

Denon AVR control protocol

Last Update: Jun. 30. 2015

Ver.02

Application terminal: Ethernet/RS-232C

Model	Terminal	Beacon No
AVR-X1200W	Ethernet	12.4.0
AVR-X2200W	Ethernet/	12.5.0
AVR-X3200W	Ethernet/RS-232C	12.6.0
AVR-X4200W	Ethernet/RS-232C	12.7.0

Connector specification

I. RS-232C

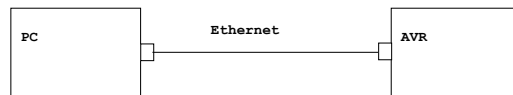
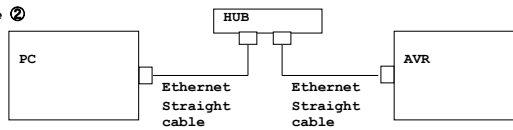
Connector type: DB-9pin female type, slave straight connection (DCE type)
(1pin : GND , 2pin : TxD , 3pin : RxD , 5pin : Common(GND) , 4,6,7,8,9pin : NC)

Communication format:

Synchronous system : Tone step synchronization
 Communication system : A half duplex
 Communication speed : 9600bps
 Character length : 8 bits
 Parity control : None
 Start bit : 1 bit
 Stop bit : 1 bit
 Communication procedure : Non procedural
 Communication data length : 135 bytes (maximum)

II. Ethernet

Connector type : RJ-45(10BASE-T/100BASE-TX)

Example ①**Example ②**

Communication format :
 Communication system : A half duplex
 Communication speed : 10Mbps/100Mbps
 Communication port : TCP port 23 (telnet)
 Communication data length : 135bytes (maximum)

NETWORK SETUP of AV Receiver**>Procedure of Network Setup mode.**

- (1) Press **SETUP** button, then Menu appears on FL-display (and GUI)
- (2) Select "Network > Settings >".
- (3) Set parameters described below.

<DHCP> "ON"---Use this setting when DHCP server is on the local network.

<IP Address> When <DHCP> sets "Off", please set IP address.

<Subnet Mask> When <DHCP> sets "Off", please set Subnet Mask.

<Gateway> Set the address of Gateway when Gateway is on the local network.

<Primary DNS> Do not set this parameter.

<Second DNS> Do not set this parameter.

<Proxy> Set this parameter "Off".

<Network Option: Network Standby Mode>

- (1) Press **SETUP** button, then Menu appears on FL-display (and GUI)

(2) Select "Network > Network Control" (except for X6200)

Select "Network > IP Control" (X6200)

- (3) Set this parameter "Always On".

"Always On"---Use this setting when using the AV Receiver Connected in a network.
 Always respond to network commands.

"Off In Standby"--- Use this setting when not using the AV Receiver connected in a network.
 Ignores network commands during standby to save power.

Protocol specification

The following three data forms are defined.

- COMMAND** : The message sent to a system(AVR) from a controller(Touch Panel etc.)
A command to a system is given from a controller.
Send the COMMAND in 50ms or more intervals.
- EVENT** : The message sent to a controller (Touch Panel etc.) from a system (AVR)
The result is sent, when a system is operated directly and a state changes.
The EVENT should be sent within 5 seconds after the state of the system (AVR) is changed.
*The form of EVENT presupposes that it is the same as that of COMMAND.
**Refer to the following table for the contents of COMMAND and EVENT.
- RESPONSE** : The message sent to a controller (Touch Panel etc.) from a system (AVR)
if the 'request command' (COMMAND+? +CR (0x0D)) has come from a controller.
The RESPONSE should be sent within 200ms of receiving the request COMMAND.
*The form of RESPONSE presupposes that it is the same as that of EVENT.

Basic specification: The command by ASCII CODE, parameter expression
*ASCII CODE which can be used is from 0x20 to 0x7F:
the alphabet and the number of 0-9, and space (0x20), some signs,
AND carriage return (0x0D) --- It is used only as a pause sign.

Command structure: COMMAND + PARAMETER + CR (0x0D)
COMMAND: ASCII CODE of 2 characters
Ex. SI : Select Input source
MS : surround Mode Setting
MV : Master Volume setting
PW : system Power setting
PARAMETER : ASCII CODE (up to 25 characters)
Ex. DVD : function name
STEREO : surround mode name
*Special Parameter--- ? : for request command

The example of a command * <CR> is the meaning of 0x0D.

