1. Outline

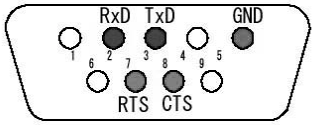
In case no comments in particular as for the contents of this papers, the descriptions are effective for the RX-V2300 and 3300. RX-Vx300 in this paper means both V3300 and RX-V2300.

1.1 Connection

5 wire system

	TxD(PIN3)	Transpose	-------->	RxD(PIN2)	
	RxD(PIN2)	receive	<-------	TxD(PIN3)	
RX-Vx300	GND(PIN5)	Ground	---------	GND(PIN5)	HOST.
Slave	CTS(PIN8)	permit to send data	<-------	RTS(PIN7)	master
	RTS(PIN7)	request to send data	-------->	CTS(PIN8)	

*When not connected, data sending to RX-Vx300 is prohibited (CTS port pull down).



1.2 RS-232C Settings

* Full duplex, start-stop synchronization communication

Baud rate	: 9600bps
Data bits	: 8
Parity	: No
Stop bit	: 1bit
Handshaking	: Hardware

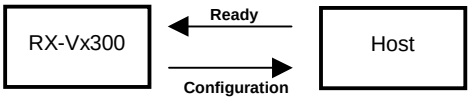
*RTS port of RX-Vx300 outputs low level while the AC plug is disconnected.
If RTS output stays low even when the AC plug is connected, there might be some trouble.

1.3 Data block timeout

It takes RX-Vx300 maximum 500msec to send one data block. If a complete data block is not received within 500msec, please cancel the transaction. There might be some trouble.

2. Start transactions

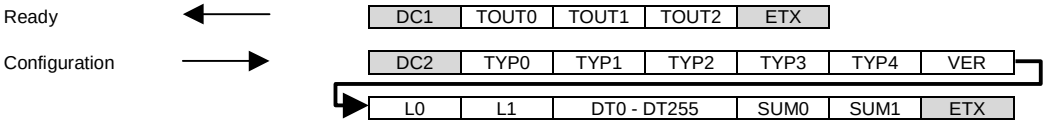
2.1 Starting Communication



Ready command is the very first command to be sent to RX-Vx300 at the start of the communication. TOUT0 - 2 in Ready Command sets timeout of the communication.

RX-Vx300 sends Configuration command (Model ID, software version, and setting data) to the host in reply to the Ready command.

RX-Vx300 will send a Configuration command within 1 sec. after receiving a Ready command from the host. If not, please send a Ready command again (max 5 times). If RX-Vx300 won't send any Configuration commands after fifth retry, please cancel the transaction because there might be some problems.



*TYPx : Model ID = “R0132” (RX-V2300)
"R0133" (RX-V3300)
*VER : Software Version
*SUM : the sum of all data except for the header and footer

function name	function	data (ASCII)	range (HEX)
TOUT0 - 2	communication timeout	0 - 9, A - F	0 - 0xFFF

*timeout between the header and the footer
*timeout=0 means no timeout

function name	function	data (ASCII)	range (HEX)
TYP0 - 4	model ID	0 - 9, A - F	voluntary
VER	software version	A - Z	voluntary
L0 - 1	data length	0 - 9, A - F	1 - 0xFF
DT0 - 255	data	0 - 9, A - F	0 - 0xF
SUM0	upper 4 bit of SUM	0 - 9, A - F	0 - 0xF
SUM1	lower 4 bit of SUM	0 - 9, A - F	0 - 0xF

*Data Structure of Configuration command

data When the power is OFF, only DT0,1,…,9 are sent to the Host.

