4	Input and Output Voltage Ranges
8	Input and Output Mute
16	Update active snapshot before recall
32	SIM3 Bus Address
64	SIM3 Probe Point
128	Clock Sync Mode
256	AVB Configuration

Exclusion codes can be added together to exclude multiple types.

For example:

- To exclude everything but still save the active snapshot before recall, add all exclusion codes except 16, which corresponds to updating the active snapshot: 2+4+8+32+64+128+256 = **495**

update_snapshot

Updates all settings in the specified snapshot to current values.

To update snapshot 6 to current device settings:

ASCII MSG	:update_snapshot 6
ASCII Hex	3a 75 70 64 61 74 65 5f 73 6e 61 70 73 68 6f 74 20 36 0d 0a
OSC MSG	/update_snaphot, i 6
UDP OSC	2f 75 70 64 61 74 65 5f 73 6e 61 70 73 68 6f 74 00 00 00 00 2c 69 00 00 00 00 00 06
TCP OSC	00 00 00 1c 2f 75 70 64 61 74 65 5f 73 6e 61 70 73 68 6f 74 00 00 00 00 2c 69 00 00 00 00 00 06

create_snapshot

Creates a new snapshot that contains the current Control Point settings. If one string argument is present, it is used as the new snapshot's name. If a second string argument is present, it is used as the new snapshot's comment.

To create a new snapshot named *Sample* with comment *Hello*:

ASCII MSG	:create_snapshot Sample Hello
ASCII Hex	3a 63 72 65 61 74 65 5f 73 6e 61 70 73 68 6f 74 20 53 61 6d 70 6c 65 20 48 65 6c 6c 6f 0d 0a
OSC MSG	/create_snapshot, ss Sample Hello
UDP OSC	2f 63 72 65 61 74 65 5f 73 6e 61 70 73 68 6f 74 00 00 00 00 2c 73 73 00 53 61 6d 70 6c 65 00 00 48 65 6c 6c 6f 00 00 00
TCP OSC	00 00 00 28 2f 63 72 65 61 74 65 5f 73 6e 61 70 73 68 6f 74 00 00 00 00 2c 73 73 00 53 61 6d 70 6c 65 00 00 48 65 6c 6c 6f 00 00 00

delete_snapshot

Deletes an existing snapshot identified by the integer argument.

To delete snapshot 6 from GALAXY memory:

ASCII MSG	:delete_snapshot 6
ASCII Hex	3a 64 65 6c 65 74 65 5f 73 6e 61 70 73 68 6f 74 20 36 0d 0a
OSC MSG	/delete_snapshot, i 6
UDP OSC	2f 64 65 6c 65 74 65 5f 73 6e 61 70 73 68 6f 74 00 00 00 00 2c 68 00 00 00 00 00 00 00 00 00 06
TCP OSC	00 00 00 20 2f 64 65 6c 65 74 65 5f 73 6e 61 70 73 68 6f 74 00 00 00 00 2c 68 00 00 00 00 00 00 00 00 00 06

ping

Send a **ping** command without an argument to maintain a current subscription.

ASCII MSG	:ping Hello World
ASCII Hex	3a 70 69 6e 67 20 48 65 6c 6c 6f 20 57 6f 72 6c 64 0d 0a
OSC MSG	/ping,s Hello World
UDP OSC	2f 70 69 6e 67 00 00 00 2c 73 00 00 48 65 6c 6c 6f 20 57 6f 72 6c 64 00
TCP OSC	00 00 00 18 2f 70 69 6e 67 00 00 00 2c 73 00 00 48 65 6c 6c 6f 20 57 6f 72 6c 64 00

After issuing a **ping** command, you will receive a **pong** response. Note that you cannot send a **pong** command. Attach a keyword(s) so you can identify the **pong** response to your **ping** command.

ASCII MSG	:pong Hello World
ASCII Hex	3a 70 6f 6e 67 20 48 65 6c 6c 6f 20 57 6f 72 6c 64 0d 0a
OSC MSG	/pong,s Hello World
UDP OSC	2f 70 6f 6e 67 00 00 00 2c 73 00 00 48 65 6c 6c 6f 20 57 6f 72 6c 64 00
TCP OSC	00 00 00 18 2f 70 6f 6e 67 00 00 00 2c 73 00 00 48 65 6c 6c 6f 20 57 6f 72 6c 64 00

CONTROL POINT FUNCTIONS

The table below shows the Control Character used to enact each Function that sets or retrieves a Control Point value.

Control Character	Function
+	Subscribe to Control Point
-	Unsubscribe from Control Point
?	Get Control Point Description
	Get Control Point Value
=	Set Control Point Value

Set Control Point Value (=)

Sets one or more Control Points to one or more values. The arguments indicate a set of one or more Control Point Addresses, followed by a list of one or more Control Point Values. The Control Point Values are assigned to the Control Point Addresses in the order listed. Note that the "=" Control Character is appended at the end of the Address.

To mute input 1:

ASCII MSG	/processing/input/1/mute=true
ASCII Hex	2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 6d 75 74 65 3d 74 72 75 65
OSC MSG	/processing/input/1/mute,T
UDP OSC	2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 6d 75 74 65 00 00 00 00 2c 54 00 00
TCP OSC	00 00 00 20 2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 6d 75 74 65 00 00 00 00 2c 54 00 00

Get Control Point Value

Retrieves the current value of a Control Point. Note that this does not use a Control Character. Just specify the Control Point address as shown below.

