TASCAM
TEAC Professional Division

TASCAM HD-R1

Serial Control port
RS-232C Protocol Specification Document

Ver. 1.00

September 2008

TEAC Corporation

1. Overview

You can control the HD-R1 from a computer or other external device using its RS-232C port. In this document, the HD-R1 is the controlled device, and the external device that controls it is the control device.

2. Specifications

Electrical specifications

Applicable standard	JIS X-5101 (equivalent to old JIS C-6361 and EIA RS-232C) (Not compatible with RS-422A in commercial use VCRs and other equipment)	
Receiver impedance	3 KΩ or more measured at applied voltage of ±3 – ±25 V	
Sender open circuit voltage	±25 V or less	
Receiver open circuit voltage	±3.3 or less	
Signal discrimination	Logic “1”	+2 V or more
	Logic “0”	+0.8 V or more

Transmission specifications

Circuit format	Three-wire, half duplex
Transmission format	Digital binary serial transmission
Data signal speed	9600 bit/sec
Character length	8 bits
Parity bit	None
Stop bit	1 bit

Note: The settings are fixed for the data signal speed, character length, parity bit and stop bit. The control device must be adjusted to match the HD-R1 settings.

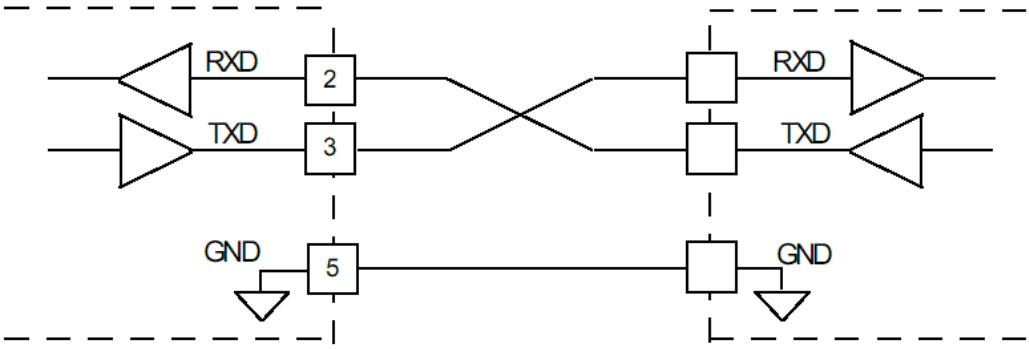
Pin configuration

Connector D-sub 9-pin female (inch screw thread)

Port pin allocations and input and output signals

Pin number	In/Out	Signal	Description
1	-	NC	Not used
2	In	Rx Data	Receive data*
3	Out	Tx Data	Send data
4	-	NC	Not used
5	-	GND	Ground
6	-	NC	Not used
7	-	NC	Not used
8	-	NC	Not used
9	-	NC	Not used

*Raise the voltage of Rx Data to comply with the RS-232C standard.



Controlled device (this unit) Control device

3. Command format

3.1 Command format overview

The serial protocol was designed to be able to function using common terminal programs. Therefore, all markers are printable 8-bit ASCII characters, and the end of line marker is flexible. Unless otherwise indicated, character strings are not case sensitive. Every message has the same structure as indicated below, but some messages do not contain all the fields defined below.

Parameter ID: A string of 1–24 characters specifies the parameter handled, including queries. Spaces before and after parameter character strings are ignored. Unless otherwise indicated, character strings are not case sensitive, and do not contain equal signs, question marks or exclamation points.

Command: One character defines what the command does. This is the same for queries.
Commands include "=" (set value) and "?" (query).

Value: Strings are of 1 to 24 characters, including query values. Spaces before and after character strings are ignored. Unless otherwise indicated, character strings do not distinguish between upper and lower case characters.

End Marker: One or two character strings. Both a carriage return followed by a line-feed (CR LF) and a line-feed (LF) are valid. The HD-R1 always accepts either type of end marker, and it can also send them.

Below is an example of a typical message. There are no blank spaces inserted after the Parameter ID and Value character strings, and one end marker character string is used.

The command format is as follows.

