Harman Kardon AVR Series Receivers
FAQ Related to RS-232 Port Instructions
And Code Listing

1.0 Introduction

This document contains Frequently Asked Questions and their answers related to connecting Harman Kardon AVR series receivers equipped with bi-direction RS-232 control capability to a computer or other compatible specialized control devices with RS-232 communications capability for control and feedback of the receiver. The current Harman Kardon products with this capability are the AVR 635, AVR 630, AVR 435 and AVR 435.

2.0 Frequently Asked Questions (FAQ)

Q: Does AVR635 have a firmware version number? If so, how can one find it?

Q: Do you have Rs-232 four bytes hex command codes in table form for AVR635 in order to check exact code for an RS-232 command to be tested?

Q: For POWER ON functionality, is the following command sequence sent to AVR correct? This command does not appear to work, but the power off command work correctly. Is this formulated incorrectly?

'PCSEND',0x02,0x04,0x80,0x70,0xC0,0x35,0x40,0x45

What bytes are used for calculating CRC and how CRC is calculated?

Q: Is it possible to get a description of the FL ICON field from the response of the AVR Status Display Mode?

Q: What does the 'FMMODE' command do?

Q: Is the 'SURR' command supposed to represent the DSP Surround Mode? For Dolby we would send "82,72,50,AF". The question becomes what do we send for DSP, and what does the command described in the protocol manual known as SURR do?

Q: Are SURR UP and SURR DOWN supposed to cycle through the Surround Sound Modes?

Q: Does the SET button on the remote control have an RS-232 equivalent? (What four byte hex code can we send over RS232 to emulate the pushing of the SET button on the remote?) I don't see how to select menu options once I get there (i.e. in the OSD menu, the MutliRoom menu, etc). For example, I send the MULTIROOM command, and the multi-room menu displays. How do I select the 'MULTI ON/OFF' menu option so that I can turn the second room on and off?

Q: What RS-232 command do I use to go up and down within the OSD menu? I only see OSD LEFT and OSD RIGHT available?

Q: What does the RDS command do?

Q: what is 'VID5' in the protocol manual? It appears to be a Video 5 input source, but I can't find it on the device. Is it not supported on this model?

Q: Is there a list of icons? Since you send out the icon information in the last byte, is there a list what icon maps to what value?

Q: What commands do we use to adjust the treble and bass settings up and down? Is it OK to send TONE command to find the correct menu item and the SET command to select the menu item (in this case TREBLE MODE or BASS MODE)? From here, do we need a Menu Up and a Menu Up command to affect the current treble and bass settings?

3.0 Answers to Frequently Asked Questions (FAQ)

Q: Does AVR635 have a firmware version number? If so, how can one find it?

A: For 635 and 435, press the ">" button under the door and hold until you see a version number readout in the FL.

Depending on the production date, there are four SW versions for this in North America and two in ROW.

Q: Do you have Rs-232 four bytes hex command codes in table form for AVR635 in order to check exact code for an RS-232 command to be tested?

A: Yes, the table is given below:

Command	**Code**			
"ON"	0x80	0x70	0xC0	0x3F
"OFF"	0x80	0x70	0x9F	0x60
"DIM"	0x80	0x70	0xDC	0x23
"MUTE"	0x80	0x70	0xC1	0x3E
"AVR"	0x82	0x72	0x35	0xCA
"DVD"	0x80	0x70	0xD0	0x2F
"CD"	0x80	0x70	0xC4	0x3B
"TAPE"	0x80	0x70	0xCC	0x33
"VID1"	0x80	0x70	0xCA	0x35
"VID2"	0x80	0x70	0xCB	0x34
"VID3"	0x80	0x70	0xCE	0x31
"VID4"	0x80	0x70	0xD1	0x2E
"AM/FM"	0x80	0x70	0x81	0x7E
"6CH/8CH"	0x82	0x72	0xDB	0x24
"SLEEP"	0x80	0x70	0xDB	0x24
"SURR"	0x82	0x72	0x58	0xA7
"DOLBY"	0x82	0x72	0x50	0xAF
"DTS"	0x82	0x72	0xA0	0x5F
"DTS NEO:6"	0x82	0x72	0xA1	0x5E
"LOGIC7	0x82	0x72	0xA2	0x5D
"STEREO	0x82	0x72	0x9B	0x64
"TEST TONE"	0x82	0x72	0x8C	0x73
"NIGHT"	0x82	0x72	0x96	0x69
"0"	0x80	0x70	0x9E	0x61
"1"	0x80	0x70	0x87	0x78
"2"	0x80	0x70	0x88	0x77
"3"	0x80	0x70	0x89	0x76