To query the mute status of Input 1:

ASCII MSG	/processing/input/1/mute
ASCII Hex	2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 6d 75 74 65 3d 74 72 75 65 0d 0a
OSC MSG	/processing/input/1/mute,
UDP OSC	2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 6d 75 74 65 00 00 00 00 2c 00 00 00
TCP OSC	00 00 00 20 2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 6d 75 74 65 00 00 00 00 2c 00 00 00

The mute status of Input 1 returns:

ASCII MSG	/processing/input/1/mute=false
ASCII Hex	2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 6d 75 74 65 3d 66 61 6c 73 65 0d 0a
OSC MSG	/processing/input/1/mute,F
UDP OSC	2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 6d 75 74 65 00 00 00 00 2c 46 00 00
TCP OSC	00 00 00 20 2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 6d 75 74 65 00 00 00 00 2c 46 00 00

In OSC, if the Get Control Point Value was received from a:

- **TCP stream**: The return packets are sent back to that TCP stream.
- **UDP packets**: The return packets are sent back to the same IP address and port from which it was sent.

Get Control Point Description (?)

Retrieves the current value and range of possible values of a Control Point. All Control Point Types are shown in Appendix B, “Control Points” but this command lists all possible values, not just the default value.

To request the Control Point Description for Input 1 Mute:

ASCII MSG	?/processing/input/1/mute
ASCII Hex	3f 2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 6d 75 74 65 0d 0a
OSC MSG	NA
UDP OSC	NA
TCP OSC	NA

The Control Point Description for Input 1 Mute is returned:

ASCII MSG	?{'/processing/input/1/mute': { 'description' : 'Input 1 Mute', 'read_only' : 'false', 'name' : 'item_1_1', 'value' : 'false', 'minimum' : 'true', 'maximum' : 'false', 'default' : 'false', 'step' : '255', 'units' : ''}}
ASCII Hex	3f 7b 27 2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 6d 75 74 65 27 3a 20 7b 20 27 64 65 73 63 72 69 70 74 69 6f 6e 27 20 3a 20 27 49 6e 70 75 74 20 31 20 4d 75 74 65 27 2c 20 27 72 65 61 64 5f 6f 6e 6c 79 27 20 3a 20 27 66 61 6c 73 65 27 2c 20 27 6e 61 6d 65 27 20 3a 20 27 69 74 65 6d 5f 31 5f 31 27 2c 20 27 76 61 6c 75 65 27 20 3a 20 27 66 61 6c 73 65 27 2c 20 27 6d 69 6e 69 6d 75 6d 27 20 3a 20 27 74 72 75 65 27 2c 20 27 6d 61 78 69 6d 75 6d 27 20 3a 20 27 66 61 6c 73 65 27 2c 20 27 64 65 66 61 75 6c 74 27 20 3a 20 27 66 61 6c 73 65 27 2c 20 27 73 74 65 70 27 20 3a 20 27 32 35 35 27 2c 20 27 75 6e 69 74 73 27 20 3a 20 27 27 7d 7d 20
OSC MSG	NA
UDP OSC	NA
TCP OSC	NA

Subscribe to Control Point (+)

This command subscribes to a set of Control Point addresses for *live updates*, which allows the client to keep track of the current state of the specified addresses, without constantly querying their state.

Note that subscriptions are handled per Control Point address, so it is possible to build up your subscription set via multiple subscribe commands. You can also *unsubscribe* from a single Control Point or an arbitrary subset at any time.

A client cannot subscribe to the same Control Point more than once. Trying to subscribe to a Control Point to which you already subscribed causes the server to re-send the Control Point's current value, but has no other effect.

Subscriptions for TCP clients remain active until they are countermanded by an unsubscribe command, or until the client's TCP connection is broken.

A UDP subscription remains active until it is countermanded by an unsubscribe command, or the server does not receive any UDP packets from the client for at least 30 seconds. To keep a UDP subscription active in the absence of GALAXY activity, use the *keepalive* tactic by sending an empty **ping** OSC message to the server.

Subscribe commands can take an optional argument that sets the time between values being returned. If no value is included, the default update rate is 30 ms. The time range for updates can be 0-100 ms. If your Control Point changes at a faster rate than you set, your update rate determines how often you receive new values. Conversely, if your Control Point changes at a slower rate than your setting, values are returned only when the Control Point value changes.

To subscribe to Input 1 Mute status with an update rate of 100 ms:

ASCII MSG	+/processing/input/1/mute 100
ASCII Hex	2b 2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 6d 75 74 65 20 31 30 30
OSC MSG	/subscribe/processing/input/1/mute,i 100
UDP OSC	2f 73 75 62 73 63 72 69 62 65 2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 6d 75 74 65 00 00 2c 69 00 00 00 00 00 64
TCP OSC	00 00 00 2c 2f 73 75 62 73 63 72 69 62 65 2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 6d 75 74 65 00 00 2c 69 00 00 00 00 00 64

Unsubscribe from Control Point (-)

This command has the same syntax as *subscribe* but the opposite effect: it *unsubscribes* from a set of Control Point addresses. Subscription records for all Control Point addresses specified in this command *that are currently subscribed to* by this client will be removed from the server. This command does not affect Control Points that your client is *not* currently subscribed to.

