

DENON AVR/AVC control protocol

Ver. 4.7

Application model : AVR-987

Application terminal : RS-232C

Connector specification

. 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)

Protocol specification

The following three data forms is defined.

- COMMAND** : The message sent to a system(AVR/AVC) from a controller(Touch Panel etc.)
A command to a system is given from a controller.
- EVENT** : The message sent to a controller(Touch Panel etc.) from a system(AVR/AVC)
The result is sent, when a system is operated directly and a state changes.
*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/AVC)
if the 'request command' (**COMMAND+?+CR(0x0D)**) has come from a controller.
The **RESPONSE** should be sent within 200ms of receiving the **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
 CDR/TAPE-1 : function name
 THX SURROUND EX : surround mode name
 SUPER STADIUM : surround mode name

*Special Parameter--- ? : for request command

The example of a command

* <CR> is the meaning of 0x0D.

SIDVD<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 SURROUND MODE changes, the value of the channel volume of all channels returns as **EVENT**.
- C) CHANNEL VOLUME returns the data of ALL channels by the present SURROUND MODE also including an intact channel. In this case, the data of an intact channel is set to "50".
- D) Since SURROUND MODE changes simultaneously when the INPUT source changes, the SURROUND MODE (and also the value of the channel volume of all channels , It described in B)) returns as **EVENT**.
- E) When SURROUND MODE is the same in between INPUT source change before and after, **EVENT** of SURROUND MODE and CHANNEL VOLUME does NOT return.
- F) Although **EVENT** of SURROUND MODE returns when the present SURROUND MODE is set up again, CHANNEL VOLUME does NOT return.
- G) When SURROUND MODE is changed, before returning SURROUND MODE after change as **EVENT**, the present SURROUND MODE is returned.
- H) 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).
- I) The **PARAMETER** (with **COMMAND** and **RESPONSE, EVENT**) of minimum level of MASTER VOLUME defines "99".
- J) If the MASTER VOLUME & CHANNEL VOLUME set with 0.5dB step, the **PARAMETER** (with **COMMAND** and **RESPONSE, EVENT**) defines three ASCII characters as bellows.

```
ex.   MASTER VOLUME = +1.0dB :    MV81<CR>
                        +0.5dB :    MV805<CR>
                        0dB :       MV80<CR>
                        -0.5dB :    MV795<CR>
                        -1.0dB :    MV79<CR>
                        |           |
                        -79.5dB :   MV005<CR>
                        -80.0dB :   MV00<CR>
                        --- :       MV99<CR>
```

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

COMMAND and PARAMETER list

COMMAND	PARAMETER	function	example
PW	ON	POWER ON/STANDBY change	PWON<CR>
	STANDBY		PWSTANDBY<CR>
	?	Return PW Status	PW?<CR>
MV	UP	MASTER VOLUME UP/DOWN , direct change to **dB	MVUP<CR>
	DOWN		MVDOWN<CR>
	**	** : 00 to 99 by ASCII , 80=0dB, 99=---(MIN)	MV80<CR>
	?	Return MV Status	MV?<CR>
CV	FL UP	CHANNEL VOLUME UP/DOWN , direct change to **dB	CVFL UP<CR>
	FL DOWN	---FRONT Lch	CVFL DOWN<CR>
	FL **	** : 38 to 62 by ASCII , 50=0dB	CVFL 50<CR>
	FR UP		CVFR UP<CR>
	FR DOWN	---FRONT Rch	CVFR DOWN<CR>
	FR **	** : 38 to 62 by ASCII , 50=0dB	CVFR 50<CR>
	C UP		CVC UP<CR>
	C DOWN	---CENTERch	CVC DOWN<CR>
	C **	** : 38 to 62 by ASCII , 50=0dB	CVC 50<CR>
	SW UP		CVSW UP<CR>
	SW DOWN	---SUBWOOFERch	CVSW DOWN<CR>
	SW **	** : 00,38 to 62 by ASCII , 50=0dB,00=OFF	CVSW 50<CR>
	SL UP		CVSL UP<CR>
	SL DOWN	---SURROUND Lch	CVSL DOWN<CR>
	SL **	** : 38 to 62 by ASCII , 50=0dB	CVSL 50<CR>
	SR UP		CVSR UP<CR>
	SR DOWN	---SURROUND Rch	CVSR DOWN<CR>
	SR **	** : 38 to 62 by ASCII , 50=0dB	CVSR 50<CR>
	SBL UP	---SURROUND BACK Lch (SBch 2SP)	CVSBL UP<CR>
	SBL DOWN		CVSBL DOWN<CR>
	SBL **	** : 38 to 62 by ASCII , 50=0dB	CVSBL 50<CR>
	SBR UP	---SURROUND BACK Rch (SBch 2SP)	CVSBR UP<CR>
	SBR DOWN		CVSBR DOWN<CR>
	SBR **	** : 38 to 62 by ASCII , 50=0dB	CVSBR 50<CR>