DT0	**Fixed**	**Baud Rate**	**Don't care ('@')**
DT1	**Fixed**	**Receive Buffer**	**Don't care ('E')**
DT2	**Fixed**	**Receive Buffer**	**Don't care ('0')**
DT3	**Fixed**	**Command Timeout**	**Don't care ('1')**
DT4	**Fixed**	**Command Timeout**	**Don't care ('9')**
DT5	**Fixed**	**Command Timeout**	**Don't care ('0')**
DT6	**Fixed**	**Handshaking**	**Don't care ('0')**
DT7	0 / 1	System	0: OK / 1: Busy
DT8	0 / 1	Power	0: OFF / 1: ON
DT9	0 - C	Input	0: PHONO / 1: CD / 2: TUNER / 3: CD-R / 4: MD-TAPE / 5: DVD / 6: D-TV-LD / 7: CBL-SAT / 9: VCR1 / A: VCR2-DVR / C: V-AUX
DT10	0 / 1	6ch input	0: OFF / 1: ON
DT11	0 - 6	Input Mode	0: AUTO / 2: DTS / 4: ANALOG / 5: ANALOG ONLY
DT12	0 / 1	Audio Mute	0: OFF / 1: ON
DT13	0 - C	Zone2 Input	0: PHONO / 1: CD / 2: TUNER / 3: CD-R / 4: MD-TAPE / 5: DVD / 6: D-TV-LD / 7: CBL-SAT / 9: VCR1 / A: VCR2-DVR / C: V-AUX
DT14	0 / 1	Zone2 Mute	0: OFF / 1: ON
DT15	0 - F	Master Volume	Upper 4 bit
DT16	0 - F	Master Volume	Lower 4 bit
DT17	0 - F	Zone2 Volume	Upper 4 bit
DT18	0 - F	Zone2 Volume	Lower 4 bit
DT19	0 - F	Program	Upper 4 bit
DT20	0 - F	Program	Lower 4 bit
DT21	0 / 1	Effect	0: OFF / 1: ON
DT22	0 - 3	6.1/ES key status	0: OFF / 1: MATRIX ON / 2: DISCRETE ON / 3: AUTO
DT23	0 - 2	OSD*	0: FULL / 1: SHORT / 2: OFF
DT24	0 - 3	Sleep	0: 120 / 2: 90 / 3: 60 / 4: 30 / 5: OFF
DT25	0 - 4	Tuner Page	0: Page A / 1: Page B / 2: Page C / 3: Page D / 4: PageE
DT26	0 - 7	Tuner No.	0: No.1 / 1: No.2 / 2: No.3 / 3: No.4 / 4: No.5 / 5: No.6 / 6: No.7 / 7: No.8
DT27		**Don't Care**	
DT28		**Don't Care**	
DT29	0 / 1	Speaker relay A	0: OFF / 1: ON
DT30	0 / 1	Speaker relay B	0: OFF / 1: ON
DT31	0 - B	Playback	0: 6ch input / 1: Analog / 2: PCM / 3: DD*(except 2.0) / 4: DD(2.0) / 5: DD.Karaoke / 6: DD.EX / 7: DTS / 8: DTS-ES / 9: Other DIGITAL / A: DTS Analog Mute / B: DTS ES Discrete
DT32	0 - B	Fs	0: Analog / 1: 32kHz / 2: 44.1kHz / 3: 48kiHz / 4: 64kHz / 5: 88.2kHz / 6: 96kHz / 7: Unknown B: DTS 96/24
DT33	0 - 2	EX/ES playback	0: OFF / 1: MATRIX ON / 2: DISCRETE ON
DT34	0 / 1	Thr / Bypass	0: Normal / 1: Bypass
DT35	0 / 1	RED dts	0: Release / 1: Wait
DT36	0 / 1	Head Phone	0: OFF / 1: ON
DT37	0 / 1	TUNER BAND	0: FM / 1: AM
DT38	0 / 1	TUNER TUNED	0: NOT TUNED / 1: TUNED
DT39	0 / 1	DC1 Control Out	0: LOW / 1: HIGH
DT40		Don't care	
DT41		**Don't Care**	
DT42	0-2	DC1 TRG Ctrl.	0: Zone1 / 1: Zone2 / 2: Zone1&2
DT43	0/1	dts 96/24	0: OFF / 1: ON
DT44	0-2	DC2 TRG Ctrl.	0: Zone1 / 1: Zone2 / 2: Zone1&2
DT45	0/1	DC2 Trigger	0: LOW / 1: HIGH
DT46		SP B set	0: Zone1 / 1: Zone2
DT47		Zone 2 SP out	0: OFF / 1: ON
DT48		Effect center	Upper 4bit
DT49			Lower 4bit
DT50		Rear R	Upper 4bit
DT51			Lower 4bit
DT52		Rear CT	Upper 4bit
DT53			Lower 4bit
DT54		Rear L	Upper 4bit
DT55			Lower 4bit
DT56		Front	Upper 4bit
DT57			Lower 4bit
DT58		SWFR	Upper 4bit
DT59			Lower 4bit
DT60		EFCT 6C center	Upper 4bit
DT61			Lower 4bit
DT62		Rear R	Upper 4bit
DT63			Lower 4bit
DT64		Rear CT	Upper 4bit
DT65			Lower 4bit
DT66		Rear L	Upper 4bit
DT67			Lower 4bit
DT68		Front	Upper 4bit
DT69			Lower 4bit
DT70		SWFR	Upper 4bit
DT71			Lower 4bit

