CLOUD CDI-S100

Serial Control Protocol

INTRODUCTION

This document describes the serial protocol used to communicate with the Cloud CDI-S100 serial control card for the Cloud CX462 mixer.
Details for configuring the Serial Interface are in the CDI-S100 installation guide.

Throughout this document all message text is shown in a `mono spaced font.`

MESSAGE STRUCTURE

There are three types of messages in the CDI-S100 control protocol;
- Control messages.
- Response messages.
- Error messages.

Control messages are sent to the CDI-S100. Response and error messages are transmitted from the CDI-S100 in reply to a control message.

All control messages use upper case letters; all response messages use lower case letters.

The message body is enclosed within a header character (`"<"`) and a terminator sequence (`"/>"`). The CDI-S100 will reset its message decoding software upon reception of a header character, discarding any previously un-decoded partial messages. The CDI-S100 will start to decode a message upon reception of the terminator sequence. If the decoded message is valid it is executed and a response message returned. An error message is returned if the message cannot be decoded or if the command cannot be executed.

THE CONTROL MESSAGE

Control messages are sent to the CDI-S100 in order to perform a function. The control message has two fields separated by a comma. They are called the destination field and the command field.

`<DESTINATION,COMMAND/>`

DESTINATION FIELD

The destination field is an abbreviated description of the mixer section the command is intended to affect. The field consists of an optional single character **default modifier**, the two character **main destination** and an optional one character **sub destination**. The sub destination is separated from the main destination by a full stop (period).

- **DEFAULT MODIFIER.** The character `"D"` is used to indicate the message is to set a default value.
- **MAIN DESTINATION.** The CDI-S100 has three possible main destinations;
  1. The music channel.
  2. The microphone channel.
  3. The System.

- **SUB DESTINATION.** The sub destination is used to address the message to a particular part of a main destination. In the CDI-S100 only the microphone destination can have a sub destination. The only sub destinations available are the individual microphones.

Examples
- `<MU,M/>`   A command is sent to the music main destination.
- `<MI.2,M/>`   A command is sent to the mic 2 sub destination.
- `<DMI,M/>`   A Default command is sent to the mic main destination.
- `<DMI.2,M/>`   A Default command is sent to the mic 2 sub destination.

COMMAND FIELD

The command field identifies the command to be performed on the destination. The command field may have up to three parts; the **command identifier**, the **command modifier** and the **command value**. No white space is permitted between these parts.

- **COMMAND IDENTIFIER**. This part is always required. It has a single alphabetic character to identify the command type.
- **COMMAND MODIFIER.** This part is optional depending on the command type. Some commands take no modifier, some commands always take a modifier and some commands can have the option of a modifier or none. The modifier is a single alphabetic character.
- **COMMAND VALUE**. This part is optional depending on the command type and modifier. The command value part is numeric and is to give a variable value to the command. In ASCII Level Mode the command value is decimal ASCII text I.E. "52" gives the command a value of 52. In Byte Level Mode the command value is a single character; the value given to the command is the byte value of the character I.E. "A" gives the command a value of 65. Non printable characters may be sent E.G. "BEL" = 7, "LF" = 12, to give a range of 0 to 255.

Examples
- `<MU,M/>`   The command identifier is "M".
- `<MU,SD/>`   The command identifier is "S", the command modifier is "D".
- `<MU,LA22/>`   The command identifier is "L", the command modifier is "A", the command value using ASCII Level Mode is "22".
- `<MU,LA%/>`   The command identifier is "L", the command modifier is "A", the command value using Byte Level Mode is "%" which give a value of 37.

DESTINATION FIELD IN DETAIL

DEFAULT MODIFIER

The default modifier is used to set the default value of a parameter. The default values are loaded at initialisation when the initialisation mode is set to default mode. If no default value has been set for a parameter the factory default value for that parameter is used.

MAIN DESTINATIONS
MUSIC
Used for setting the music channel's source, level and mute status.
The identifier is: `MU`.