SI?DVD<CR> : Select Input source DVD
MSSTEREO<CR> : surround Mode Set to STEREO
MVUP<CR> : Master Volume UP
PWON<CR> : system Power ON
PWSTANDBY<CR> : system Power STANDBY
SI?<CR> : Request command for now playing input source >> Return RESPONSE 'SI***<CR>'

Others

- A) COMMAND is receivable also during transmission of EVENT.
- B) Since CHANNEL VOLUME changes simultaneously when the input source changes, the value of the channel volume of used channels returns as EVENT.
- C) Since SURROUND MODE or CHANNEL VOLUME changes simultaneously when the INPUT source changes, the SURROUND MODE or CHANNEL VOLUME returns as EVENT.
- D) When SURROUND MODE or CHANNEL VOLUME is the same in between INPUT source change before and after, EVENT of SURROUND MODE and CHANNEL VOLUME does NOT return.
- E) Although EVENT of SURROUND MODE returns when the present SURROUND MODE is set up again, CHANNEL VOLUME does NOT return.
- F) When SURROUND MODE is changed, before returning SURROUND MODE after change as EVENT, the present SURROUND MODE is returned.
- G) The RESPONSE should be sent as opposed to the request command by all the commands with which an EVENT exists , not need to the another request commands(ex. SV command).
- H) The PARAMETER (with COMMAND and RESPONSE, EVENT) of minimum level of MASTER VOLUME defines "00".
- I) If the MASTER VOLUME & CHANNEL VOLUME set with 0.5dB step, the PARAMETER (with COMMAND and RESPONSE, EVENT) defines three ASCII characters as follows.

Ex. MASTER VOLUME = +18.0dB : MV98<CR>
+1.0dB : MV81<CR>
+0.5dB : MV805<CR>
0dB : MV80<CR>
-0.5dB : MV795<CR>
-1.0dB : MV79<CR>
| |
-79.5dB : MV005<CR>
--- : MV00<CR>

* At the *.0dB step, only uses two ASCII characters as PARAMETER, same as usual.

- J) 1 second later, please transmit the next COMMAND after transmitting a power on COMMAND (PWON) .

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COMMAND and RESPONSE PARAMETER list

Table with columns: COMMAND, PARAMETER, FUNCTION, EXAMPLE, RESPONSE(EXAMPLE), and columns for AVR-X4200W, AVR-X3200W, AVR-X2200W, AVR-X1200W (NA, EU, CH, JP).