DT72	Main balance		Upper 4bit
DT73			Lower 4bit
DT74	LFE Lvl. SP		Upper 4bit
DT75			Lower 4bit
DT76	HP		Upper 4bit
DT77			Lower 4bit
DT78	**Don't Care**		
DT79	**Don't Care**		
DT80	SP DLY Center		Upper 4bit
DT81			Lower 4bit
DT82	Rear CT		Upper 4bit
DT83			Lower 4bit
DT84	Input mode set		0: AUTO / 1: LAST
DT85	Dimmer		0: -4 / 1: -3 / 2: -2 / 3: -1 / 4: 0
DT86	**Don't Care**		
DT87	OSD shift		0: -5 / 1: -4 / ..... / 8: +3 / 9: +4 / A: +5
DT88	**Don't Care**		
DT89	Glay back		0: OFF / 1: AUTO
DT90	Video conversion		0: OFF / 1: ON
DT91	D. Range	SP	0: MAX / 1: STD / 2: MIN
DT92		HP	0: MAX / 1: STD / 2: MIN
DT93	Zone 2 vol. Out		
DT94	**Don't Care**		
DT95	Memory guard		0: OFF / 1: ON
DT96	SP set	Center	0: Large / 1: Small / 2: None
DT97		Main	0: Large / 1: Small
DT98		Rear L/R	0: Large / 1: Small / 2: None
DT99		Rear CT	0: Large / 1: Small / 2: None
DT100		Front	0: Yes / 1: None
DT101		LFE/BASS	0: SWFR / 1: Main / 2: Both
DT102	6CH	Center	0: Center / 1: Main
DT103		SWFR	0: SWFR / 1: Main
DT104	Main level		0: Normal / 1: -10dB
DT105	Test mode		0: OFF / 1: Dolby / 2: DTS

*DD = Dolby Digital
*OSD = On Screen Display

3. Control Command

*RX-Vx300 can receive control commands only while the power is on.
(Except Power commands and System commands*)

*Please do not send any control commands while the system status is in wait. No commands are permitted until RX-Vx300 reports OK

*RX-Vx300 will send a Report Command** within 1 sec of receiving the Control Command. If no Report Command is received, resend control command (max 5 times) If RX-Vx300 doesn't send a Report Commands after fifth retry, cancel the transaction because there might be some troubles.

*'SW' switches the type of the control command. When the 'SW' is set to '0', you can control RX-Vx300 remotely via RS-232C.

*RX-Vx300 will only send one report command for each type of control. The Report Command will report only the final status of all settings in a strings of commands (may not report all steps in a status, only final status).
For example, if a user set the input selector on the unit to D-TV/LD just after the host sends command to change input to CD, RX-Vx300 may report only the final status that the input was changed to D-TV/LD by the system operation.