To unsubscribe from Input 1 mute state:

ASCII MSG	-/processing/input/1/mute
ASCII Hex	2d 2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 6d 75 74 65
OSC MSG	/unsubscribe/processing/input/1/mute,
UDP OSC	2f 75 6e 73 75 62 73 63 72 69 62 65 2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 6d 75 74 65 00 00 00 00 2c 00 00 00
TCP OSC	00 00 00 2c 2f 75 6e 73 75 62 73 63 72 69 62 65 2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 6d 75 74 65 00 00 00 00 2c 00 00 00

APPENDIX A: ASCII AND OSC COMMANDS

Examples of ASCII and OSC (UDP and TCP/IP) commands

Command	Type	String
Mute Output 1	ASCII MSG	/processing/output/1/mute=true
	ASCII Hex	2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 31 2f 6d 75 74 65 3d 74 72 75 65 0d 0a
	OSC MSG	/processing/output/1/mute, T
	UDP OSC	2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 31 2f 6d 75 74 65 00 00 00 2c 54 00 00
	TCP OSC	00 00 00 20 2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 31 2f 6d 75 74 65 00 00 00 2c 54 00 00
Unmute Output 1	ASCII MSG	/processing/output/1/mute=false
	ASCII Hex	2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 31 2f 6d 75 74 65 3d 66 61 6c 73 65 0d 0a
	OSC MSG	/processing/output/1/mute, F
	UDP OSC	2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 31 2f 6d 75 74 65 00 00 00 2c 46 00 00
	TCP OSC	00 00 00 20 2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 31 2f 6d 75 74 65 00 00 00 2c 46 00 00
Mute Input 1	ASCII MSG	/processing/input/1/mute=true
	ASCII Hex	2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 6d 75 74 65 3d 74 72 75 65 0d 0a
	OSC MSG	/processing/input/1/mute, T
	UDP OSC	2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 6d 75 74 65 00 00 00 00 2c 54 00 00
	TCP OSC	00 00 00 20 2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 6d 75 74 65 00 00 00 00 2c 54 00 00

Examples of ASCII and OSC (UDP and TCP/IP) commands

Command	Type	String
Unmute Input 1	ASCII MSG	/processing/input/1/mute=false
	ASCII Hex	2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 6d 75 74 65 3d 66 61 6c 73 65 0d 0a
	OSC MSG	/processing/input/1/mute, F
	UDP OSC	2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 6d 75 74 65 00 00 00 00 2c 46 00 00
	TCP OSC	00 00 00 20 2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 6d 75 74 65 00 00 00 00 2c 46 00 00
Set Input 1 gain to -90 dB (-inf)	ASCII MSG	/processing/input/1/gain=-90
	ASCII Hex	2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 67 61 69 6e 3d 2d 39 30 0d 0a
	OSC MSG	/processing/input/1/gain,f -90.0
	UDP OSC	2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 67 61 69 6e 00 00 00 00 2c 66 00 00 c2 b4 00 00
	TCP OSC	00 00 00 24 2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 67 61 69 6e 00 00 00 00 2c 66 00 00 c2 b4 00 00
Set Input 1 gain to 0 dB (unity)	ASCII MSG	/processing/input/1/gain=0
	ASCII Hex	2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 67 61 69 6e 3d 30 0d 0a
	OSC MSG	/processing/input/1/gain,f 0.0
	UDP OSC	2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 67 61 69 6e 00 00 00 00 2c 66 00 00 00 00 00 00
	TCP OSC	00 00 00 24 2f 70 72 6f 63 65 73 73 69 6e 67 2f 69 6e 70 75 74 2f 31 2f 67 61 69 6e 00 00 00 00 2c 66 00 00 00 00 00 00
Set Output 1 gain to -90 dB (-inf)	ASCII MSG	/processing/output/1/gain=-90
	ASCII Hex	2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 31 2f 67 61 69 6e 3d 2d 39 30 0d 0a
	OSC MSG	/processing/output/1/gain,f -90.0
	UDP OSC	2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 31 2f 67 61 69 6e 00 00 00 2c 66 00 00 c2 b4 00 00
	TCP OSC	00 00 00 24 2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 31 2f 67 61 69 6e 00 00 00 2c 66 00 00 c2 b4 00 00

Examples of ASCII and OSC (UDP and TCP/IP) commands

Command	Type	String
Set Output 1 gain to 0 dB (unity)	ASCII MSG	/processing/output/1/gain=0
	ASCII Hex	2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 31 2f 67 61 69 6e 3d 30
	OSC MSG	/processing/output/1/gain,f 0.0
	UDP OSC	2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 31 2f 67 61 69 6e 00 00 00 2c 66 00 00 00 00 00 00
	TCP OSC	00 00 00 24 2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 31 2f 67 61 69 6e 00 00 00 2c 66 00 00 00 00 00 00
All Outputs Mute	ASCII MSG	/processing/output/([1-9]|1[0-6])/mute=1
	ASCII Hex	2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 28 5b 31 2d 39 5d 7c 31 5b 30 2d 36 5d 29 2f 6d 75 74 65 3d 31 0d 0a
	OSC MSG	/processing/output/([1-9]|1[0-6])/mute, T
	UDP OSC	?2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 28 5b 31 2d 39 5d 7c 31 5b 30 2d 36 5d 29 2f 6d 75 74 65 00 00 2c 69 00 00 00 00 00 00
	TCP OSC	?00 00 00 30 2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 28 5b 31 2d 39 5d 7c 31 5b 30 2d 36 5d 29 2f 6d 75 74 65 00 00 2c 69 00 00 00 00 00 00
Outputs 1-8 and 11-16 Muted & Output 9-10 untouched	ASCII MSG	/processing/output/([1-8]|1[1-6])/mute=0
	ASCII Hex	2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 28 5b 31 2d 38 5d 7c 31 5b 31 2d 36 5d 29 2f 6d 75 74 65 3d 30 0d 0a
	OSC MSG	/processing/output/([1-8]|1[1-6])/mute, F
	UDP OSC	2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 28 5b 31 2d 38 5d 7c 31 5b 31 2d 36 5d 29 2f 6d 75 74 65 00 00 2c 69 00 00 00 00 00 01
	TCP OSC	2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 28 5b 31 2d 38 5d 7c 31 5b 31 2d 36 5d 29 2f 6d 75 74 65 00 00 2c 69 00 00 00 00 00 01