System Control	Command	Response	NSRPT<CR>	NSRND<CR>	NSB00<CR>	NSC00<CR>	NSH<CR>	NSFV MEM<CR>	NSA<CR>	NSE<CR>	MN	SY	TR	UG	RM	DIM				
	RPT	*Repeat(toggle) (Media Server,USB,iPod Direct,Spotify,AirPlay,Bluetooth)	NSRPT<CR>	*command only	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	RND	*Random(toggle) (Media Server,USB,iPod Direct,Spotify,AirPlay,Bluetooth)	NSRND<CR>	*command only	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	B** (PRESET No.)	Preset Call (except Bluetooth, USB/iPod) ** : 00-56 → 00-35(2014 AVR)	NSB00<CR>	*command only	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	C** (PRESET No.)	Preset Memory (except Bluetooth, USB/iPod) ** : 00-56 → 00-35(2014 AVR)	NSC00<CR>	NSC00<CR> NSCOK<CR>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	H	Net Audio Preset Name status (UTF-8) (except Bluetooth, USB/iPod)	NSH<CR>	NSH<CR> (Return) NSH00***** (20 digits) <CR> (Preset Name : 01) NSH01***** (20 digits) <CR> (Preset Name : 02) ~ NSH05***** (20 digits) <CR> (Preset Name : 36)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	FV MEM	Add Favorites folder	NSFV MEM<CR>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
NSA		Return Onscreen Display Information List (ASCII CODE Character) *ASCII Character (MAX96byte) _Null ? Don't Care (The character after Null should be disregarded) *:Cursor&Playable Information Data(1byte) Bit1:Playable Music =1 Bit2:Directory Bit3:Don't Care Bit4:CURSOR SELECT=1 Bit7:Picture Bit5,6,8:Don't Care ***** ??:MAX 96byte	NSA<CR> (Return NSA0-NSA8)	NSA0<CR> (Return) NSA0***** (96byte) <CR> NSA1:(Flag1byte)***** (95byte) <CR> NSA2:(Flag1byte)***** (95byte) <CR> NSA3:(Flag1byte)***** (95byte) <CR> NSA4:(Flag1byte)***** (95byte) <CR> NSA5:(Flag1byte)***** (95byte) <CR> NSA6:(Flag1byte)***** (95byte) <CR> NSA7:(Flag1byte)***** (95byte) <CR> NSA8 [1/10]***** <CR>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
			(example)	NSANow Playing USB ??????<CR> NSA1:Song ??????????????<CR> NSA2:Artist ??????????????<CR> NSA3:bitrate ??????????????<CR> NSA4:Album ??????????????<CR> NSA5: 00:11 100% ???<CR> NSA6_ ??????????????????<CR> NSA7_ ??????????????????<CR> NSA8 [1/10] ??????<CR>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
				BT playback NSANow Playing ??????<CR> NSA1:Title_ ??????????????????<CR> NSA2:Artist_ ??????????????????<CR> NSA3: ??????????????????<CR> NSA4:Album_ ??????????????????<CR> NSA5_ ??????????????????<CR> NSA6_ ??????????????????<CR> NSA8 [1/10] ??????<CR>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
NSE		Request Onscreen Display Information List (UTF-8 CODE Character) *UTF-8 Character (MAX96byte) _Null ? Don't Care (The character after Null should be disregarded) *:Cursor&Playable Information Data(1byte) Bit1:Playable Music =1 Bit2:Directory Bit3:Don't Care Bit4:CURSOR SELECT=1 Bit7:Picture Bit5,6,8:Don't Care	NSE<CR> (Return NSE0-NSE8)	NSE0<CR> (Return) NSE0***** (96byte) <CR> NSE1:(Flag1byte)***** (95byte) <CR> NSE2:(Flag1byte)***** (95byte) <CR> NSE3:(Flag1byte)***** (95byte) <CR> NSE4:(Flag1byte)***** (95byte) <CR> NSE5:(Flag1byte)***** (95byte) <CR> NSE6:(Flag1byte)***** (95byte) <CR> NSE7:(Flag1byte)***** (95byte) <CR> NSE8 [1/10]***** <CR>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
			(example)	NSENow Playing USB ??????<CR> NSE1:Song ??????????????<CR> NSE2:Artist_ ??????????????<CR> NSE3: ??????????????????<CR> NSE4:Album_ ??????????????<CR> NSE5: 00:11 100% ???<CR> NSE6_ ??????????????????<CR> NSE7_ ??????????????????<CR> NSE8 [1/10] ??????<CR>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
				Bluetooth playback NSENow Playing ??????<CR> NSE1:Title_ ??????????????????<CR> NSE2:Artist_ ??????????????????<CR> NSE3: ??????????????????<CR> NSE4:Album_ ??????????????????<CR> NSE5_ ??????????????????<CR> NSE6_ ??????????????????<CR> NSE8 [1/10] ??????<CR>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MN	CUP	*Cursor Up* Control	MNCUP<CR>	*command only	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	CDN	*Cursor Down* Control	MNCND<CR>	*command only	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	GLT	*Cursor Left* Control	MNCLT<CR>	*command only	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	GRT	*Cursor Right* Control	MNCR<CR>	*command only	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	ENT	*Enter* Control	MNENT<CR>	*command only	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	RTN	*RETURN* Control	MNRTN<CR>	*command only	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	OPT	*OPTION* Control	MNOPT<CR>	*command only	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	INF	*INFO* Control	MNINF<CR>	*command only	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	CHL	*Channel Level Adjust* menu on/off Control	MNCHL<CR>	*command only	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	MEN ON	*Setup Menu ON* Control	MNMEN ON<CR>	<<	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	MEN OFF	*Setup Menu OFF* Control	MNMEN OFF<CR>	<<	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	MEN?	Return MNMEN(Menu) status	MNMEN?<CR>	<<	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	ZST ON	*All Zone Stereo* direct Control	MNZST ON<CR>	<<	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	ZST OFF	*All Zone Stereo* direct Control	MNZST OFF<CR>	<<	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	ZST?<CR>	Return MNZST status	MNZST?<CR>	<<	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
SY	REMOTE LOCK ON	REMOTE CONTROL LOCK ON/OFF	SYREMOTE LOCK ON<CR>	<<	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	REMOTE LOCK OFF	REMOTE CONTROL LOCK ON/OFF	SYREMOTE LOCK OFF<CR>	<<	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	PANEL LOCK ON	PANEL BUTTON/except MASTER VOL CONTROL LOCK ON	SY PANEL LOCK ON<CR>	<<	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	PANEL LV LOCK ON	PANEL BUTTON & MASTER VOL CONTROL LOCK ON	SY PANEL LV LOCK ON<CR>	<<	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	PANEL LOCK OFF	PANEL BUTTON & MASTER VOL CONTROL LOCK OFF	SY PANEL LOCK OFF<CR>	<<	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
TR	1 ON	Trioper 1 ON/OFF Control	TR1 ON<CR>	<<	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	1 OFF	Trioper 1 ON/OFF Control	TR1 OFF<CR>	<<	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	2 ON	Trioper 2 ON/OFF Control	TR2 ON<CR>	<<	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	2 OFF	Trioper 2 ON/OFF Control	TR2 OFF<CR>	<<	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	?	Return TR Status	TR?<CR>	TR1 ON<CR> TR2 ON<CR>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
UG	IDN	ID Number for UPGRADE is displayed on FL Display *****:12-digit ID Number	UGIDN<CR>	UGIDN *****<CR>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
RM	STA	REMOTE MAINTENANCE Mode Start	RM STA<CR>	<<	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	END	REMOTE MAINTENANCE Mode End	RM END<CR>	<<	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	?	Return RM Status	RM ?<CR>	RM ON<CR> RM OFF<CR>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
DIM	BRI	Dimmer = Bright	DIM BRI<CR>	<<	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	DIM	Dimmer = Dim	DIM DIM<CR>	<<	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	DAR	Dimmer = Dark	DIM DAR<CR>	<<	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	OFF	Dimmer = Off	DIM OFF<CR>	<<	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	SEL	Dimmer setting select(Toggle) Bright-Dim-Dark-Off	DIM SEL<CR>	<<	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
	?	Return DIM Status	DIM ?<CR>	<<	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			