*System command, **Report command --> described in later

- Command Switch (changing the type of control command)

control command

STX	SW	CMDT0	CMDT1	CMDT2	CMDT3	ETX

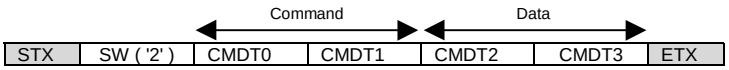
SW=0 :Operation Command (Remote Control) — 4 byte remote control code
SW=1 :command (***Not in use***) — command / data
SW=2 :system command — command / data
SW=3 :packet data — data

function name	function	data (ASCII)	range (HEX)
SW	command switch	0 - 9	0 - 9
CMDT0 - 3	command & data	0 - 9, A - F	variable

* 'SW' switches the command type of the Control Command.
SW=0 : 4 byte command for remote control code
SW=1 : 1 byte command 0 - F (HEX expression in ASCII)
SW=2 : 2 byte command 10 - FF (HEX expression in ASCII)
SW=3 : 4 byte packet data

* RX-Vx300 uses following three types of Control Command.
- Operation Commands for remote control (SW = 0)
- System Commands for system setting (SW = 2)
- packet data for test data transmission (SW = 3)

3.1 System Command (SW = '2')



System Command can be made by setting the 'SW' byte in the Control Command to '2'. With System command you can control RX-Vx300's system settings (Report Command Enable / Disable, Report Command delay, etc)

With a System Command you can also ...
- set absolute master volume value.
- send text strings to the On Screen Display (OSD).
- request RX-Vx300 text data regarding tuner freq., master volume, input name, zone2 input name.

(from RX-Vx300)

	Command			data			Report Command		
SW	CMDT0	CMDT1		CDMT2	CMDT3		Type	RCMD1,2	RDAT1,2
2	0	0	report command enable	0	0	enable	0	00	00(OK)
				0	1	disable	0	00	00(OK)
2	0	1	time between two report commands	0	0	real time	0	00	00(OK)
			(Report Command Delay)	0	1	50ms	0	00	00(OK)
				0	2	100ms	0	00	00(OK)
				0	3	150ms	0	00	00(OK)
				0	4	200ms	0	00	00(OK)
				0	5	250ms	0	00	00(OK)
				0	6	300ms	0	00	00(OK)
				0	7	350ms	0	00	00(OK)
				0	8	400ms	0	00	00(OK)
2	1	0	OSD message start command	0	0	start	0	00	00(OK)
2	2	0	Tuning frequency text request	0	0		Refer to the following section		
			Main volume value text request	0	1				
			Zone 2 volume value text request	0	2				
			Input name text request	0	3				
			Zone2 input name text request	0	4				
2	3	0	Master volume direct setting	X	X		0	26	
2	3	1	Zone 2 volume direct setting	X	X		0	27	
2	3	2	Main L/R balance	X	X		0	50	
2	3	3	Main level	0	0	Normal	0	3D	
				0	1	-10dB	0	3D	
2	4	0	Level Center (Main)	X	X		0	40	
2	4	1	Rear R (Main)	X	X		0	41	
2	4	2	Rear CT (Main)	X	X		0	42	
2	4	3	Rear L (Main)	X	X		0	43	
2	4	4	Front (Main)	X	X		0	44	
2	4	5	SWFR (Main)	X	X		0	45	
2	4	8	Level Center (6CH)	X	X		0	48	
2	4	9	Rear R (6CH)	X	X		0	49	
2	4	A	Rear CT (6CH)	X	X		0	4A	
2	4	B	Rear L 6CH	X	X		0	4B	
2	4	C	Front (6CH)	X	X		0	4C	
2	4	D	SWFR 6CH	X	X		0	4D	
2	5	0	LFE SP	X	X		0	51	
2	5	1	LFE HP	X	X		0	52	
2	5	2	Audio Delay	X	X		0	53	
2	5	3	SP Delay Center	X	X		0	54	
2	5	4	SP Delay Rear CT	X	X		0	55	
2	6	0	Input Mode	0	0	Auto	0	60	
				0	1	Last	0	60	
2	6	1	Dimmer	X	X		0	61	
2	6	2	OSD Shift	X	X		0	62	
2	6	3	Gray Back	0	0	Off	0	63	
				0	1	Auto	0	63	
2	6	4	Dynamic Range SP	0	0	Max	0	64	
				0	1	STD	0	64	
				0	2	Min	0	64	
2	6	5	Dynamic Range HP	0	0	Max	0	65	
				0	1	STD	0	65	
				0	2	Min	0	65	
2	6	6	Zone 2 Volume Output	0	0	Var.	0	66	
				0	1	Fix	0	66	
2	6	7	Zone 2 Mode	0	0	Mode 1	0	67	
				0	1	Mode 2	0	67	