MV , CV **COMMAND** : "*" parameter uses two or three ASCII characters. (see page4 J) section)

COMMAND	PARAMETER	function	example
CV	SB UP	---SURROUND BACKch (SBch 1SP)	CVSB UP<CR>
	SB DOWN		CVSB DOWN<CR>
	SB **	** : 00 to 99 by ASCII , 50=0dB	CVSB 50<CR>
	?	Return CV Status	CV?<CR>
MU	ON	OUTPUT MUTE ON/OFF change	MUON<CR>
	OFF		MUOFF<CR>
	?	Return MU Status	MU?<CR>
SI	PHONO	Select INPUT source	SIPHONO<CR>
	CD		SICD<CR>
	TUNER		SITUNER<CR>
	DVD		SIDVD<CR>
	VDP		SIVDP<CR>
	TV		SITV<CR>
	DBS		SIDBS<CR>
	VCR-1		SIVCR-1<CR>
	VCR-2		SIVCR-2<CR>
	VCR-3	---Invalid at AVR-987	SIVCR-3<CR>
	V.AUX		SIV.AUX<CR>
	CDR/TAPE		SICDR/TAPE<CR>
	?	Return SI Status	SI?<CR>
	ZM	ON	MAIN-ZONE ON/OFF change at AVR-987
OFF			ZMOFF<CR>
?		Return ZM Status	ZM?<CR>
Z2	PHONO	MULTI ZONE-2 mode set, and select source at AVR-987	Z2PHONO<CR>
	V.AUX	---The name of PARAMETER is the same as that of the time of SI COMMAND.	Z2V.AUX<CR>
	SOURCE	MULTI ZONE-2 mode cancel at AVR-987	Z2SOURCE<CR>

CV **COMMAND** : "*" parameter uses two ASCII characters. (see page4 J) section)

COMMAND	PARAMETER	function	example
Z2	UP	MULTI ZONE-2 VOLUME UP/DOWN , direct change to **dB at AVR-987(Power Amp Assign=ZONE2 Only) ** :10 to 99 by ASCII , 80=0dB, 99=---(MIN)	Z2UP<CR>
	DOWN		Z2DOWN<CR>
	**		Z280<CR>
	ON	MULTI ZONE-2 ON/OFF change at AVR-987	Z2ON<CR>
	OFF		Z2OFF<CR>
	?		Return Z2 Status
Z2MU	ON	ZONE2 OUTPUT MUTE ON/OFF change	Z2MUON<CR>
	OFF		Z2MUOFF<CR>
	?		Return Z2MU Status
Z3	PHONO	---Invalid at AVR-987	Z3PHONO<CR>
	V.AUX		Z3V.AUX<CR>
	SOURCE		Z3SOURCE<CR>
	UP		Z3UP<CR>
	DOWN		Z3DOWN<CR>
	**		Z380<CR>
	ON		Z3ON<CR>
	OFF		Z3OFF<CR>
?	---Invalid at AVR-987	Z3?<CR>	
Z3MU	ON	---Invalid at AVR-987	Z3MUON<CR>
	OFF		Z3MUOFF<CR>
	?		---Invalid at AVR-987
SR	PHONO	REC SELECT mode set , and select source ---The name of PARAMETER is the same as that of the time of SI COMMAND.	SRPHONO<CR>
	V.AUX	SRV.AUX<CR>	
	SOURCE	REC SELECT mode cancel	SRSOURCE<CR>
?	Return SR Status	SR?<CR>	

Z2 **COMMAND** : "*" parameter uses two ASCII characters. (see page4 J) section)