APPENDIX B: CONTROL POINTS

PROCESSING

Input

Input 1 Processing Control Points

Control Point	Default Value
/processing/input/1/delay	'0'
/processing/input/1/delay_type	'0'
/processing/input/1/eq/1/band_bypass	'false'
/processing/input/1/eq/1/bandwidth	'1'
/processing/input/1/eq/1/frequency	'62'
/processing/input/1/eq/1/gain	'0'
/processing/input/1/eq/2/band_bypass	'false'
/processing/input/1/eq/2/bandwidth	'1'
/processing/input/1/eq/2/frequency	'125'
/processing/input/1/eq/2/gain	'0'
/processing/input/1/eq/3/band_bypass	'false'
/processing/input/1/eq/3/bandwidth	'1'
/processing/input/1/eq/3/frequency	'250'
/processing/input/1/eq/3/gain	'0'
/processing/input/1/eq/4/band_bypass	'false'
/processing/input/1/eq/4/bandwidth	'1'
/processing/input/1/eq/4/frequency	'500'
/processing/input/1/eq/4/gain	'0'
/processing/input/1/eq/5/band_bypass	'false'
/processing/input/1/eq/5/bandwidth	'1'
/processing/input/1/eq/5/frequency	'1000'
/processing/input/1/eq/5/gain	'0'
/processing/input/1/eq/bypass	'false'

Input 1 Processing Control Points

Control Point	Default Value
/processing/input/1/equalization_bypass	'false'
/processing/input/1/gain	'-90'
/processing/input/1/mute	'false'
/processing/input/1/solo	'false'
/processing/input/1/ushaping/1/frequency	'62'
/processing/input/1/ushaping/1/gain	'0'
/processing/input/1/ushaping/1/slope	'2'
/processing/input/1/ushaping/2/frequency	'250'
/processing/input/1/ushaping/2/gain	'0'
/processing/input/1/ushaping/2/slope	'2'
/processing/input/1/ushaping/3/frequency	'1000'
/processing/input/1/ushaping/3/gain	'0'
/processing/input/1/ushaping/3/slope	'2'
/processing/input/1/ushaping/4/frequency	'4000'
/processing/input/1/ushaping/4/gain	'0'
/processing/input/1/ushaping/4/slope	'2'
/processing/input/1/ushaping/5/gain	'0'
/processing/input/1/ushaping/bypass	'false'
/processing/input/1/variable_eq/bypass	'true'
/processing/input/1/variable_eq/frequency	'1000'
/processing/input/1/variable_eq/q	'1'
/processing/input/1/variable_eq/type	'0'

Output

Output 1 Processing Control Points

Control Point	Default Value
/processing/output/1/allpass/1/band_bypass	'true'
/processing/output/1/allpass/1/frequency	'32'
/processing/output/1/allpass/1/q	'1'
/processing/output/1/allpass/2/band_bypass	'true'
/processing/output/1/allpass/2/frequency	'64'
/processing/output/1/allpass/2/q	'1'
/processing/output/1/allpass/3/band_bypass	'true'
/processing/output/1/allpass/3/frequency	'128'
/processing/output/1/allpass/3/q	'1'
/processing/output/1/allpass/bypass	'true'
/processing/output/1/atmospheric/bypass	'true'
/processing/output/1/atmospheric/distance	'0'
/processing/output/1/atmospheric/gain	'10'
/processing/output/1/beam_control_allpass/band_bypass	'true'
/processing/output/1/beam_control_allpass/frequency	'32'
/processing/output/1/beam_control_allpass/q	'1'
/processing/output/1/delay	'0'
/processing/output/1/delay_integration/1/band_bypass	'true'
/processing/output/1/delay_integration/1/frequency	'32'
/processing/output/1/delay_integration/1/q	'1'
/processing/output/1/delay_integration/10/band_bypass	'true'
/processing/output/1/delay_integration/10/frequency	'8000'
/processing/output/1/delay_integration/10/q	'1'
/processing/output/1/delay_integration/11/band_bypass	'true'
/processing/output/1/delay_integration/11/frequency	'10000'
/processing/output/1/delay_integration/11/q	'1'
/processing/output/1/delay_integration/12/band_bypass	'true'

Output 1 Processing Control Points

Control Point	Default Value
/processing/output/1/delay_integration/12/frequency	'12000'
/processing/output/1/delay_integration/12/q	'1'
/processing/output/1/delay_integration/13/band_bypass	'true'
/processing/output/1/delay_integration/13/frequency	'14000'
/processing/output/1/delay_integration/13/q	'1'
/processing/output/1/delay_integration/14/band_bypass	'true'
/processing/output/1/delay_integration/14/frequency	'16000'
/processing/output/1/delay_integration/14/q	'1'
/processing/output/1/delay_integration/2/band_bypass	'true'
/processing/output/1/delay_integration/2/frequency	'63'
/processing/output/1/delay_integration/2/q	'1'
/processing/output/1/delay_integration/3/band_bypass	'true'
/processing/output/1/delay_integration/3/frequency	'125'
/processing/output/1/delay_integration/3/q	'1'
/processing/output/1/delay_integration/4/band_bypass	'true'
/processing/output/1/delay_integration/4/frequency	'250'
/processing/output/1/delay_integration/4/q	'1'
/processing/output/1/delay_integration/5/band_bypass	'true'
/processing/output/1/delay_integration/5/frequency	'500'
/processing/output/1/delay_integration/5/q	'1'
/processing/output/1/delay_integration/6/band_bypass	'true'
/processing/output/1/delay_integration/6/frequency	'1000'
/processing/output/1/delay_integration/6/q	'1'
/processing/output/1/delay_integration/7/band_bypass	'true'
/processing/output/1/delay_integration/7/frequency	'2000'
/processing/output/1/delay_integration/7/q	'1'
/processing/output/1/delay_integration/8/band_bypass	'true'
/processing/output/1/delay_integration/8/frequency	'3000'