	Parameter ID	Cmd	Value	End Marker
Character string	**Input Source**	=	**Analog/Mic**	**LF (or CR+LF)**
ASCII codes (decimal)	**73 110 112 117 116 32 83 111 117 114 99 101**	**61**	**65 110 97 108 111 103 47 77 105 99**	**10**

Conventions

In this document commands sent to the HD-R1 are indicated as follows.

Input Source?

Responses from the HD-R1 are indicated in italic.

Input Source=Analog/Mic

3.2 Explanation of command types and concrete examples

Input commands

Parameter query

When the input message command field contains a "?" (question mark), the message is a parameter query command. If a parameter is not recognized or does not support this function, the HD-R1 will return an error message. Otherwise, it will respond with the current value of the parameter. The following is an example of a command that requests the current value of a parameter and the response from the HD-R1.

Input Source?

Input Source=Analog/Mic

Set parameter

When the input message contains an equal sign in the command field, the message is a set parameter command. When the HD-R1 receives a set parameter command, it will set the parameter as requested if conditions make it possible and the value is valid. If the parameter is set successfully, the HD-R1 will not respond. If the parameter is not recognized or the value is not valid, it will respond with an error. Usually, character strings for the parameter IDs and their values match the text shown on the LCD user interface screen. The following is an example of a command that sets a parameter.

Input Source=Analog/Mic

Output commands

Parameter value response

When the command field of a message being set contains "=" (equal sign), the HD-R1is reporting the current value of the parameter. Usually, character strings for parameter IDs and their values match the text shown on the LCD user interface screen. For example:

Input Source?

Input Source=S/PDIF

Error responses

When the command field of a message being sent to it contains "?" (question mark), if the HD-R1 cannot interpret the received message it reports an error. For example, the HD-R1 will respond as follows if it receives a parameter query for an invalid parameter called "Blah."

Blah?

Blah???

If the HD-R1 receives an invalid parameter set command, it will respond as follows.

Blah=Foo

Blah???Foo

Set value refusal responses

If the HD-R1 receives a parameter set command for a valid parameter, but the value is invalid, the HD-R1 will respond with "!" (exclamation point) added to the command field.

Input Source=Blah

Input Source!Blah

If the HD-R1 receives a parameter set command for a valid parameter, but the value is missing, the HD-R1 will respond as follows.

Input Source=

Input Source!Missing Value

Some parameters can be applied only when the transport is stopped. If you try to change one of these parameters when the transport is not stopped, the HD-R1 responds with "*" (asterisk). For example, if you try to change the sampling frequency while recording, the HD-R1 will respond as follows.

WAV Sample Rate=44.1 kHz

WAV Sample Rate*44.1 kHz

Special incoming commands

End markers

By sending a line feed (LF) or carriage return and line feed (CR LF), the HD-R1 can be informed of the end of a message. The HD-R1 can accept this query or command at any time. After turning the power on, the end marker is set to CR LF by default. The following are end marker setting commands.

End Marker=LF

End Marker=CR LF

Protocol width
Since fixed parameter widths for messages might be preferable depending on the device, the HD-R1 can be set to either fixed or variable parameter width using a message. When set to fixed, both the parameter ID and the value are padded with blank spaces to make them 24 characters. The HD-R1 can accept this query or command at any time. After turning the power on, the parameter width defaults to variable.

Protocol Width=Fixed

Protocol Width=Variable

Logging in
After turning the power on, the HD-R1 requires the Login password before responding to End Marker and Protocol Width commands. The HD-R1's password is case sensitive, and the default password is "hdr1." The login password can be changed through the front panel.

Login=hdr1

Login Succeeded

Logging Out
By sending the following command after logging in, you can log out of the session.

Logout

Logged Out

Software Version
Sending this command causes the HD-R1 to reply with the current software version number.

Version?

Version=1.0

4. Command details

4.1 Direct transport commands

Since the potential behavior of keys (PLAY, STOP, etc.) changes depending on the current transport state, sometimes they do not respond as intended. Direct transport commands do not depend on the current transport state, however, and this can be advantageous in some circumstances. For example, by sending a "Record" direct transport command, the HD-R1 should start recording immediately.
The following is an example of the usual format of a direct transport command.

	Parameter ID	Cmd	Value	End Marker
Character string	**Transport**	=	**<Value>**	**LF (or CR+LF)**

The following is a list of direct transport commands.