EVENT	PARAMETER	function	example	
SD	AUTO	set DIGITAL INPUT AUTO mode	SDAUTO<CR>	
	PCM	set DIGITAL INPUT force PCM mode	SDPCM<CR>	
	DTS	set DIGITAL INPUT force DTS mode	SDDTS<CR>	
	ANALOG	set force ANALOG INPUT mode	SDANALOG<CR>	
	EXT.IN-1	---Set EXT.IN mode at AVR-987	SDEXT.IN-1<CR>	
	EXT.IN-2	---Invalid at AVR-987	SDEXT.IN-2<CR>	
	?	Return SD Status	SD?<CR>	
SV	DVD	VIDEO SELECT mode set , and select source	SVDVD<CR>	
	VDP		SVVDP<CR>	
	TV		SVTV<CR>	
	DBS		SVDBS<CR>	
	VCR-1		SVVCR-1<CR>	
	VCR-2		SVVCR-2<CR>	
	VCR-3		---Invalid at AVR-987	SVVCR-3<CR>
	V.AUX		SVV.AUX<CR>	
	SOURCE		VIDEO SELECT mode cancel	SVSOURCE<CR>
	?		Return SV Status	SV?<CR>
MS	DIRECT	SURROUND mode set	MSDIRECT<CR>	
	PURE DIRECT		MSPURE DIRECT<CR>	
	STEREO		MSSTEREO<CR>	
	MULTI CH IN	---This is received as "SATNDARD".	MSMULTI CH IN<CR>	
	MULTI CH DIRECT		MSMULTI CH DIRECT<CR>	
	MULTI CH PURE D	All are received as "STANDARD" , the surround mode which changed return as <i>EVENT</i> .	MSMULTI CH PURE D<CR>	
	DOLBY PRO LOGIC		MSDOLBY PRO LOGIC<CR>	
	DOLBY PL2		MSDOLBY PL2<CR>	
	DOLBY PL2x		MSDOLBY PL2X<CR>	
	DOLBY DIGITAL		MSDOLBY DIGITAL<CR>	
	DOLBY D EX		MSDOLBY D EX<CR>	
	DTS NEO:6		All are received as "DTS SURROUND" ,	MSDTS NEO:6<CR>
	DTS SURROUND	MSDTS SURROUND<CR>		
	DTS ES DSCRT6.1	MSDTS ES DSCRT6.1<CR>		
DTS ES MTRX6.1	MSDTS ES MTRX6.1<CR>			

EVENT	PARAMETER	function	example
MS	DOLBY H/P	---Invalid at AVR-987 model	MSDOLBY H/P<CR>
	DTS+DOLBY H/P	---Invalid at AVR-987 model	MSDTS+DOLBY H/P<CR>
	HOME THX CINEMA	---Invalid at AVR-987 model	MSHOME THX CINEMA<CR>
	THX5.1	---Invalid at AVR-987 model	MSTHX5.1<CR>
	THX U2 CINEMA	---Invalid at AVR-987 model	MSTHX U2 CINEMA<CR>
	THX MUSIC MODE	---Invalid at AVR-987 model	MSTHX MUSIC MODE<CR>
	THX GAMES MODE	---Invalid at AVR-987 model	MSTHX GAMES MODE<CR>
	THX6.1	---Invalid at AVR-987 model	MSTHX6.1<CR>
	THX SURROUND EX	---Invalid at AVR-987 model	MSTHX SURROUND EX<CR>
	WIDE SCREEN		MSWIDE SCREEN<CR>
	5CH STEREO	Both are received as "5CH/7CH STEREO" , the surround mode which changed return as <i>EVENT</i> .	MS5CH STEREO<CR>
	7CH STEREO		MS7CH STEREO<CR>
	SUPER STADIUM		MSSUPER STADIUM<CR>
	ROCK ARENA		MSROCK ARENA<CR>
	JAZZ CLUB		MSJAZZ CLUB<CR>
	CLASSIC CONCERT		MSCLASSIC CONCERT<CR>
	MONO MOVIE		MSMONO MOVIE<CR>
	MATRIX		MSMATRIX<CR>
	VIDEO GAME		MSVIDEO GAME<CR>
	VIRTUAL		MSVIRTUAL<CR>
	MPEG2 AAC	---Invalid at AVR model	MSMPEG2 AAC<CR>
	AAC+DOLBY EX	---Invalid at AVR model	MSAAC+DOLBY EX<CR>
	?	Return MS Status	MS?<CR>
	USER1	USER1-3 MODE SELECT	MSUSER1<CR>
	USER2		MSUSER2<CR>
	USER3		MSUSER3<CR>
	USER1 MEMORY	USER1-3 MODE MEMORY	MSUSER1 MEMORY<CR>
	USER2 MEMORY		MSUSER2 MEMORY<CR>
USER3 MEMORY	MSUSER3 MEMORY<CR>		
USER ?	Return MSUSER Status	MSUSER ?<CR>	