"4"	0x80	0x70	0x8A	0x75
"5"	0x80	0x70	0x8B	0x74
"6"	0x80	0x70	0x8C	0x73
"7"	0x80	0x70	0x8D	0x72
"8"	0x80	0x70	0x8E	0x71
"9"	0x80	0x70	0x9D	0x62
"TUNE UP"	0x80	0x70	0x84	0x7B
"TUNE DN"	0x80	0x70	0x85	0x7A
"VOL DN"	0x80	0x70	0xC8	0x37
"VOL UP"	0x80	0x70	0xC7	0x38
"PRESET UP"	0x82	0x72	0xD0	0x2F
"PRESET DN"	0x82	0x72	0xD1	0x2E
"TUN-M"	0x80	0x70	0x93	0x6C
"DELAY"	0x82	0x72	0x52	0xAD
"SET"	0x82	0x72	0x84	0x7B
"SPKR"	0x82	0x72	0x53	0xAC
"CH."	0x82	0x72	0x5D	0xA2
"RDS"	0x82	0x72	0xDD	0x22
"DIRECT"	0x80	0x70	0x9B	0x64
"CLEAR"	0x82	0x72	0xD9	0x26
"MEM"	0x80	0x70	0x86	0x79
"M-ROOM"	0x82	0x72	0xDF	0x20
"OSD"	0x82	0x72	0x5C	0xA3
"OSD-LT"	0x82	0x72	0xC1	0x3E
"OSD-RT"	0x82	0x72	0xC2	0x3D
"DIGITAL"	0x82	0x72	0x54	0xAB

Q: For POWER ON functionality, is the following command sequence sent to AVR correct? This command does not appear to work, but the power off command work correctly. Is this formulated incorrectly?

'PCSEND',0x02,0x04,0x80,0x70,0xC0,0x35,0x40,0x45

What bytes are used for calculating CRC and how CRC is calculated?

A: The last two bytes in the protocol are the CRC which is calculated only from the 4 byte command/information field.

The protocol dictates to send the commands to AVR in following way:

'PCSEND', 0x02, 0x04, (4 byte command), (2 byte CRC)

Command code for Power "ON" as shown in table is: 0x80, 0x70, 0xC0, 0x3F. So, you have wrong command code.

CRC is calculated based on following C function as given in RS-232 protocol document:

```
void CalculateCRC16(BYTE * buf, int len, BYTE * crc)
{
	int i;
	crc[0] = crc[1] = 0;

	for (i=0; i<len; i+=2)
	{
		crc[0] ^= buf[i];
	}
	for (i=1; i<len; i+=2)
	{
		crc[1] ^= buf[i];
	}
}
```

Based on Power on code and CRC calculation method given above overall code sequence would be:

'PCSEND',0x02,0x04,0x80,0x70,0xC0,0x3F,0x40,0x4F

Q: Is it possible to get a description of the FL ICON field from the response of the AVR Status Display Mode?

A: Feedback data from AVR consists of VFD first line, VFD Second Line and VFD Icon Info. If you see AVR635 Control Panel, you will see two lines of information consisting of 14 green characters each and some Icons for which 14 characters should be enough. If the question is in relation to the speaker/stream icons, those are not controlled by the RS-232 or the remote, but rather are a response to the setup of the systems. I do not believe that this indication is available for data export.

Q: What does the 'FMMODE' command do?

A: 'FMMODE' command selects FM mode of radio in AVR

Q: Is the 'SURR' command supposed to represent the DSP Surround Mode? For Dolby we would send "82, 72, 50, AF". The question becomes what do we send for DSP, and what does the command described in the protocol manual known as SURR do?

A: Yes, when we press "SURR" or emulate it, DSP Surround mode will be selected as default. For further explanation of 'SURR' modes and selection, please see AVR 635 Owner's Manual and for Rs-232 related hex code, please see the byte table given in this document.

Q: Are SURR UP and SURR DOWN supposed to cycle through the Surround Sound Modes?

A: I don't think SURR UP and SURR DOWN are cyclic.

Q: Does the SET button on the remote control have an RS-232 equivalent? (What four byte hex code can we send over RS232 to emulate the pushing of the SET button on the remote?) I don't see how to select menu options once I get there (i.e. in the OSD menu, the MutliRoom menu, etc). For example, I send the MULTIROOM command, and the multi-room menu displays. How do I select the 'MULTI ON/OFF' menu option so that I can turn the second room on and off?

