

**Serial protocol description  
for Lyngdorf Audio CD-1**

## RS232 Control Codes

Lyngdorf Audio products utilizes RS232 communication channel to communicate with PS and other units. To send data or commands to the device, PC software sends variable length data packet. Each packet consists of N bytes. Packets are structured in the following way:

Byte #0 = **N** - number of bytes in the packet  
 Byte #1 = **A0** - Least significant address byte  
 Byte #2 = **A1** - Most significant address byte  
 Byte #3 = **CC** - Command code byte  
 Byte #4 = **D0** - First data byte  
 Byte #5 = **D1** - Second data byte  
 ....  
 Byte #(N-2) = Last data byte  
 Byte #(N-1) = Check sum byte

All bytes are copied into COMM\_TxBuffer() and then transmitted. Last byte contains packets check sum. Check sum is computed in the following way:

```
Check_Sum = 0;
For(i=0;i<N-1;i++){
  Check_Sum = Check_Sum + COMM_TxBuffer(i);
}
Check_Sum = Check_Sum & 0xFF;
```

```
COMM_TxBuffer(N-1)= Check;
```

All Lyngdorf components connected to the PC will receive transmitted packed. The only component that will respond to the received message is the one that matches its internal address with the received one. All others will ignore entire packet. Addressed component could respond by sending a packet of its own to acknowledge received packet, or send back requested information, or not to respond at all depending on the received command code.

## Product device code

The different PROD\_DEV\_CODE defined in sysinfo.h are:

```
4:      CD-1
```

## Examples

This is commands for TDAI 2200 with device address 1:

Command	TX (Hex)	RX (Hex)	Comments
Power Off	06 01 00 75 00 7C	-	No ACK returned
Power On	06 01 00 75 01 7D	-	No ACK returned
Set volume to 40.0 dB	07 01 00 70 90 01 09	02 AA	
Selecting input A1	06 01 00 72 01 7A	02 AA	
Selecting input D1	06 01 00 71 01 79	02 AA	

To get information from the TDAI 2200 here's the command:

```
TX: 05 01 00 C8 CE
```

The amplifier could reply reply:

```
RX: 19 01 26 02 00 26 02 E7 03 05 01 01 00 00 00 00 00 00 00 00 00 23 07 85
```

Much information can be retrieved from the reply (see documentation for command 200 (Hex C8)).

**RS232 Control Codes overview / CD-1**

Command	Code
Communication test	1
Toggle power	16
Power on command	17
Power off command	18
IR enable command	22
IR disable command	23
IR toggle command	24
Volume up command	25
Set Address	67
Show Software version	68
Send Default to EEPROM	73
CD Play/Pause	140
CD Stop	141
CD Eject	142
CD Skip Left	143
CD Skip Right	144
CD Scan Left Start	145
CD Scan Right Start	146
CD Scan Stop	147
CD Select Track	148
CD Set Repeat	149
CD Toggle Repeat	150
CD Set Random	151
CD Toggle Random	152
CD AB Repeat	153
CD Set Sample rate	154
CD Set DAC Gain	155
Get CD State (incl. TOC)	156

<b>Communication Test</b>	<b>CC = 1</b>
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This command is used to test RS232 communication channel. It can be used to detect if a Lyngdorf component with specified address is connected to PC.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0	A1
3	1	CC – command code
4	7	Check sum

Received packet:

Byte#	Value	Description
0	2	Packet size
1	0xaa	Acknowledgement byte

If received packet is not equal to above description communication error has occurred.

**Note:** Device address is calculated as:

$$\text{Device Address} = 256 * A1 + A0$$

<b>CD Play/Pause</b>	<b>CC = 140</b>
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CD-1 command.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0	A1
3	140	CC – command code
4	xx	Check sum

Received packet:

No returned packet.

<b>CD Stop</b>	<b>CC = 141</b>
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CD-1 command.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0	A1
3	141	CC – command code
4	xx	Check sum

Received packet:

No returned packet.

<b>CD Eject</b>	<b>CC = 142</b>
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CD-1 command.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0	A1
3	142	CC – command code
4	xx	Check sum

Received packet:

No returned packet.

<b>CD Skip Left</b>	<b>CC = 143</b>
---------------------	-----------------

CD-1 command.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0	A1
3	143	CC – command code
4	xx	Check sum

Received packet:

No returned packet.