EVENT	PARAMETER	function	example	
PS	TONE DEFEAT ON	PARAMETER setting	PSTONE DEFEAT ON<CR>	
	TONE DEFEAT OFF	TONE DEFEAT ON/OFF	PSTONE DEFEAT OFF<CR>	
	TONE DEFEAT ?	Return PSTONE DEFEAT Status	PSTONE DEFEAT ?<CR>	
	SB:MTRX ON	SURROUND BACK SP MODE set	PSSB:MTRX ON<CR>	
	SB:NON MTRX		PSSB:NON MTRX<CR>	
	SB:PL2xCINEMA		PSSB:PL2X CINEMA<CR>	
	SB:PL2xMUSIC		PSSB:PL2X MUSIC<CR>	
	SB:OFF		PSSB:OFF<CR>	
	SB: ?		Return PSSB: Status	PSSB: ?<CR>
	CINEMA EQ.ON		CINEMA EQ. ON/OFF	PSCINEMA EQ.ON<CR>
	CINEMA EQ.OFF	PSCINEMA EQ.OFF<CR>		
	CINEMA EQ.OFF	Return PSCINEMA EQ.Status		PSCINEMA EQ. ?<CR>
	MODE:MUSIC	CINEMA / MUSIC / GAME / PL mode change (This parameter can change DOLBY PL2, PL2x, NEO:6 mode.)	PSMODE:MUSIC<CR>	
	MODE:CINEMA		PSMODE:CINEMA<CR>	
	MODE:GAME		PSMODE:GAME<CR>	
	MODE:PRO LOGIC		PSMODE:PRO LOGIC<CR>	

	MODE: ?	Return PSMODE: Status	PSMODE: ?<CR>	
	ROOM EQ:AUDYSSEY	ROOM EQ mode direct change	PSROOM EQ:AUDYSSEY<CR>	
	ROOM EQ:FRONT		PSROOM EQ:FRONT<CR>	
	ROOM EQ:FLAT		PSROOM EQ:FLAT<CR>	
	ROOM EQ:MANUAL		PSROOM EQ:MANUAL<CR>	
	ROOM EQ:OFF		PSROOM EQ:OFF<CR>	
	ROOM EQ: ?		Return PS ROOM EQ: Status	PSROOM EQ: ?<CR>
	DELAY UP	AUDIO DELAY UP/DOWN , direct change to ***dB ***:000 to 999 by ASCII , 000=0ms, 200=200ms --- AVR-987 can be operated from 0 to 200	PSDELAY UP<CR>	
	DELAY DOWN		PSDELAY DOWN<CR>	
	DELAY ***		PSDELAY 200<CR>	
	NIGHT ON	NIGHT MODE ON/OFF (This parameter can change DOLBY DIGITAL SIGNAL)	PSNIGHT ON<CR>	
	NIGHT OFF		PSNIGHT OFF<CR>	
	FRONT SPA	Switch THE FRONT SP A/B/A+B	PSFRONT SPA<CR>	
	FRONT SPB		PSFRONT SPB<CR>	
	FRONT A+B		PSFRONT A+B<CR>	
	FRONT?		Return PSFRONT: Status	PSFRONT ?<CR>

<i>EVENT</i>	<i>PARAMETER</i>	function	example
TF	UP	TUNER Frequency UP/DOWN , direct change	TFUP<CR>
	DOWN		TFDOWN<CR>
	***** (6 digits)	--- ****.* kHz at AM band (>050000 is AM.) ****.* MHz at FM band (<050000 is FM.)	TF105000<CR> (1050.00kHz at AM)
	XM*** (3 digits)	--- *** CH at XM band (North America model Only)	TFXM001<CR> (XM001 CH at XM)
	?	Return TF Status	TF?<CR>
TP	UP	TUNER PRESET CH UP/DOWN , direct change to No.**	TPUP<CR>
	DOWN		TPDOWN<CR>
	**(PRESET No.)		TPA1<CR> (PRESET No."A1")
	?	Return TP Status	TP?<CR>
	MEMORY	TUNER PRESET MEMORY	TPMEMORY<CR>
TM		TUNER BAND , MODE Select	
	AM	---Band set to AM	TMAM<CR>
	FM	---Band set to FM	TMFM<CR>
	XM	---Band set to XM (North America model Only)	TMXM<CR>
	?	Return TM Status	TM?<CR>
	AUTO	---Tuning mode set to AUTO mode	TMAUTO<CR>
	MANUAL	---Tuning mode set to MANUAL mode	TMMANUAL<CR>

TF, TP, TM **COMMAND** : '*' parameters can NOT operate when INPUT source isn't TUNER.