2	6	8	Memory Guard	0	0	Off	0	68	
				0	1	On	0	68	
2	6	9	Video Conversion	0	0	Off	0	69	
				0	1	On	0	69	
2	7	0	SP Center	0	0	Large	0	70	
				0	1	Small	0	70	
				0	2	None	0	70	
2	7	1	Main	0	0	Large	0	71	
				0	1	Small	0	71	
2	7	2	Rear L/R	0	0	Large	0	72	
				0	1	Small	0	72	
				0	2	None	0	72	
2	7	3	Rear Center	0	0	Large	0	73	
				0	1	Small	0	73	
				0	2	None	0	73	
2	7	4	Front (only V3300)	0	0	Yes	0	74	
				0	1	None	0	74	
2	7	5	LFE/Bass	0	0	SWFR	0	75	
				0	1	Main	0	75	
				0	2	Both	0	75	
2	7	8	6CH Center to	0	0	Center	0	78	
					1	Main	0	78	
2	7	9	6CH SWFR to	0	0	SWFR	0	79	
					1	Main	0	79	
2	8	0	Test	0	0	Off	0	80	
					1	Dolby	0	80	
					2	DSP	0	80	

: Not supported by RX-Vx300 Series

***OSD message function**

OSD Message function can display a message of 16 characters to Vx300's OSD for a few seconds. The command sequence block will start by sending "start command" as mentioned above, followed by 4 bytes of packet data (SW:3) repeated four times. Then the message of sixteen characters(ASCII) will display and the command block finish automatically.
(ex.)Want to display " Test message ! " characters to OSD.

1. Send the start command.

STX	2	1	0	0	0	ETX

2. Send SW:3 commands four times as follows.

STX	3	' '	'T'	'e'	's'	ETX
STX	3	't'	' '	'm'	'e'	ETX
STX	3	's'	's'	'a'	'g'	ETX
STX	3	'e'	' '	'!'	' '	ETX

3. The command block will be finished automatically.

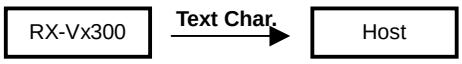
The available characters to display the message are as follows.
**""(SPACE)"!""#""%""&""("")""*""+","-
"."0""1""2""3""4""5""6""7""8""9"":""<""=">""?""A""B""C""D""E""F""G""H""I""J""K""L""M""N""O""P""Q""R""S""T""
U""V""W""X""Y""Z""["]""_""a""b""c""d""e""f""g""h""i""j""k""l""m""n""o""p""q""r""s""t""u""v""w""x""y""z"**

***Commands to get the display characters as text data(ASCII)**

This command can get certain of text data(ASCII) from the RX-Vx300 to be used by Host device as follows.

- Tuner frequency characters : " 107.9 "(MHz)
- Master volume value characters : " –99.0dB" / " MUTE"
- Input name : " MY PC " (Even renamed by "SET MENU:INPUT RENAME")
- Zone2 input name : " PS 2 " (Even renamed by "SET MENU:INPUT RENAME")

The response protocol for the text request commands are as follows.

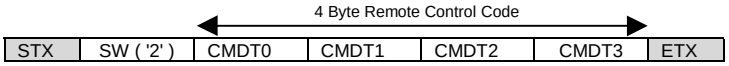


RCMD0,1	COMMAND	0 – 9,A - F	0~0xFF
DDAT 0 - 7	DATA	0 – 9,A - Z SP	ASCII char. Space char.