Value (character string)	Functions
Stop	**Stops the transport**
Play	**Starts playback**
Record	**Starts recording**
Ready	**Puts unit in ready to play mode**
Monitor	**Puts unit in ready to record mode**
First Track	**Moves to first track**
Next Track	**Moves to next track**
Prev Track	**Moves to previous track**
Last Track	**Moves to last track**
Next Track/Marker	**Moves to next track or next marker**
Prev Track/Marker	**Moves to previous track or previous marker**

The following are valid commands when the transport is stopped.

Value (character string)	Function
First Folder/Playlist	**Moves to first folder or first playlist in playback mode**
Next Folder/Playlist	**Moves to next folder or next playlist in playback mode**
Prev Folder/Playlist	**Moves to previous folder or previous playlist in playback mode**
Last Folder/Playlist	**Moves to last folder or last playlist in playback mode**

The following are examples of transport state queries.

Value (character string)	Meaning
Transport?	**Asks for the transport state**
Transport=Record	**Example HD-R1 response**

The following are examples of other state queries.

Value (character string)	Meaning
Current Track Number?	**What is the current track number?**
Total Time Elapsed?	**What is the total elapsed time?**
Event Elapsed?	**What is the elapsed time?**
Event Remaining?	**What is the remaining time?**

4.2 Setting commands

Most of the HD-R1's settings can be configured remotely. Their parameter IDs and acceptable values are defined in the following tables. With some exceptions, all parameters may both be set and queried with a command. Although they are not case sensitive, blank spaces within parameter IDs and setting values must be exactly as shown.

The format for setting commands is the same as for others as shown in the example below.

	Parameter ID	Command	Setting value	End Marker
Character string	**Auto Cue (example)**	**=: set value** **?: query**	**<Value>: as necessary**	**LF (or CR+LF)**

The following can be set and queried at any time.

Parameter ID	**Valid values**
Num Of Folders	Total number of folders (query only)
Num Of Playlists	Total number of playlists (query only)
Repeat	**Off** **On**
Auto Ready	**Off** **On**
Auto Cue	**Off** **-72 dBFS** **-66 dBFS** **-60 dBFS** **-54 dBFS** **-48 dBFS** **-42 dBFS** **-36 dBFS** **-30 dBFS** **-24 dBFS**
Channels	**Mono Left** **Mono Right** **Mono Summed** **Stereo**
WAV Sample Width	**16 Bits** **24 Bits**

Mono MP3 Bit Rate	**32 kbps** **40 kbps** **64 kbps** **80 kbps** **96 kbps** **112 kbps** **128 kbps** **160 kbps**
Stereo MP3 Bit Rate	**64 kbps** **80 kbps** **128 kbps** **160 kbps** **192 kbps** **224 kbps** **256 kbps** **320 kbps**
Mark Audio Overs	**Off** **On**
Mark Time Interval	**Off** **1 minute** **2 minutes** **3 minutes** **4 minutes** **5 minutes** **10 minutes** **30 minutes** **60 minutes**
Auto Track	**512 MB** **1 GB** **1.5 GB** **1.8 GB** **2 GB** **5 Min** **10 Min** **15 Min** **30 Min** **1 Hour**

Sync Record	**Off** **-72 dBFS** **-66 dBFS** **-60 dBFS** **-54 dBFS** **-48 dBFS** **-42 dBFS** **-36 dBFS** **-30 dBFS** **-24 dBFS**
Audio File Base Name	Base name (up to 20 alphanumeric characters, including '-', '_' and ' ')
Mark Base Name	Base name (up to 20 alphanumeric characters, including '-', '_' and ' ')
Shuttle Mode	**Track/Mark Only** **Hours** **Minutes** **Seconds** **Tenths**
Time Display	**Total Elapsed** **Total Remaining** **Event Elapsed** **Event Remaining**
Keyboard Type	**English** **Japanese**
Overload Threshold	**-0.2 dBFS** **0 dBFS**
Overload Hold	**Flash** **3 Sec** **6 Sec** **10 Sec** **Infinite**
Peak Decay Rate	**Hold** **Fast Decay** **Medium Decay** **Slow Decay** **Off**

