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# Rivendell Core Audio Control Protocol

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## Overview

Formats used for audio storage are Broadcast Wave Format (BWF), as specified in EBU Tech Pub 3285 with annexes.

Commands to the Core Audio Engine are passed by means of a TCP SOCK\_STREAM connection to TCP port 5005 on the host server.

Commands have the following general syntax:

*cmd-code* [*arg*] [...]!

*cmd-code*                      A two letter command code, describing the generic action to be performed

*arg*                              Zero or more arguments, delimited by spaces or, if the last argument, by ! (see below)

!                                  The ASCII character 33, indicating the end of the command sequence.

Unless otherwise specified, the engine will echo back the command with a + or - before the !, to indicate the success or failure of the command execution.

## Connection Management

### Password

Pass a password to the server for authentication.

**PW *password*!**

*password*                      A password to be supplied before granting the client access.

Returns: PW +! to indicate success, PW -! to indicate failure

### Drop Connection

Drop the TCP connection and end the session.

**DC!**

## Playback Operations

### Load Playback

Prepare an audio interface to play an audio file, while also muting all stream-to-port mixer controls for the stream that is internally allocated by **caed(8)**.

**LP *serial card-num port-num name*!**

*serial*                          32 bit Unsigned integer, unique within the scope of the TCP connection. Used to refer to this playback session in subsequent calls to CAE.

*card-num*                      The number of the audio adapter to use.

*port-num*                      The output port number of the audio adapter to use.

*name*                            The base name of an existing file in the audio storage filesystem.

Returns: LP *serial card-num port-num name*!

### Unload Playback

Free an audio playback interface.

**UP *serial*!**

*serial*                The *serial* value used in the corresponding **Load Playback** command.

## Play Position

Position the playback pointer.

**PP *serial position*!**

*serial*                The *serial* value used in the corresponding **Load Playback** command.

*position*             Position in file, in milliseconds.

## Play

Play the loaded file from the current position.

**PY *serial length speed pitch-flag*!**

*serial*                The *serial* value used in the corresponding **Load Playback** command.

*length*               Playback length in milliseconds, relative to the current start position.

*speed*                Playback speed in thousandths of a percent. 100000 = normal speed.

*pitch-flag*           Controls whether audio pitch changes with speed or not. 0 = no, 1 = yes.

## Stop Playback

Stop playback of the specified playback interface.

**SP *serial*!**

*serial*                The *serial* value used in the corresponding **Load Playback** command.

## Set Output Volume

Set the volume of an output playback.

**OV *serial level*!**

*serial*                The *serial* value used in the corresponding **Load Playback** command.

*level*                The level, in hundredths of a dB.

## Fade Output Volume

Transition the volume of an output playback over time.

**FV *serial level length*!**

*serial*                The *serial* value used in the corresponding **Load Playback** command.

*level*                The level, in hundredths of a dB.

*length*               The length of the transition, in milliseconds.

## Timescaling Support

Query CAE if *card-num* supports timescaling.

**TS** *card-num*!

*card-num*                      The number of the audio adapter to query.

Returns: TS *card-num* +|- !

## Record Operations

### Load Recording

Prepare an audio interface to capture an audio file.

**LR** *card-num port-num coding channels samp-rate bit-rate name*!

*card-num*                      The number of the audio adapter to use.

*port-num*                      The input port number to use. This is relative to the audio adapter selected.

*coding*                        0 = PCM16, 1 = MPEG Layer 1, 2 = MPEG Layer 2, 4 = PCM24

*channels*                      1 = Mono, 2 = Stereo

*samp-rate*                      Sample Rate in samples/sec. 32000, 44100 or 48000 supported.

*bit-rate*                        MPEG Bit Rate. For PCM, this should be zero.

*name*                            The base name of a file in the audio storage filesystem. If the file already exists, it will be overwritten, otherwise it will be created.

#### Note

Rivendell always assumes that the input port number specified in *port-num* corresponds to the recording stream number used internally by **caed**(8).

### Unload Recording

Free an audio capture interface.

**UR** *card-num port-num*!

*card-num*                      The *card-num* value used in the corresponding **Load Recording** command.

*port-num*                      The *port-num* value used in the corresponding **Load Recording** command.

Returns: UR *card-num port-num length*!

*length*                        Length of recording, in mS.

### Record

Record a loaded file.

**RD *card-num port-num length threshold*!**

*card-num*            The *card-num* value used in the corresponding **Load Recording** command.

*port-num*           The *port-num* value used in the corresponding **Load Recording** command.

*length*            Length of time to record in milliseconds. If zero, record until sent a **Stop Recording** command.

*threshold*        Threshold of audio detected at which to start recording, in 1/100 dBfs. If '0', start immediately.

Returns: When recording actually begins, a Record Start (RS) confirmation will be echoed back. If record time expires a Stop Record (SR) confirmation will be echoed back.

## Stop Recording

Stop recording of the specified record interface.

**SR *card-num port-num*!**

*card-num*           The *card-num* value used in the corresponding **Load Recording** command.

*port-num*           The *port-num* value used in the corresponding **Load Recording** command.

## Record Start (Receive Only)

Receive-only signal to indicate recording has actually started (as with a VOX event, where actual recording may begin some time after the interface is placed into record).

**RS *card-num port-num*!**

*card-num*           The *card-num* value used in the corresponding **Load Recording** command.

*port-num*           The *port-num* value used in the corresponding **Load Recording** command.

## Set Input Volume

Set the volume of an input stream.

**IV *card-num port-num level*!**

*card-num*           The *card-num* value used in the corresponding **Load Recording** command.

*port-num*           The *port-num* value used in the corresponding **Load Recording** command.

*level*              The level, in hundredths of a dB.