Report Command

	DC1	RCMD0	RCMD1	DDAT0	DDAT1	DDAT2	DDAT3	DDAT4	DDAT5	DDAT6	DDAT7	ETX
Tuner Frequency	DC1	0	0	SP	SP	x	x	x	x	x	x	ETX
Master Volume Value	DC1	0	1	SP	x	x	x	x	x	x	x	ETX
Input Name	DC1	0	3	x	x	x	x	x	x	x	x	ETX
Zone2 Input Name	DC1	0	4	x	x	x	x	x	x	x	x	ETX

3.2 Operation Command (SW = '0')



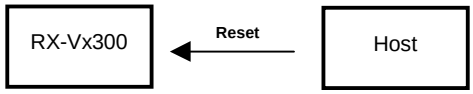
Operation Command supports all **direct codes** from the standard and extended IR code library for the RX-3200. **No toggle codes** are supported.

Operation Command							Report Command	
SW	CMDT0	CMDT1	CMDT2	CMDT3	function	setting	Type	RCMD1,2
0	7	A	1	A	master volume	Up	0	26
	7	A	1	B		Down		
	7	E	A	2	Audio Mute	ON		23
	7	E	A	3		OFF		
	7	A	1	4	Input	PHONO		21
	7	A	1	5		CD		
	7	A	1	6		TUNER		
	7	A	1	9		CD-R		
	7	A	C	9		MD/TAPE		
	7	A	C	1		DVD		
	7	A	5	4		D-TV/LD		
	7	A	C	0		CABLE (CBL/SAT)		
	7	A	C	A		SAT		
	7	A	0	F		VCR1		
	7	A	1	3		VCR2/DVR		
	7	A	C	8		VCR3		
	7	A	5	5		V-AUX		
	7	E	A	4	6ch input	ON		
	7	E	A	5		OFF		
	7	E	A	6	Input Mode	AUTO		22
	7	E	A	7		D.D., RF		
	7	E	A	8		DTS		
	7	E	A	9		DIGITAL		
	7	E	A	A		ANALOG		
	7	E	3	B		AAC		
	7	A	D	A	Zone 2 Volume	UP		27
	7	A	D	B		DOWN		
	7	E	A	0	Zone2 mute	ON		25
	7	E	A	1		OFF		
	7	A	D	0	Zone2 Input	PHONO		24
	7	A	D	1		CD		
	7	A	D	2		TUNER		
	7	A	D	4		CD-R		
	7	A	C	F		MD/TAPE		
	7	A	C	D		DVD		
	7	A	D	9		D-TV/LD		
	7	A	C	C		CABLE (CBL/SAT)		
	7	A	C	B		SAT		
	7	A	D	6		VCR1		
	7	A	D	7		VCR2/DVR		
	7	A	C	E		VCR3		
	7	A	D	8		V-AUX		
	7	A	1	D	Power	ON		20
	7	A	1	E		OFF		
	7	E	7	E	Main(Zone1) Power	ON		
	7	E	7	F		OFF		
	7	E	B	A	Zone2 power	ON		
	7	E	B	B		OFF		
	7	E	B	0	On screen(OSD)	OFF		2B
	7	E	B	1		SHORT		
	7	E	B	2		FULL		
	7	E	B	3	Sleep	OFF		2C
	7	E	B	4		120		
	7	E	B	5		90		
	7	E	B	6		60		
	7	E	B	7		30		
	7	E	B	8	EX/ES	ON (MATRIX)		2D
	7	E	B	9		OFF		
	7	E	7	C		AUTO		
	7	E	7	D		DISCRETE		
	7	E	2	7	Effect	OFF		28
	7	E	E	0	Stereo			
	7	E	E	1	DSP Program	Hall A (HALL1)		
	7	E	E	2		Hall B		
	7	E	E	3		Hall C		
	7	E	E	4		Hall U.S.A.		
	7	E	E	5		Hall E		
	7	E	E	6		Live Concert (HALL2)		
	7	E	E	7		Tokyo		
	7	E	E	8		Freiburg (CHURCH)		
	7	E	E	9		Royaumont		
	7	E	E	A		Village Gate		
	7	E	E	B		Village Vanguard		
	7	E	E	C		The Bottom Line (JAZZ)		
	7	E	E	D		The Roxy Theatre (ROCK)		
	7	E	E	E		Warehouse Loft		
	7	E	E	F		Arena		
	7	E	F	0		Disco		
	7	E	F	1		Party		
	7	E	F	2		Game		
	7	E	F	F		6/8ch Stereo		
	7	E	F	3		Pop/Rock (Music Video)		
	7	E	F	4		DJ		
	7	E	F	5		Classical/Opera		
	7	E	F	6		Pavillion		
	7	E	F	7		Mono Movie		
	7	E	F	8		Variety Sports		