Meter Decay Rate	**Fast Decay** **Medium Decay** **Slow Decay**
Parallel Mode	**Off** **Direct Play** **Binary Play** **Program Play**
Input Polarity	**Active Low** **Active High**
Busy1 Signal	**Playback** **Recording** **Finished** **Ducking** **CF Door** **Media Full**
Busy1 Polarity	**Normally Open** **Normally Closed**
Busy2 Signal	**Playback** **Recording** **Finished** **Ducking** **CF Door** **Media Full**
Busy2 Polarity	**Normally Open** **Normally Closed**
System Time	Hours: minutes: seconds
System Date	Day/month/year

The following settings can be queried at any time but can only be changed when the transport is stopped. Attempting to change them while the transport is not stopped will result in an error command being sent back with an "*" (asterisk).

Parameter ID	**Valid values**
Folder Name	Folder name (case sensitive)
Playlist Name	Playlist name (case sensitive)
Folder Number	Folder number
Playlist Number	Playlist number

Playback Mode	**All** **Single** **Folder** **Playlist**
Folder Sorting	**Time** **Name**
Random	**On** **Off**
Input Source	**Analog/Mic** **S/PDIF**
WAV Sample Rate	**44.1 kHz** **48 kHz** **82.2 kHz** **96 kHz**
MP3 Sample Rate	**44.1 kHz** **48 kHz**
File Format	**WAV** **MP3**
Pre-Record	**Off** **On**
Ref Level	**-20 dBFS = +4 dBu** **-18 dBFS = +4 dBu** **-16 dBFS = +4 dBu** **-14 dBFS = +4 dBu** **-9 dBFS = +6 dBu**
Ducking Mode	**Off** **Attenuate Input** **Attenuate Playback**
Ducking Threshold	**-6 dBFS** **-12 dBFS** **-18 dBFS** **-24 dBFS** **-30 dBFS**

Ducking Attenuation	**-3 dB** **-6 dB** **-9 dB** **-12 dB** **-18 dB** **-24 dB** **-Infinity**
Ducking Hold Time	**0.1 Sec** **0.5 Sec** **1.0 Sec** **1.5 Sec** **2.0 Sec** **2.5 Sec** **3.0 Sec** **3.5 Sec** **4.0 Sec** **4.5 Sec** **5.0 Sec**

4.3 Checking playlists and folders

These commands allow you to check which playlists and folders can be used currently. The following are concrete examples.

1. Check the total number of playlists

Use this to check how many playlists are on the currently inserted CF card.

	Query	HD-R1 response
Command	**Num Of Playlists?**	***Num Of Playlists=3***

This shows that there are three playlists on the CF card.

2. Check the playlist name

Please note that playlists are in alphabetical order.

	Query	HD-R1 response
Command	**Playlist Name?1**	***Playlist Name=Jazz***

This shows that the name of the first playlist is "***Jazz***".

Use this command to check the name of the second playlist.

	Query	HD-R1 response
Command	**Playlist Name?2**	***Playlist Name=Rock***

This shows that the name of the second playlist is "***Rock***".

3. Name a playlist

Input a command like the following to set the name of the playlist.

Command character string
Playlist Name=Rock

This will name the playlist unless there is an error.

4. Add a playlist number

Input a command like the following to set the number of a playlist.

Command character string
Playlist Number=2

The setting will be made unless there is an error.

5. Check the total number of folders

	Query	HD-R1 response
Command	**Num Of Folders?**	***Num Of Folders=3***

This shows that the total number of folders on the CF card is ***3***.

6. Folder name query

Please note that playlists are in alphabetical order.

	Query	HD-R1 response
Command	**Folder Name?1**	***Folder Name=Monday***

This shows that the name of the first folder is "***Monday***".

Use this command to check the name of the second folder.

	Query	HD-R1 response
Command	**Folder Name?2**	***Folder Name= Tuesday***

This shows that the name of the second folder is "***Tuesday***".

7. Name a folder

Input a command like the following to set the name of the folder.

Command character string
Folder Name=Tuesday

The setting will be made unless there is an error.

8. Add a number to a folder

Input a command like the following to set the number of a folder.

Command character string
Folder Number=2

The setting will be made unless there is an error.