Output 1 Processing Control Points

Control Point	Default Value
/processing/output/1/delay_integration/8/q	'1'
/processing/output/1/delay_integration/9/band_bypass	'true'
/processing/output/1/delay_integration/9/frequency	'4000'
/processing/output/1/delay_integration/9/q	'1'
/processing/output/1/delay_integration/bypass	'false'
/processing/output/1/delay_integration/polarity_reversal	'false'
/processing/output/1/delay_integration/type	'1'
/processing/output/1/delay_type	'0'
/processing/output/1/eq/1/band_bypass	'false'
/processing/output/1/eq/1/bandwidth	'1'
/processing/output/1/eq/1/frequency	'62'
/processing/output/1/eq/1/gain	'0'
/processing/output/1/eq/10/band_bypass	'false'
/processing/output/1/eq/10/bandwidth	'1'
/processing/output/1/eq/10/frequency	'16000'
/processing/output/1/eq/10/gain	'0'
/processing/output/1/eq/2/band_bypass	'false'
/processing/output/1/eq/2/bandwidth	'1'
/processing/output/1/eq/2/frequency	'125'
/processing/output/1/eq/2/gain	'0'
/processing/output/1/eq/3/band_bypass	'false'
/processing/output/1/eq/3/bandwidth	'1'
/processing/output/1/eq/3/frequency	'250'
/processing/output/1/eq/3/gain	'0'
/processing/output/1/eq/4/band_bypass	'false'
/processing/output/1/eq/4/bandwidth	'1'
/processing/output/1/eq/4/frequency	'500'
/processing/output/1/eq/4/gain	'0'

Output 1 Processing Control Points

Control Point	Default Value
/processing/output/1/eq/5/band_bypass	'false'
/processing/output/1/eq/5/bandwidth	'1'
/processing/output/1/eq/5/frequency	'1000'
/processing/output/1/eq/5/gain	'0'
/processing/output/1/eq/6/band_bypass	'false'
/processing/output/1/eq/6/bandwidth	'1'
/processing/output/1/eq/6/frequency	'2000'
/processing/output/1/eq/6/gain	'0'
/processing/output/1/eq/7/band_bypass	'false'
/processing/output/1/eq/7/bandwidth	'1'
/processing/output/1/eq/7/frequency	'4000'
/processing/output/1/eq/7/gain	'0'
/processing/output/1/eq/8/band_bypass	'false'
/processing/output/1/eq/8/bandwidth	'1'
/processing/output/1/eq/8/frequency	'8000'
/processing/output/1/eq/8/gain	'0'
/processing/output/1/eq/9/band_bypass	'false'
/processing/output/1/eq/9/bandwidth	'1'
/processing/output/1/eq/9/frequency	'12000'
/processing/output/1/eq/9/gain	'0'
/processing/output/1/eq/bypass	'false'
/processing/output/1/equalization_bypass	'false'
/processing/output/1/gain	'-90'
/processing/output/1/highpass/bypass	'true'
/processing/output/1/highpass/frequency	'40'
/processing/output/1/highpass/type	'11'
/processing/output/1/lowpass/bypass	'true'
/processing/output/1/lowpass/frequency	'160'

Output 1 Processing Control Points

Control Point	Default Value
/processing/output/1/lowpass/type	'11'
/processing/output/1/mute	'false'
/processing/output/1/polarity_reversal	'false'
/processing/output/1/solo	'false'
/processing/output/1/unlinked_mute	'false'
/processing/output/1/ushaping/1/frequency	'62'
/processing/output/1/ushaping/1/gain	'0'
/processing/output/1/ushaping/1/slope	'2'
/processing/output/1/ushaping/2/frequency	'250'
/processing/output/1/ushaping/2/gain	'0'
/processing/output/1/ushaping/2/slope	'2'
/processing/output/1/ushaping/3/frequency	'1000'
/processing/output/1/ushaping/3/gain	'0'
/processing/output/1/ushaping/3/slope	'2'
/processing/output/1/ushaping/4/frequency	'4000'
/processing/output/1/ushaping/4/gain	'0'
/processing/output/1/ushaping/4/slope	'2'
/processing/output/1/ushaping/5/gain	'0'
/processing/output/1/ushaping/bypass	'false'
/processing/output/1/variable_eq/bypass	'true'
/processing/output/1/variable_eq/frequency	'1000'
/processing/output/1/variable_eq/q	'1'
/processing/output/1/variable_eq/type	'0'