iPod Extended Control

<i>EVENT</i>	<i>PARAMETER</i>	function	example
IP	90	"Cursor Up" Control	IP90<CR>
	91	"Cursor Down" Control	IP91<CR>
	92	"Cursor Left" Control	IP92<CR>
	93	"Cursor Right" Control	IP93<CR>
	94	"Enter (Play/Pause)" Control	IP94<CR>
	9A	"Play/Pause" Control	IP9A<CR>
	9C	"Stop" Control	IP9C<CR>
	9D	"Skip Plus" Control	IP9D<CR>
	9E	"Skip Minus" Control	IP9E<CR>
	9F	"Manual Search Plus" Control	IP9F<CR>
	9G	"Manual Search Minus" Control	IP9G<CR>
	9H	"Repeat One" Control	IP9H<CR>
	9I	"Repeat All" Control	IP9I<CR>
	9J	"Repeat Off" Control	IP9J<CR>
	9K	"Shuffle Songs" Control	IP9K<CR>
	9L	"Shuffle Album" Control	IP9L<CR>
	9M	"Shuffle Off" Control	IP9M<CR>
	9N	"MENU" Control	IP9N<CR>
	9P	Switch the "Browse Mode" Control	IP9P<CR>
9Q	Switch the "Remote Mode" Control	IP9Q<CR>	
IPA		Return Onscreen Display Information List	IPA<CR> (Return IPA0-IPA8)

Cursor/Enter/Setup/Parameter

<i>EVENT</i>	<i>PARAMETER</i>	function	example
SS	CUP	"Cursor Up" Control	SSCUP<CR>
	CDN	"Cursor Down" Control	SSCDN<CR>
	CLT	"Cursor Left" Control	SSCLT<CR>
	CRT	"Cursor Right" Control	SSCRT<CR>
	ENT	"Enter" Control	SSENT<CR>
	MEN ON	"System Setup Menu ON" Control	SSMEN ON<CR>
	MEN OFF	"System Setup Menu OFF" Control	SSMEN OFF<CR>
PS	MEN ON	"Surround Parameter Menu ON" Control	PSMEN ON<CR>
	MEN OFF	"Surround Parameter Menu OFF" Control	PSMEN OFF<CR>

Remote Lock/Panel Lock

<i>EVENT</i>	<i>PARAMETER</i>	function	example
SY	REMOTE LOCK ON	REMOTE CONTROL LOCK ON/OFF	SYREMOTE LOCK ON<CR>
	REMOTE LOCK OFF		SYREMOTE LOCK OFF<CR>
	PANEL LOCK ON	PANEL BUTTON(Except MASTER VOL.)CONTROL LOCK ON	SYPANEL LOCK ON<CR>
	PANEL+V LOCK ON	PANEL BUTTON & MASTER VOL. CONTROL LOCK ON	SYPANEL+V LOCK ON<CR>
	PANEL LOCK OFF	PANEL BUTTUM & MASTER VOL. CONTROL LOCK OFF	SYPANEL LOCK OFF<CR>

EVENT(or RESPONSE) and PARAMETER list

<i>EVENT</i>	<i>PARAMETER</i>	function	example
PW	ON	POWER ON/STANDBY change	PWON<CR>
	STANDBY		PWSTANDBY<CR>
MV	**	MASTER VOLUME change , **:00 to 99 by ASCII 98 = +18dB(MAX) 80 = 0dB 00 = -80dB 99 = --- (MIN)	MV80<CR>
CV	FL **	CHANNEL VOLUME change , **:00,38 to 62 by ASCII 62 = +12dB(MAX) 50 = 0dB 38 = -12dB(MIN) 00 = OFF (define ONLY SWch in DIRECT mode.) (at SBch 2SP) (at SBch 2SP) (at SBch 1SP)	CVFL 50<CR>
	FR **		CVFR 50<CR>
	C **		CVC 50<CR>
	SW **		CVSW 50<CR>
	SL **		CVSL 50<CR>
	SR **		CVSR 50<CR>
	SBL **		CVSBL 50<CR>
	SBR **		CVSBR 50<CR>
	SB **		CVSB 50<CR>
SI	PHONO	INPUT source change	SIPHONO<CR>
	CD		SICD<CR>
	TUNER		SITUNER<CR>
	DVD		SIDVD<CR>
	VDP		SIVDP<CR>
	TV		SITV<CR>
	DBS		SIDBS<CR>
	VCR-1		SIVCR-1<CR>
	VCR-2		SIVCR-2<CR>
	VCR-3		---Invalid at AVR-987 model SIVCR-3<CR>
	V.AUX		SIV.AUX<CR>
	CDR/TAPE		SICDR/TAPE<CR>

The '*' *PARAMETER* of MV, CV *EVENT* : Uses two or three ASCII characters. (see page4 J) section)