## Set Input Vox Level

Set the VOX threshold level of an input stream.

**IX *card-num port-num level*!**

*card-num*           The *card-num* value used in the corresponding **Load Recording** command.

|                 |  |
|-----------------|--|
| <i>port-num</i> | The <i>port-num</i> value used in the corresponding <b>Load Recording</b> command. |
| <i>level</i>    | The level, in hundreths of a dB.   |

## Global Mixer Operations

These commands operate independently of any specific playback or recording operation.

### Set Output Level

Set the gain level of an output port.

**OL *card-num port-num level*!**

|                 |   |
|-----------------|---|
| <i>card-num</i> | The number of the audio adapter to use.                                 |
| <i>port-num</i> | The port number to use. This is relative to the audio adapter selected. |
| <i>level</i>    | The level, in hundreths of a dB.  |

### Set Output Mode

Set the mode of an output port.

**OM *card-num port-num mode*!**

|                 |  |
|-----------------|--|
| <i>card-num</i> | The number of the audio adapter to use.  |
| <i>port-num</i> | The output port number to use. This is relative to the audio adapter selected. |
| <i>mode</i>     | The mode, as follows:  |
| 0               | Normal   |
| 1               | Swap left and right channels   |
| 2               | Left audio on both channels  |
| 3               | Right audio on both channels   |

### Set Input Level

Set the gain level of an input port.

**IL *card-num port-num level*!**

|                 |   |
|-----------------|---|
| <i>card-num</i> | The number of the audio adapter to use.                                       |
| <i>port-num</i> | The input port number to use. This is relative to the audio adapter selected. |
| <i>level</i>    | The level, in hundreths of a dB.  |

### Set Input Mode

Set the mode of an input port.

**IM *card-num port-num mode*!**

|                 |   |                              |
|-----------------|---|------------------------------|
| <i>card-num</i> | The number of the audio adapter to use.                                       |                              |
| <i>port-num</i> | The input port number to use. This is relative to the audio adapter selected. |                              |
| <i>mode</i>     | The mode, as follows:   |                              |
|                 | 0   | Normal                       |
|                 | 1   | Swap left and right channels |
|                 | 2   | Left audio on both channels  |
|                 | 3   | Right audio on both channels |

## Set Input Type

Set the signal type of an input port.

**IT *card-num port-num type*!**

|                 |   |              |
|-----------------|---|--------------|
| <i>card-num</i> | The number of the audio adapter to use.                                 |              |
| <i>port-num</i> | The port number to use. This is relative to the audio adapter selected. |              |
| <i>type</i>     | The mode, as follows:   |              |
|                 | 0   | Analog       |
|                 | 1   | AES3 Digital |

## Get Input Status

Request the status of an input port.

**IS *card-num port-num*!**

|                 |   |  |
|-----------------|---|--|
| <i>card-num</i> | The number of the audio adapter to use.                                 |  |
| <i>port-num</i> | The port number to use. This is relative to the audio adapter selected. |  |

Returns: IS *card-num port-num status*!

|               |                         |         |
|---------------|-------------------------|---------|
| <i>status</i> | The status, as follows: |         |
|               | 0                       | OK      |
|               | 1                       | No Sync |

## Set Audio Passthrough Level

Set the gain of an audio passthrough path.

**AL *card-num input-num output-num level*!**

|                 |   |  |
|-----------------|---|--|
| <i>card-num</i> | The number of the audio adapter to use. |  |
|-----------------|---|--|

|                   |   |
|-------------------|---|
| <i>input-num</i>  | The input number to use. This is relative to the audio adapter selected.  |
| <i>output-num</i> | The output number to use. This is relative to the audio adapter selected. |
| <i>level</i>      | The level, in hundreths of a dB.  |

## Set Clock Source

Set source of an audio adapter's sample clock. Relevant only for cards that feature AES3 inputs.

**CS *card-num input-num*!**

|                  |  |
|------------------|--|
| <i>card-num</i>  | The number of the audio adapter to use.                                  |
| <i>input-num</i> | The input number to use. This is relative to the audio adapter selected. |

## Meter and Positioning Updates

### Meter Enable

Set UDP port to which to send meter update messages for the specified card(s). If set to a non-zero UDP port, update messages (see below) from the specified cards will be sent to that port.

**ME *udp-port card0 ..*!**

|                 |  |
|-----------------|--|
| <i>udp-port</i> | UDP port number.                             |
| <i>card0</i>    | Audio card number for which to send updates. |

### Meter Status Updates

The following messages are sent by CAE to indicate audio levels and playout positions. They are sent to the UDP port requested by the Meter Enable ['ME'] command.

### Port Meter Levels

Current meter levels of an input or output port.

**ML *type card-num port-num left-lvl right-lvl*!**

|                  |   |        |
|------------------|---|--------|
| <i>type</i>      | Type of meter.                          |        |
|                  | I                                       | Input  |
|                  | O                                       | Output |
| <i>card-num</i>  | The number of the audio adapter to use. |        |
| <i>port-num</i>  | The port number on the audio adapter.   |        |
| <i>left-lvl</i>  | Left channel level, in 100ths of dBFS.  |        |
| <i>right-lvl</i> | Right channel level, in 100ths of dBFS. |        |



## Output Stream Meter Levels

Send current meter level of the output stream.

*MO serial left-lvl right-lvl!*

*serial*                      The serial number of the playback event, from the **Load Playback** call.

*left-lvl*                    Left channel level, in 100ths of dBFS.

*right-lvl*                   Right channel level, in 100ths of dBFS.

## Output Play Position

Output play position.

*MP serial pos!*

*serial*                      The serial number of the playback event, from the **Load Playback** call.

*pos*                          The play position in mS.