Matrix

Matrix Processing Control Points

Control Point	Default Value
/processing/matrix/Matrix	''
/processing/matrix/1/1/delay	'0'
/processing/matrix/1/1/delay_type	'0'
/processing/matrix/1/1/gain	'0'
/processing/matrix/1/10/delay	'0'
/processing/matrix/1/10/delay_type	'0'
/processing/matrix/1/10/gain	'0'
/processing/matrix/1/11/delay	'0'
/processing/matrix/1/11/delay_type	'0'
/processing/matrix/1/11/gain	'0'
/processing/matrix/1/12/delay	'0'
/processing/matrix/1/12/delay_type	'0'
/processing/matrix/1/12/gain	'0'
/processing/matrix/1/13/delay	'0'
/processing/matrix/1/13/delay_type	'0'
/processing/matrix/1/13/gain	'0'
/processing/matrix/1/14/delay	'0'
/processing/matrix/1/14/delay_type	'0'
/processing/matrix/1/14/gain	'0'
/processing/matrix/1/15/delay	'0'
/processing/matrix/1/15/delay_type	'0'
/processing/matrix/1/15/gain	'0'
/processing/matrix/1/16/delay	'0'
/processing/matrix/1/16/delay_type	'0'
/processing/matrix/1/16/gain	'0'
/processing/matrix/1/2/delay	'0'
/processing/matrix/1/2/delay_type	'0'

Matrix Processing Control Points

Control Point	Default Value
/processing/matrix/1/2/gain	'0'
/processing/matrix/1/3/delay	'0'
/processing/matrix/1/3/delay_type	'0'
/processing/matrix/1/3/gain	'0'
/processing/matrix/1/4/delay	'0'
/processing/matrix/1/4/delay_type	'0'
/processing/matrix/1/4/gain	'0'
/processing/matrix/1/5/delay	'0'
/processing/matrix/1/5/delay_type	'0'
/processing/matrix/1/5/gain	'0'
/processing/matrix/1/6/delay	'0'
/processing/matrix/1/6/delay_type	'0'
/processing/matrix/1/6/gain	'0'
/processing/matrix/1/7/delay	'0'
/processing/matrix/1/7/delay_type	'0'
/processing/matrix/1/7/gain	'0'
/processing/matrix/1/8/delay	'0'
/processing/matrix/1/8/delay_type	'0'
/processing/matrix/1/8/gain	'0'
/processing/matrix/1/9/delay	'0'
/processing/matrix/1/9/delay_type	'0'
/processing/matrix/1/9/gain	'0'

Processing Beam Control Point

Beam Processing Control Points

Control Point	Default Value
/processing/beam_control_array/1/beam_angle	'15'
/processing/beam_control_array/1/bypass	'true'
/processing/beam_control_array/1/control_type	'0'
/processing/beam_control_array/1/elements_per_output	'1'
/processing/beam_control_array/1/error_code	'1'
/processing/beam_control_array/1/error_string	''
/processing/beam_control_array/1/name	'Array 1'
/processing/beam_control_array/1/number_of_elements	'12'
/processing/beam_control_array/1/product_type	'0'
/processing/beam_control_array/1/starting_element	'1'
/processing/beam_control_array/1/starting_output_number	'1'
/processing/beam_control_array/1/upper_freq_boundary	'400'
/processing/beam_control_array/2/beam_angle	'15'
/processing/beam_control_array/2/bypass	'true'
/processing/beam_control_array/2/control_type	'0'
/processing/beam_control_array/2/elements_per_output	'1'
/processing/beam_control_array/2/error_code	'1'
/processing/beam_control_array/2/error_string	''
/processing/beam_control_array/2/name	'Array 2'
/processing/beam_control_array/2/number_of_elements	'12'
/processing/beam_control_array/2/product_type	'0'
/processing/beam_control_array/2/starting_element	'1'
/processing/beam_control_array/2/starting_output_number	'1'
/processing/beam_control_array/2/upper_freq_boundary	'400'
/processing/beam_control_array/3/beam_angle	'15'
/processing/beam_control_array/3/bypass	'true'
/processing/beam_control_array/3/control_type	'0'

Beam Processing Control Points

Control Point	Default Value
/processing/beam_control_array/3/elements_per_output	'1'
/processing/beam_control_array/3/error_code	'1'
/processing/beam_control_array/3/error_string	''
/processing/beam_control_array/3/name	'Array 3'
/processing/beam_control_array/3/number_of_elements	'12'
/processing/beam_control_array/3/product_type	'0'
/processing/beam_control_array/3/starting_element	'1'
/processing/beam_control_array/3/starting_output_number	'1'
/processing/beam_control_array/3/upper_freq_boundary	'400'
/processing/beam_control_array/4/beam_angle	'15'
/processing/beam_control_array/4/bypass	'true'
/processing/beam_control_array/4/control_type	'0'
/processing/beam_control_array/4/elements_per_output	'1'
/processing/beam_control_array/4/error_code	'1'
/processing/beam_control_array/4/error_string	''
/processing/beam_control_array/4/name	'Array 4'
/processing/beam_control_array/4/number_of_elements	'12'
/processing/beam_control_array/4/product_type	'0'
/processing/beam_control_array/4/starting_element	'1'
/processing/beam_control_array/4/starting_output_number	'1'
/processing/beam_control_array/4/upper_freq_boundary	'400'

SYSTEM

System Control Points

Control Point	Default Value
/system/access/1/code	''
/system/access/1/name	'Default'

System Control Points

Control Point	Default Value
/system/access/1/privilege	'9223372036854775807'
/system/access/2/code	''
/system/access/2/name	''
/system/access/2/privilege	'0'
/system/access/3/code	''
/system/access/3/name	''
/system/access/3/privilege	'0'
/system/access/4/code	''
/system/access/4/name	''
/system/access/4/privilege	'0'
/system/access/5/code	''
/system/access/5/name	''
/system/access/5/privilege	'0'
/system/access/6/code	''
/system/access/6/name	''
/system/access/6/privilege	'0'
/system/access/7/code	''
/system/access/7/name	''
/system/access/7/privilege	'0'
/system/access/8/code	''
/system/access/8/name	''
/system/access/8/privilege	'0'
/system/diagnostic/glitch_test/never_clear_meters	'false'
/system/firmware/code	'0'
/system/firmware/status	'0'
/system/firmware/status_string	''
/system/hardware/front_panel_lockout	'false'
/system/meter/demo/active	'false'