EVENT	PARAMETER	function	example
MU	ON	OUTPUT MUTE ON/OFF change	MUON<CR>
	OFF		MUOFF<CR>
ZM	ON	MAIN-ZONE ON/OFF change	ZMON<CR>
	OFF		ZMOFF<CR>
Z2	PHONO V.AUX	MULTI ZONE-2 source change ---The name of PARAMETER is the same as that of the time of SI COMMAND.	Z2PHONO<CR> Z2V.AUX<CR>
	SOURCE	MULTI ZONE-2 mode cancel	Z2SOURCE<CR>
	**	MULTI ZONE-2 VOLUME change , **:10 to 99 by ASCII 98 = +18dB(MAX) 80 = 0dB 10 = -70dB 99 = ---(MIN) (Power Amp Assign=ZONE2 Only)	Z280<CR>
	ON	MULTI ZONE-2 ON/OFF change	Z2ON<CR>
	OFF		Z2OFF<CR>
	Z2MU	ON	ZONE2 OUTPUT MUTE ON/OFF change
OFF		Z2MUOFF<CR>	
Z3	PHONO V.AUX	MULTI ZONE-3 source change ---The name of PARAMETER is the same as that of the time of SI COMMAND.	Z3PHONO<CR> Z3V.AUX<CR>
	SOURCE	MULTI ZONE-3 mode cancel	Z3SOURCE<CR>
	**	MULTI ZONE-3 VOLUME change , **:10 to 99 by ASCII 98 = +18dB(MAX) 80 = 0dB 10 = -70dB 99 = ---(MIN)	Z380<CR>
	ON	MULTI ZONE-3 ON/OFF change	Z3ON<CR>
	OFF		Z3OFF<CR>
	Z3MU	ON	ZONE3 OUTPUT MUTE ON/OFF change
OFF		Z3MUOFF<CR>	

The '*' **PARAMETER** of Z2, Z3 **EVENT** : Uses two ASCII characters. (see page4 J) section)

EVENT	PARAMETER	function	example	
SR	PHONO	REC SELECT source change ---The name of PARAMETER is the same as that of the time of SI COMMAND.	SRPHONO<CR>	
	V.AUX		SRV.AUX<CR>	
	SOURCE	REC SELECT mode cancel	SRSOURCE<CR>	
SV	DVD	VIDEO SELECT mode source change	SVDVD<CR>	
	VDP		SVVDP<CR>	
	TV		SVTV<CR>	
	DBS		SVDBS<CR>	
	VCR-1		SVVCR-1<CR>	
	VCR-2		SVVCR-2<CR>	
	VCR-3		---Invalid at AVR-987	SVVCR-3<CR>
	V.AUX			SVV.AUX<CR>
	SOURCE		SVSOURCE<CR>	
SD	AUTO	INPUT mode change	SDAUTO<CR>	
	PCM		SDPCM<CR>	
	DTS		SDDTS<CR>	
	ANALOG		SDANALOG<CR>	
	EXT.IN-1		---Set EXT.IN mode at AVR-987	SDEXT.IN-1<CR>
	EXT.IN-2	---Invalid at AVR-987	SDEXT.IN-2<CR>	

<i>EVENT</i>	<i>PARAMETER</i>	<i>function</i>	<i>example</i>
TF	***** (6 digits)	TUNER Frequency change --- ****.** kHz at AM band ****.** MHz at FM band	TF105000<CR> (1050.00kHz at AM)
	XM*** (3 digits)	--- *** CH at XM band (North America model Only)	TFXM001<CR> (XM001 CH at XM)
TP	**(PRESET No.)	TUNER PRESET change to No.**	TPA1<CR> (PRESET No."A1")
TM		TUNER BAND , MODE change	
	AM	---Band set to AM	TMAM<CR>
	FM	---Band set to FM	TMFM<CR>
	XM	---Band set to XM (North America model Only)	TMXM<CR>
	AUTO	---Tuning mode set to AUTO mode	TMAUTO<CR>
	MANUAL	---Tuning mode set to MANUAL mode	TMMANUAL<CR>
	CH NAME ***** (8 digit)	XM CH NAME change (Band XM Only)	TMCH NAME 20 on 20<CR>
	ARTIST ***** (16 digit)	XM ARTIST NAME change (Band XM Only)	TMARTIST EMINEM <CR>
	TITLE ***** (16 digit)	XM TITLE NAME change (Band XM Only)	TMTITLE JUST LOSE IT <CR>
	XMID ***** (8 digit)	XM RADIO ID(XM000 Selected) (Band XM Only)	TMXMID J3JU703B<CR>
	SIGNAL GOOD	XM ANTENNA SIGNAL STATUS change (Band XM Only)	TMSIGNAL GOOD<CR>
	SIGNAL WEAK		TMSIGNAL WEAK<CR>
	SIGNAL MARGINAL		TMSIGNAL MARGINAL<CR>
SIGNAL NOSIGNAL	TMSIGNAL NOSIGNAL<CR>		