MICROPHONE
Used for setting the master level and mute status of the microphone channel. The individual microphones can be accessed as a sub destination to allow them to be muted or opened. The level of the individual microphones cannot be controlled.
The identifier is: `MI`.

SYSTEM
Used for setting the power up mode system parameter, the value mode system parameter, and to command a system reset.
The identifier is: `SY`.

SUB DESTINATIONS
INDIVIDUAL MICROPHONES
This sub destination allows access to the mute status of the four individual microphones. The sub destination identifier is the number of the individual microphone.
Valid main destination and sub destination identifier combinations are `MI.1, MI.2, MI.3 and MI.4`.

COMMAND FIELD IN DETAIL
Please see the examples table.

LEVEL "L"
The command is used to set the level of the Music or Microphone channel. The level command requires a modifier. These are (`"A"`) for **Absolute** value (`"U"`) for **Up**, and (`"D"`) for **Down**. All forms take a numeric value. An **Absolute** value is the attenuation required in half dB steps. E.G. an **Absolute** value of 20 represents 20 half dB attenuation or -10dB. An **Up** or **Down** value is the change in attenuation in half dB steps. E.G. an **Up** value of ten will increase the level ten half dB steps or 5dB. Any attempt to set a value greater than the maximum attenuation of 90dB will set the mute state. The response message is always a lower case version of an **Absolute** Level command; this is so that the new level value can be returned in reply to the **Up** or the **Down** command.

MUTE "M"
OPEN "O"
These commands change the mute status and are available to the music destination, microphone destination and the individual microphone sub destinations. The command takes no modifier or value. The response message is a lower case version of the control message.

SOURCE "S"

This command is only available to the Music destination.
The source command requires a modifier. These are ("A") for **Absolute** value ("U") for **Up**, and ("D") for **Down**. Only the form with the **Absolute** modifier takes a numeric value which is the line number to select; values can be in the range 0 to 6. A value of 0 selects none of the line inputs. With the **Up** or the **Down** modifier no value is required as the increment or decrement step is always 1. The response message is always a lower case version of an **Absolute** Source command; this is so that the new source value can be returned in reply to the **Up** or the **Down** command.

SYSTEM LEVEL MODE "L"

This command is only available to the system destination ("SY"). It always takes a modifier and takes no value. There are two modifiers ("C") for **ASCII** level mode and ("B") for **Byte** level mode. The response message is a lower case version of the original message.

SYSTEM INITIALISATION MODE "I"

This command is only available to the system destination ("SY"). The command is used to set the Initialisation mode of the CDI-S100.
The command must have a modifier to set the boot mode to **Default** mode ("D") or **Last configuration** mode ("P" for previous). The response message is a lower case version of the control message.

SYSTEM RESET "R"

This command is only available to the system destination ("SY"). It has no modifiers and takes no value. The command causes the CDI-S100 to reset all of its parameters to factory settings. Microphone and Music level is set at -90dB, Music source is set at line 1, all Muting is off, Level mode is set to **ASCII** and Initialisation mode is set to **Default**. The response message is "<sy,r/>".

THE RESPONSE MESSAGE

The response message is the CDI-S100's reply to a valid message. Response messages are always in lower case. For Mute, Open and commands sent to the System destination the response messages are a lower case version of the message sent. The response message confirms the new state. For Level and Source commands the response message confirms the new value that has been set and the response message is always a lower-case message of the **Absolute** command required to set the new value.

Examples

- <MU,LA12/>   Set the music level to 12.
- <mu,la12/>   Response returns the new value of music level.
- <MU,LU3/>   Increment the music level by 3.
- <mu,la9/>   Response returns the new value of music level.

THE ERROR MESSAGE

The error message is the CDI-S100's reply to an invalid message.
The error message is `<*/>`.