	7	E	F	9		Spectacle		
	7	E	F	A		Sci-Fi		
	7	E	F	B		Adventure		
	7	E	F	C		General		
0	7	E	F	D		Normal		
	7	E	F	E		Enhanced		
	7	E	6	7		PLII MOVIE		
	7	E	6	8		PLII MUSIC		
	7	E	6	9		NEO:6 CINEMA		
	7	E	6	A		NEO:6 MUSIC		
	7	A	E	0	Tuner preset page	A	0	29
	7	A	E	1		B		
	7	A	E	2		C		
	7	A	E	3		D		
	7	A	E	4		E		
	7	A	E	5	Tuner preset No.	1		2A
	7	A	E	6		2		
	7	A	E	7		3		
	7	A	E	8		4		
	7	A	E	9		5		
	7	A	E	A		6		
	7	A	E	B		7		
	7	A	E	C		8		
	7	E	B	C	Tuner band	FM		35
	7	E	B	D		AM		
	7	E	B	E	Auto tuning start	UP		15
	7	E	B	F		DOWN		
	7	E	A	B	speaker relay A	ON		2E
	7	E	A	C		OFF		
	7	E	A	D	speaker relay B	ON		2F
	7	E	A	E		OFF		
	7	E	2	B	Home preset memory	A		
	7	E	2	C		B		
	7	E	2	D		C		
	7	E	2	E		D		
	7	E	2	F		E		
	7	E	2	0		F		
	7	E	3	5	Home preset recall	A		
	7	E	3	6		B		
	7	E	3	7		C		31
	7	E	3	8		D		
	7	E	3	9		E		
	7	E	3	A		F		
	7	E	6	B	Volume preset memory	A		
	7	E	6	C		B		
	7	E	6	D		C		
	7	E	6	E		D		
	7	E	6	F		E		
	7	E	6	0		F		
	7	E	7	5	Volume preset recall	A		
	7	E	7	6		B		
	7	E	7	7		C		
	7	E	7	8		D		
	7	E	7	9		E		
	7	E	7	A		F		
	7	E	8	7	Z2 Vol. Memory	A		
	7	E	8	8		B		
	7	E	8	9		C		
	7	E	8	A		D		
	7	E	8	B		E		
	7	E	8	C		F		
	7	E	8	D	Z2 Vol. Recall	A		
	7	E	8	E		B		
	7	E	8	F		C		
	7	E	9	0		D		
	7	E	9	1		E		
	7	E	9	2		F		
	7	E	3	2	DC1 TRG Control	Zone 1		3A
	7	E	3	3		Zone 2		
	7	E	3	4		Zone 1&2		
	7	E	7	1	Zone 2 DC1 TRG	On		36
	7	E	7	2		Off		
	7	E	7	3	Zone 1 DC1 TRG	On		36
	7	E	7	4		Off		
	7	E	9	3	Dual Mono	Main		39
	7	E	9	4		Sub		
	7	E	9	5		All		
	7	E	9	6	DC2 TRG Control	Zone 1		3B
	7	E	9	7		Zone 2		
	7	E	9	8		Zone 1&2		
	7	E	3	C	Zone 2 DC2 TRG	On		3C
	7	E	3	D		Off		
	7	E	3	E	Zone 1 DC2 TRG	On		3C
	7	E	3	F		Off		
	7	E	2	8	SP B SET	Zone 1		3E
	7	E	2	9		Zone 2		
	7	E	9	9	Zone 2 SP OUT	On		3F (70/73/78)
	7	E	9	A		Off		