EVENT	PARAMETER	function	example
MS	DIRECT	SURROUND mode change	MSDIRECT<CR>
	PURE DIRECT		MSPURE DIRECT<CR>
	STEREO		MSSTEREO<CR>
	MULTI CH IN		MSMULTI CH IN<CR>
	MULTI CH IN +PL2x C		MSM CH IN+PL2X C<CR>
	MULTI CH IN +PL2x M		MSM CH IN+PL2X M<CR>
	MULTI CH DIRECT		MSMULTI CH DIRECT<CR>
	MULTI CH DIRECT +PL2x C		MSM CH DRCT+PL2X C <CR>
	MULTI CH DIRECT +PL2x M		MSM CH DRCT+PL2X M <CR>
	MULTI CH PURE D		MSMULTI CH PURE D<CR>
	MULTI CH PURE D +PL2x C		MSM CH PURE D+PL2X C <CR>
	MULTI CH PURE D +PL2x M		MSM CH PURE D+PL2X M <CR>
	DOLBY PRO LOGIC		MSDOLBY PRO LOGIC<CR>
	DOLBY PL2 CINEMA		MSDOLBY PL2 C<CR>
	DOLBY PL2 MUSIC		MSDOLBY PL2 M<CR>
	DOLBY PL2 G		MSDOLBY PL2 G<CR>
	DOLBY PL2x C		MSDOLBY PL2X C<CR>
	DOLBY PL2x M		MSDOLBY PL2X M<CR>
	DOLBY PL2x G		MSDOLBY PL2X G<CR>
	DOLBY DIGITAL		MSDOLBY DIGITAL<CR>
	DOLBY D EX		MSDOLBY D EX<CR>
	DOLBY D +PL2x C		MSDOLBY D+PL2X C<CR>
	DOLBY D +PL2x M		MSDOLBY D+PL2X M<CR>

EVENT	PARAMETER	function	example
MS	DTS NEO:6 C		MSDTS NEO:6 C<CR>
	DTS NEO:6 M		MSDTS NEO:6 M<CR>
	DTS SURROUND		MSDTS SURROUND<CR>
	DTS ES DSCRT6.1		MSDTS ES DSCRT6.1<CR>
	DTS ES MTRX6.1		MSDTS ES MTRX6.1<CR>
	DTS+PL2x C		MSDTS+PL2X C<CR>
	DTS+PL2x M		MSDTS+PL2X M<CR>
	DOLBY H/P	---Invalid at AVR-987 model	MSDOLBY H/P<CR>
	DTS+DOLBY H/P	---Invalid at AVR-987 model	MSDTS+DOLBY H/P<CR>
	PL2x C+THX	---Invalid at AVR-987 model	MSPL2X C+THX<CR>
	PL2 C+THX	---Invalid at AVR-987 model	MSPL2 C+THX<CR>
	PL+THX	---Invalid at AVR-987 model	MSPL+THX<CR>
	NEO:6 C+THX	---Invalid at AVR-987 model	MSNEO:6 C+THX<CR>
	THX5.1	---Invalid at AVR-987 model	MSTHX5.1<CR>
	THX U2 CINEMA	---Invalid at AVR-987 model	MSTHX U2 CINEMA<CR>
	THX MUSIC MODE	---Invalid at AVR-987 model	MSTHX MUSIC MODE<CR>
	THX GAMES MODE	---Invalid at AVR-987 model	MSTHX GAMES MODE<CR>
	THX6.1	---Invalid at AVR-987 model	MSTHX6.1<CR>
	THX SURROUND EX	---Invalid at AVR-987 model	MSTHX SURROUND EX<CR>
	WIDE SCREEN		MSWIDE SCREEN<CR>
	5CH STEREO		MS5CH STEREO<CR>
	7CH STEREO		MS7CH STEREO<CR>
	SUPER STADIUM		MSSUPER STADIUM<CR>
	ROCK ARENA		MSROCK ARENA<CR>
	JAZZ CLUB		MSJAZZ CLUB<CR>
	CLASSIC CONCERT		MSCLASSIC CONCERT<CR>
	MONO MOVIE		MSMONO MOVIE<CR>
	MATRIX		MSMATRIX<CR>
	VIDEO GAME		MSVIDEO GAME<CR>