Table of Commands

Command		Identifier	Example Messages		
			Music	**Microphone**	**Individual Microphone**
Mute		M	`<MU,M/>`	`<MI,M/>`	`<MI.1,M/>`
Open		O	`<MU,O/>`	`<MI,O/>`	`<MI.2,O/>`
Source Select	Up	SU	`<MU,SU/>`	**NA**	**NA**
	Down	SD	`<MU,SD/>`		
	Absolute	SA	`<MU,SA3/>`		
Level	Up	LU	`<MU,LU5/>`	`<MI,LU5/>`	**NA**
	Down	LD	`<MU,LD4/>`	`<MI,LD4/>`	
	Absolute	LA	`<MU,LA22/>`	`<MI,LA22/>`	
Default Commands					
Level		D[dst],LA	`<DMU,LA35/>`	`<DMI,LA40/>`	**NA**
Source		D[dst],SA	`<DMU,SA2/>`	**NA**	**NA**
Mute		D[dst],M	`<DMU,M/>`	`<DMI,M/>`	`<DMI.3,M/>`
Open		D[dst],O	`<DMU,O/>`	`<DMI,O/>`	`<DMI.2,O/>`
System Commands					
			System Destination		
Reset		R	`<SY,R/>`		
Initialisation Mode	Previous	IP	`<SY,IP/>`		
	Default	ID	`<SY,ID/>`		
Level Mode	ASCII	LC	`<SY,LC/>`		
	Byte	LB	`<SY,LB/>`		

EXAMPLES

Each example has a typical CDI-S100 reply in red.

Music Level
Set the music level.

`<MU,LA12/><mu,la12/>`	(* Music level to 12. (-6dB)
`<MU,LU7/><mu,la5/>`	(* Music level up by 7 (Up 3.5 dB to -2.5dB).
`<MU,LD3/><mu,la8/>`	(* Music level down by 3 (Down 1.5 dB to -4 dB).

Music Mute/ Open

`<MU,M/><mu,m/>`	(* Music mute On.
`<MU,O/><mu,o/>`	(* Music mute Off.

Music Source
Set the music source.

`<MU,SA2/><mu,sa2/>`	(* Music source to 2.
`<MU,SD/><mu,sa1/>`	(* Music source down.
`<MU,SU/><mu,sa2/>`	(* Music 1 source up.

Microphone Level
Set the microphone level.

`<MI,LA12/><mi,la12/>`	(* Microphone level to 12 (-6dB).
`<MI,LU7/><mi,la5/>`	(* Microphone level up by 7 (Up 3.5 dB to -2.5 dB).
`<MI,LD3/><mi,la8/>`	(* Microphone level down by 3 (Down 1.5 db to -4dB).

Microphone Mute/ Open

```
<MI,M/><mi,m/>          (* Microphone mute On.
<MI,O/><mi,o/>          (* Microphone mute Off.
<MI.4,M/><mi.4,m/>      (* Mute microphone 4.
<MI.1,O/><mi.1,o/>      (* Open microphone 1.
```

Defaults

Defaults are available to commands to the Music and Microphone destinations and to the individual microphone sub destinations.

```
<DMU,LA2/><dmu,la2/>    (* Default music level set to 2.
<DMU,SA3/><dmu,sa3/>    (* Default music source set to 3.
<DMU,M/><dmu,m/>        (* Default music mute state set to on.
<DMU,O/><dmu,o/>        (* Default music mute state set to off.
<DMI,LA31/><dmi,la31/>  (* Default microphone level set to 31.
<DMI,M/><dmi,m/>        (* Default microphone mute state set to on.
<DMI,O/><dmi,o/>        (* Default microphone mute state set to off.
<DMI.3,M/><dmi.3,m/>    (* Default microphone 3 mute state set to on.
<DMI.2,O/><dmi.2,o/>    (* Default microphone 3 mute state set to off.
```

System Commands

Power up Mode (initialisation)

```
<SY,ID/><sy,id/>        (* set power up mode to default.
<SY,IP/><sy,ip/>        (* set power up mode to last (previous hence the 'P' ).
```

Level

```
<SY,LC/><sy,lc/>        (* Set Levels encoding to ASCII.
<SY,LB/><sy,lb/>        (* Set Levels encoding to Byte.
```

Reset

```
<SY,R/><sy,r/>          (* Reset to factory settings.
```