<b>CD Skip Right</b>	<b>CC = 144</b>
----------------------	-----------------

CD-1 command.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0	A1
3	144	CC – command code
4	xx	Check sum

Received packet:

No returned packet.

<b>CD Scan Left Start</b>	<b>CC = 145</b>
---------------------------	-----------------

CD-1 command.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0	A1
3	145	CC – command code
4	xx	Check sum

Received packet:

No returned packet.

<b>CD Scan Right Start</b>	<b>CC = 146</b>
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CD-1 command.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0	A1
3	146	CC – command code
4	xx	Check sum

Received packet:

No returned packet.

<b>CD Scan Stop</b>	<b>CC = 147</b>
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CD-1 command.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0	A1
3	147	CC – command code
4	xx	Check sum

Received packet:

No returned packet.

<b>CD Select Track</b>	<b>CC = 148</b>
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CD-1 command.

Transmitted packet:

Byte#	Value	Description
0	6	Packet size
1	1	A0
2	0	A1
3	148	CC – command code
4	n	Track no
5	xx	Check sum

Received packet:

No returned packet.

<b>CD Set Repeat</b>	<b>CC = 149</b>
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CD-1 command.

Transmitted packet:

Byte#	Value	Description
0	6	Packet size
1	1	A0
2	0	A1
3	149	CC – command code
4	n	0: Repeat off; 1: Repeat one; 2: Repeat All
5	xx	Check sum

Received packet:

No returned packet.

<b>CD Toggle Repeat</b>	<b>CC = 150</b>
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CD-1 command.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0	A1
3	150	CC – command code
4	xx	Check sum

Received packet:

No returned packet.

<b>CD Set Random</b>	<b>CC = 151</b>
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CD-1 command.

Transmitted packet:

Byte#	Value	Description
0	6	Packet size
1	1	A0
2	0	A1
3	151	CC – command code
4	n	0: Off; 1: On
5	xx	Check sum

Received packet:

No returned packet.

<b>CD Toggle Random</b>	<b>CC = 152</b>
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CD-1 command.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0	A1
3	152	CC – command code
4	xx	Check sum

Received packet:

No returned packet.

<b>CD A/B Repeat</b>	<b>CC = 153</b>
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CD-1 command.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0	A1
3	153	CC – command code
4	xx	Check sum

Received packet:

No returned packet.

<b>CDSet Sample Rate</b>	<b>CC = 154</b>
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CD-1 command.

Transmitted packet:

Byte#	Value	Description
0	6	Packet size
1	1	A0
2	0	A1
3	154	CC – command code
4	n	0: 44.1 kHz 1: 48 kHz 2: 96 kHz 3: 192 kHz
5	xx	Check sum

Received packet:

No returned packet.

<b>CD Set DAC Gain</b>	<b>CC = 155</b>
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CD-1 command.

Transmitted packet:

Byte#	Value	Description
0	6	Packet size
1	1	A0
2	0	A1
3	155	CC – command code
4	gain	0-12: 0 = 0dB; 1 = -0,5dB; 2 = -1dB ...
5	xx	Check sum

Received packet:

No returned packet.

**Get CD State (incl. TOC)****CC = 156**

CD-1 command.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0	A1
3	156	CC – command code
4	xx	Check sum

Received packet:

Byte#	Value	Description
0	18	Packet size
1	Byte 1	CD state: 0: Not initialized 1: Open 2: Opening 3: Closing 4: Closed 5: No disc 6: Error 7: Search error 8: Stopped 9: Playing
2	Byte 2	CD playing state: 0: Normal 1: Wind or Rewind 2: Playing A 3: Playing B 4: Playing AB 5: Search 6: Stopping 7: Opening
3	Byte 3	0: Repeat off; 1: Repeat one; 2: Repeat All
4	Byte 4	Random state 0: Off; 1: On
5	Byte 5	Title min.
6	Byte 6	Title max.
7	Byte 7	CD time minutes
8	Byte 8	CD time seconds
9	Byte 9	CD time frames
10	Byte 10	Track title
11	Byte 11	Track index
12	Byte 12	Track minutes
13	Byte 13	Track seconds
14	Byte 14	Sample rate: 0: 44.1 kHz 1: 48 kHz 2: 96 kHz 3: 192 kHz
15	Byte 15	DAC gain: 0-12: 0 = 0dB; 1 = -0,5dB; 2 = -1dB ...
16	Byte 16	IR on/off
17	xx	Check sum