EVENT	PARAMETER	function	example
MS	VIRTUAL		MSVIRTUAL<CR>
	MPEG2 AAC	---Invalid at AVR model	MSMPEG2 AAC<CR>
	AAC+DOLBY EX	---Invalid at AVR model	MSAAC+DOLBY EX<CR>
	AAC+PL2x C	---Invalid at AVR model	MSAAC+PL2X C<CR>
	AAC+PL2x M	---Invalid at AVR model	MSAAC+PL2X M<CR>
	DSD DIRECT	---Invalid at AVR-987 model	MSDSD DIRECT<CR>
	DSD PURE DIRECT	---Invalid at AVR-987 model	MSDSD PURE DIRECT<CR>
	DSD MULTI DRCT	---Invalid at AVR-987 model	MSDSD MULTI DRCT<CR>
	DSD MULTI PURE	---Invalid at AVR-987 model	MSDSD MULTI PURE<CR>
	USER1	USER mode change	MSUSER1<CR>
	USER2		MSUSER2<CR>
	USER3		MSUSER3<CR>
	USER0	---User 1(or User 2 or User 3) Change User OFF	MSUSER0<CR>
	PS	TONE DEFEAT ON	TONE DEFEAT ON/OFF change
TONE DEFEAT OFF		PSTONE DEFEAT OFF<CR>	
SB:MTRX ON		SURROUND BACK MODE change	PSSB:MTRX ON<CR>
SB:NON MTRX			PSSB:NON MTRX<CR>
SB:PL2xC			PSSB:PL2X CINEMA<CR>
SB:PL2xM			PSSB:PL2X MUSIC<CR>
SB:OFF			PSSB:OFF<CR>
SB:ESDSCRT			PSSB:ESDSCRT<CR>
SB:ESMTRX			PSSB:ESMTRX<CR>
SB:ON			PSSB:ON<CR>
SB:MUSIC			PSSB:MUSIC<CR>
SB:DSCRT ON			PSSB:DSCRT ON<CR>
SB:GAME			PSSB:GAME<CR>
CINEMA EQ.ON		CINEMA EQ. ON/OFF Change	PSCINEMA EQ.ON<CR>
CINEMA EQ.OFF			PSCINEMA EQ.OFF<CR>
MODE:MUSIC		CINEMA / MUSIC / GAME / PL mode change	PSMODE:MUSIC<CR>
MODE:CINEMA			PSMODE:CINEMA<CR>
MODE:GAME			PSMODE:GAME<CR>
MODE:PRO LOGIC	PSMODE:PRO LOGIC<CR>		

EVENT	PARAMETER	function	example
PS	ROOM EQ:AUDYSSEY	ROOM EQ mode direct change	PSROOM EQ:AUDYSSEY<CR>
	ROOM EQ:FRONT		PSROOM EQ:FRONT<CR>
	ROOM EQ:FLAT		PSROOM EQ:FLAT<CR>
	ROOM EQ:MANUAL		PSROOM EQ:MANUAL<CR>
	ROOM EQ:OFF		PSROOM EQ:OFF<CR>
	DELAY ***	AUDIO DELAY change, ***:000 to 999 by ASCII	PSDELAY 200<CR>
		---AVR-987 : 200=200ms (MAX)	
		100=100ms, 000=0ms	
	NIGHT:ON	NIGHT mode ON/OFF change (This parameter can change DOLBY DIGITAL SIGNAL)	PSNIGHT:ON<CR>
	NIGHT:OFF		PSNIGHT:OFF<CR>
	FRONT SPA	FRONT SP A/B/A+B change	PSFRONT SPA<CR>
	FRONT SPB		PSFRONT SPB<CR>
	FRONT A+B		PSFRONT A+B<CR>

iPod Extended Control

EVENT	PARAMETER	function	
IPA		Onscreen Display Information is Answered By the IPA Command.	
	0	Display Line1 Information	IPA0*****_???.<CR>
	1	Display Line3 Information	IPA1 *****_???.<CR>
	2	Display Line4 Information	IPA2 *****_???.<CR>
	3	Display Line5 Information	IPA3 *****_???.<CR>
	4	Display Line6 Information	IPA4 *****_???.<CR>
	5	Display Line7 Information	IPA5 *****_???.<CR>
	6	Display Line8 Information	IPA6 *****_???.<CR>
	7	Display Line9 Information	IPA7*****_???.<CR>
	8	Display Line10 Information	IPA8*****_???.<CR>
			*:Character Length MAX96 _:Null ?:Exclusion(The character after Null should be disregarded) :Cursor Infomation Data(1Byte) Bit1,2,3:Don't Care Bit4:CURSOR SELECT=1 Bit5,6,7,8:Don't Care
			<example> IPA0Now Playing iPod_???????.<CR> IPA1 A HARD DAY'S NIGHT._???.<CR> IPA2 /The Beatles_?????????.<CR> IPA3 _?????????????????????.<CR> IPA4 A HARD DAY'S NIGHT_???.<CR> IPA5 00:04_?????????????????.<CR> IPA6 _?????????????????????.<CR> IPA7 RPT All SFL Songs_?????.<CR> IPA8_?????????????????????.<CR>