Revision
 FY15V01 4/23/2015 Added X1200/X2200
 FY15V02 6/30/2015 Added X3200/X4200

Volume_CMD^MV^Z2**^Z3****

Relative(dB)	Absolute
-	0
-79.5	0.5
-79	1
-78.5	1.5
-78	2
-77.5	2.5
-77	3
-76.5	3.5
-76	4
-75.5	4.5
-75	5
-74.5	5.5
-74	6
-73.5	6.5
-73	7
-72.5	7.5
-72	8
-71.5	8.5
-71	9
-70.5	9.5
-70	10
-69.5	10.5
-69	11
-68.5	11.5
-68	12
-67.5	12.5
-67	13
-66.5	13.5
-66	14
-65.5	14.5
-65	15
-64.5	15.5
-64	16
-63.5	16.5
-63	17
-62.5	17.5
-62	18
-61.5	18.5
-61	19
-60.5	19.5
-60	20
-59.5	20.5
-59	21
-58.5	21.5
-58	22
-57.5	22.5
-57	23
-56.5	23.5
-56	24
-55.5	24.5
-55	25
-54.5	25.5
-54	26
-53.5	26.5
-53	27
-52.5	27.5
-52	28
-51.5	28.5
-51	29
-50.5	29.5
-50	30
-49.5	30.5
-49	31
-48.5	31.5
-48	32
-47.5	32.5
-47	33
-46.5	33.5
-46	34
-45.5	34.5
-45	35
-44.5	35.5
-44	36
-43.5	36.5
-43	37
-42.5	37.5
-42	38
-41.5	38.5
-41	39
-40.5	39.5
-40	40
-39.5	40.5
-39	41
-38.5	41.5
-38	42
-37.5	42.5
-37	43
-36.5	43.5
-36	44
-35.5	44.5
-35	45
-34.5	45.5
-34	46
-33.5	46.5
-33	47
-32.5	47.5
-32	48
-31.5	48.5
-31	49
-30.5	49.5
-30	50
-29.5	50.5
-29	51
-28.5	51.5
-28	52
-27.5	52.5
-27	53
-26.5	53.5
-26	54
-25.5	54.5
-25	55
-24.5	55.5
-24	56
-23.5	56.5
-23	57
-22.5	57.5
-22	58
-21.5	58.5
-21	59
-20.5	59.5
-20	60
-19.5	60.5
-19	61
-18.5	61.5
-18	62
-17.5	62.5
-17	63
-16.5	63.5
-16	64
-15.5	64.5
-15	65
-14.5	65.5
-14	66
-13.5	66.5
-13	67
-12.5	67.5
-12	68
-11.5	68.5
-11	69
-10.5	69.5
-10	70
-9.5	70.5
-9	71
-8.5	71.5
-8	72
-7.5	72.5
-7	73
-6.5	73.5
-6	74
-5.5	74.5
-5	75
-4.5	75.5
-4	76
-3.5	76.5
-3	77
-2.5	77.5
-2	78
-1.5	78.5
-1	79
-0.5	79.5
0	80
0.5	80.5
1	81
1.5	81.5
2	82
2.5	82.5
3	83
3.5	83.5
4	84
4.5	84.5
5	85
5.5	85.5
6	86
6.5	86.5
7	87
7.5	87.5
8	88
8.5	88.5
9	89
9.5	89.5
10	90
10.5	90.5
11	91
11.5	91.5
12	92
12.5	92.5
13	93
13.5	93.5
14	94
14.5	94.5
15	95
15.5	95.5
16	96
16.5	96.5
17	97
17.5	97.5
18	98