System Control Points

Control Point	Default Value
/system/mode/running	'true'
/system/network/static/gateway	''
/system/network/static/ip_address	''
/system/network/static/net_mask	''
/system/network/type	'1'

DEVICE

Device Preferences

Control Point	Default Value
/device/preferences/brightness	'1'
/device/preferences/display_color	'3'

Device Sim Settings

Control Point	Default Value
/device/sim/bus_address	'10'
/device/sim/configured	'false'
/device/sim/mute_relay/1	'true'
/device/sim/mute_relay/2	'true'
/device/sim/mute_relay/3	'true'
/device/sim/mute_relay/4	'true'
/device/sim/probe/1/channel	'1'
/device/sim/probe/1/point	'2'
/device/sim/probe/2/channel	'1'
/device/sim/probe/2/point	'4'

Input

Input 1 Device Control Points

Control Point	Default Value
/device/input/1/aes/enable_asrc	'true'
/device/input/1/avb_sample_sync	'false'
/device/input/1/input_link_group	'0'
/device/input/1/isolate	'false'
/device/input/1/mode	'2'
/device/input/1/name	''
/device/input/1/scale	'26'
/device/input/1/select	'false'

Input Link Group Control Points

Control Point	Default Value
/device/input_link_group/1/bypass	'true'
/device/input_link_group/1/name	'Group 1'
/device/input_link_group/2/bypass	'true'
/device/input_link_group/2/name	'Group 2'
/device/input_link_group/3/bypass	'true'
/device/input_link_group/3/name	'Group 3'
/device/input_link_group/4/bypass	'true'
/device/input_link_group/4/name	'Group 4'

Input AVB Controller Mode

Control Point	Default Value
/device/input/avb/controller_mode	'0'

Output

Output 1 Device Control Points

Control Point	Default Value
/device/output/1/isolate	'false'
/device/output/1/mute_relay	'false'
/device/output/1/name	''
/device/output/1/output_link_group	'0'
/device/output/1/scale	'26'
/device/output/1/select	'false'
/device/output/1/sim/trim	'0'

Output Link Group Control Points

Control Point	Default Value
/device/output_link_group/1/bypass	'true'
/device/output_link_group/1/name	'Group 1'
/device/output_link_group/2/bypass	'true'
/device/output_link_group/2/name	'Group 2'
/device/output_link_group/3/bypass	'true'
/device/output_link_group/3/name	'Group 3'
/device/output_link_group/4/bypass	'true'
/device/output_link_group/4/name	'Group 4'
/device/output_link_group/5/bypass	'true'
/device/output_link_group/5/name	'Group 5'
/device/output_link_group/6/bypass	'true'
/device/output_link_group/6/name	'Group 6'
/device/output_link_group/7/bypass	'true'
/device/output_link_group/7/name	'Group 7'
/device/output_link_group/8/bypass	'true'
/device/output_link_group/8/name	'Group 8'

Output AVB Presentation Time

Control Point	Default Value
/device/output/avb/presentation_time	'2000000'

Output AES Settings

Control Point	Default Value
/device/output/aes/disable_high8ch_tx	'false'
/device/output/aes/disable_low8ch_tx	'false'
/device/output/aes/enable_asrc	'true'

Output Atmospheric Settings

Control Point	Default Value
/device/output/atmospheric/altitude	'0'
/device/output/atmospheric/humidity	'50'
/device/output/atmospheric/temperature	'293.15'

PROJECT

Project Settings

Control Point	Default Value
/project/boot_snapshot_id	'3'
/project/metadata/content_type	'2'
/project/metadata/schema_version	'6'
/project/name	'Default'
/project/project_firmware_version	'none'
/project/snapshot/0/comment	'All settings are set to default values'
/project/snapshot/0/created	'2016-11-08 23:06:10'
/project/snapshot/0/last_updated	'2016-11-08 23:06:10'
/project/snapshot/0/locked	'true'
/project/snapshot/0/modified	'false'
/project/snapshot/0/name	'Factory Defaults'
/project/snapshot/1/comment	''
/project/snapshot/1/created	'2017-09-10 22:07:54'
/project/snapshot/1/last_updated	'2017-09-10 22:07:54'
/project/snapshot/1/locked	'false'
/project/snapshot/1/modified	'false'
/project/snapshot/1/name	'My Snapshot'

ENTITY

Entity Settings

Control Point	Default Value
/entity/entity_id	'0x1cabfffe00587c'
/entity/entity_model_id	'0x1cabb804004001'
/entity/entity_name	''
/entity/firmware_version	'1.3.0-R1-1708311319'
/entity/group_name	''
/entity/input_channel_count	'64'
/entity/input_stream/1/channel/1/name	'Input 1'
/entity/input_stream/1/channel/2/name	'Input 2'
/entity/input_stream/1/channel/3/name	'Input 3'
/entity/input_stream/1/channel/4/name	'Input 4'
/entity/input_stream/1/channel/5/name	'Input 5'
/entity/input_stream/1/channel/6/name	'Input 6'
/entity/input_stream/1/channel/7/name	'Input 7'
/entity/input_stream/1/channel/8/name	'Input 8'
/entity/input_stream/1/channel_count	'8'
/entity/input_stream/1/name	'Sink-1'
/entity/input_stream/1/sample_rate	'96000'
/entity/input_stream/1/stream_format	'45040429753698304'
/entity/output_channel_count	'24'
/entity/output_stream/1/channel/1/name	''
/entity/output_stream/1/channel/2/name	''
/entity/output_stream/1/channel/3/name	''
/entity/output_stream/1/channel/4/name	''
/entity/output_stream/1/channel/5/name	''
/entity/output_stream/1/channel/6/name	''
/entity/output_stream/1/channel/7/name	''
/entity/output_stream/1/channel/8/name	''