A: For "SET" command four bytes used are: 0x82, 0x72, 0x84, 0x7B. SET button is a feature of Remote Control. SET button does not work alone. If we have to send some information to AVR for memory setup, we first make a selection and then if that selection is desired we press SET button. Once a selection is made and SET button is pressed, RS-232 code (four bytes mentioned in the table given in this document and code for the new selection) is generated to be sent to AVR memory for selected setting. For any selection you have to work in OSD Up or OSD down and then send SET for selection when reaching any desired mode. If you want OSD Up to get to settings desired to be changed, you can use command code 0x82, 0x72, 0x85, 0x7a. If you want OSD DOWN for this purpose, you can use command code 0x82, 0x72, 0x86, 0x79.

Q: What RS-232 command do I use to go up and down within the OSD menu? I only see OSD LEFT and OSD RIGHT available?

A: As mentioned in answer to above question, If you want OSD Up to get to settings desired to be changed, you can use command code 0x82, 0x72, 0x85, 0x7a. If you want OSD DOWN for this purpose, you can use command code 0x82, 0x72, 0x86, 0x79.

Q: What does the RDS command do?

A: RDS stands for Radio Data System. On the application, the RDS feature is grouped together with the AM/FM radio options. The RDS operation shows the station name and availability of TP (traffic program) information. Please note that RDS operation is a function of 230 volt (Euro) versions of all HK AVR products, but is not part of the US/North America/120V feature set. For information on typical operation, look here:

https://www.hci-services.com/tech_doc/documents/harman%20kardon/Home/Electronics/AVR/AVR%20635/Owner%27s%20Manual/AVR635_ENG.pdf

Q: What is 'VID5' in the protocol manual? It appears to be a Video 5 input source, but I can't find it on the device. Is it not supported on this model?

A: VID5 can be used in future if another video port is needed. Some of the features in protocol have been added to keep in mind future needs of AVRs.

Q: Is there a list of icons? Since you send out the icon information in the last byte, is there a list what icon maps to what value?

A: There is no separate list of Icons. Architect and designer of the code have all possible Icons to be displayed in Front Panel in his/her mind and unique algorithm is used to display these Icons. Icons are displayed on Front Panel based on a byte/character received from AVR. Based on character received, the part of Icon (taken from the types mentioned below) and its position is decided. Each byte can lead to the following portion of Icon built:

1) Point Type
2) Text Type e.g., "DIGITAL", "STEREO", "R", "SR" etc.
3) Person Type
4) Bitmap Type
5) Rectangle Type
6) Left bracket
7) Right Bracket
8) Top Bracket,
9) Bottom Bracket

An Icon is displayed by combination of the types mentioned above placed at proper position keeping in mind the desired Icon to be displayed on Front Panel.

Q: What commands do we use to adjust the treble and bass settings up and down? Is it OK to send TONE command to find the correct menu item and the SET command to select the menu item (in this case TREBLE MODE or BASS MODE)? From here, do we need a Menu Up and a Menu Up command to affect the current treble and bass settings?

A: You can't access the Treble or Bass settings DIRECTLY with the remote, and thus it is similarly not possible when using the RS-232 codes to simulate the remote's operation. You can do this indirectly by pressing the TONE button to change options and settings, but this requires looking at the front panel or a video display.

The indirect method to be used is to send four bytes command code for tone and then send command codes to set values for treble and/or bass. To cycle through treble and bass modes, continue sending tone command. When you reach the settings that is needed to be changed (treble or bass), quickly send any series of OSD UP or OSD DOWN to get to the desired values and after selecting that desired value, issue the SET command. In summary, we use the following procedure:

(1) Send tone (as many time as needed), the related four bytes command code is 0x82, 0x72, 0xc5, 0x3a.
(2) If you want OSD Up to get to settings desired to be changed, you can use command code 0x82, 0x72, 0x85, 0x7a. If you want OSD DOWN for this purpose, you can use command code 0x82, 0x72, 0x86, 0x79.
(3) Finally for setting a desired value, you can use command code 0x82, 0x72, 0x84, 0x7B.

In order to fully understand the procedure to follow, we use an example of setting treble to +6 assuming default treble value is 0.

We send commands in the following sequence:

1) Send tone command (“tone in/out” mode will be displayed on front panel)
2) Send tone command again (“treble mode” will be displayed on front panel)
3) Send OSD Up (“treble 0 displayed”)
4) Send OSD Up (“treble +2 displayed”)
5) Send OSD Up (“treble +4 displayed”)
6) Send OSD Up (“treble +6 displayed”)
7) Send SET command and this will set the treble value to +6 and AVR will go back to standby/current surround display.