Entity Settings

Control Point	Default Value
/entity/output_stream/1/channel_count	'8'
/entity/output_stream/1/name	'Outputs 1-8'
/entity/output_stream/1/sample_rate	'96000'
/entity/output_stream/1/stream_format	'45040429753698304'
/entity/serial_number	'16342726'

APPENDIX C: REGULAR EXPRESSION COMMANDS

Examples of commands using regular expressions

Command	Type	String
List all Control Points	ASCII MSG	/.*
	ASCII Hex	2f 2e 2a 0d 0a
	OSC MSG	/.*,
	UDP OSC	2f 2e 2a 00 2c 00 00 00
	TCP OSC	00 00 00 08 2f 2e 2a 00 2c 00 00 00
Unmute all outputs method 1	ASCII MSG	/processing/output/([1-9]|1[0-6])/mute=false
	ASCII Hex	2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 28 5b 31 2d 39 5d 7c 31 5b 30 2d 36 5d 29 2f 6d 75 74 65 3d 66 61 6c 73 65 0d 0a
	OSC MSG	/processing/output/([1-9]|1[0-6])/mute, F
	UDP OSC	2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 28 5b 31 2d 39 5d 7c 31 5b 30 2d 36 5d 29 2f 6d 75 74 65 00 00 2c 46 00 00
	TCP OSC	00 00 00 2c 2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 28 5b 31 2d 39 5d 7c 31 5b 30 2d 36 5d 29 2f 6d 75 74 65 00 00 2c 46 00 00
Unmute all outputs method 2	ASCII MSG	/processing/output/\d+/mute=false
	ASCII Hex	2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 5c 64 2b 2f 6d 75 74 65 3d 66 61 6c 73 65 0d 0a
	OSC MSG	/processing/output/\d+/mute, F
	UDP OSC	2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 5c 64 2b 2f 6d 75 74 65 00 2c 46 00 00
	TCP OSC	00 00 00 20 2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 5c 64 2b 2f 6d 75 74 65 00 2c 46 00 00

Examples of commands using regular expressions

Command	Type	String
Unmute outputs1-8	ASCII MSG	/processing/output/([1-8])/mute=false
	ASCII Hex	2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 28 5b 31 2d 38 5d 29 2f 6d 75 74 65 3d 66 61 6c 73 65 0d 0a
	OSC MSG	/processing/output/([1-8])/mute, F
	UDP OSC	2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 28 5b 31 2d 38 5d 29 2f 6d 75 74 65 00 2c 46 00 00
	TCP OSC	00 00 00 24 2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 28 5b 31 2d 38 5d 29 2f 6d 75 74 65 00 2c 46 00 00
Unmute outputs 9-16	ASCII MSG	/processing/output/([9]|1[0-6])/mute=false
	ASCII Hex	2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 28 5b 39 5d 7c 31 5b 30 2d 36 5d 29 2f 6d 75 74 65 3d 66 61 6c 73 65 0d 0a
	OSC MSG	/processing/output/([9]|1[0-6])/mute
	UDP OSC	2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 28 5b 39 5d 7c 31 5b 30 2d 36 5d 29 2f 6d 75 74 65 00 00 00 00 2c 46 00 00
	TCP OSC	00 00 00 2c 2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 28 5b 39 5d 7c 31 5b 30 2d 36 5d 29 2f 6d 75 74 65 00 00 00 00 2c 46 00 00
Unmute a single digit output (d =1,2,3...9)	ASCII MSG	/processing/output/\d/mute=false
	ASCII Hex	2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 5c 64 2f 6d 75 74 65 3d 66 61 6c 73 65 0d 0a
	OSC MSG	/processing/output/\d/mute, F
	UDP OSC	2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 5c 64 2f 6d 75 74 65 3d 66 61 6c 73 65 00 00 00 00 2c 46 00 00
	TCP OSC	00 00 00 28 2f 70 72 6f 63 65 73 73 69 6e 67 2f 6f 75 74 70 75 74 2f 5c 64 2f 6d 75 74 65 3d 66 61 6c 73 65 00 00 00 00 2c 46 00 00
Mute input 1 and output 1	ASCII MSG	/processing/(in|out)put/1/mute=true
	ASCII Hex	2f 70 72 6f 63 65 73 73 69 6e 67 2f 28 69 6e 7c 6f 75 74 29 70 75 74 2f 31 2f 6d 75 74 65 3d 74 72 75 65 0d 0a
	OSC MSG	/processing/(in|out)put/1/mute, T
	UDP OSC	2f 70 72 6f 63 65 73 73 69 6e 67 2f 28 69 6e 7c 6f 75 74 29 70 75 74 2f 31 2f 6d 75 74 65 3d 74 72 75 65 00 2c 54 00 00
	TCP OSC	00 00 00 28 2f 70 72 6f 63 65 73 73 69 6e 67 2f 28 69 6e 7c 6f 75 74 29 70 75 74 2f 31 2f 6d 75 74 65 3d 74 72 75 65 00 2c 54 00 00

Meyer Sound Laboratories Inc.
2832 San Pablo Ave.
Berkeley, CA 94702

www.meyersound.com
T: +1 510 486.1166
F: +1 510 486.8356

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