4. Reset Command

Reset Command recalls factory preset data. Once the factory preset are recalled, all user controllable setting / parameter data will be deleted and replaced with original factory settings.
Please do not use this command unless you have been experiencing problems with the system or if you just want to clean up the system.



After the system is reset, please request the Configuration Command using Ready Command (see section 2) in order to get accurate feedback of status of RX-Vx300 to your touch panel system.

Ready ←

DC3	DEL	DEL	DEL	ETX

*recall factory preset of all data

5. Report Command

RX-Vx300 will send Report Command in response to Control Commands from the host controller. From Report Command you can receive the current status of the RX-Vx300.

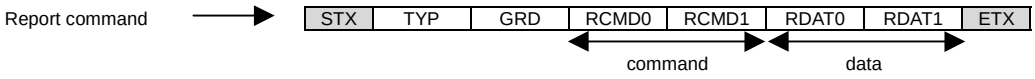
There are three types of Report Command classified by their information type.

- System Status Report : RX-Vx300 reports a System Status Report when the system status changed.
- Playback Status Report : RX-Vx300 reports a Playback Status Report when the internal playback status changed.
- Operation Report : When the RX-Vx300 is controlled by remote controller, front panel, RS-232C or by system controller, RX-Vx300 sends a Operation Report, which includes the latest setting status of the controlled function.

*RX-Vx300 reports a System State Report with system guard to inform its power status (power off) when a control command was sent to RX-Vx300 while it's turned off.

*The guard status is included in the Report Command (GRD). If the control command the host sent was accepted by RX-Vx300, the guard status in the Report Command is '0' (No Guard). On the contrary the guard status will be 'System Guard' or 'Setting Guard' when the command was guarded for some reason (e.g. If you send a 'Speaker A ON' command while you are using a headphone, the guard status will be 'System Guard' because the speaker controls are prohibited by system while a headphone is used.)

*If a status changed multiple times in a certain time, RX-Vx300 report only one report command.



function name	function	data (ASCII)	range (HEX)
TYP	control type	0 - 9	0 - 9
GRD	guard status	0 - 9	0 - 9
RCMD0, 1	command	0 - 9, A - F	0 - 0xFF
RDAT0, 1	data	0 - 9, A - F	0 - 0xFF

<Control type> This indicates for which type of control the report command is.

TYP	control type
0	controlled by RS-232C
1	controlled by remote controller (I/R)
2	controlled by keys in the unit
3	controlled by system
4	controlled by encoder

<Guard status> This indicates guard status against all control command

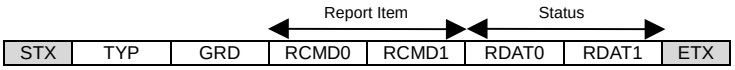
GRD	Guard status*
0	no guard
1	system guard
2	setting guard

*see the following chart

*Factor of the guards and the contents informed in report commands when there are no guards

operation	no guard	system guard	setting guard
Power	Power status	---	---
Input	6ch input/ selected input		---
Input mode	selected Input mode	6ch Input is ON during Input Rename function doesn't have the designated Input mode	---
Zone2 Input	selected input	zone2 selector is not at "REMOTE"	---
Mute	mute status	---	---
Zone2 mute	mute status	---	---
master volume	volume value	---	---
Program	Program ID	6ch input is ON source is not 32kHz,44.1kHz or 48kHz	---
6.1/ES Key	status	6ch input is ON Program is OFF	---
Tuner page	page	Tuner function is not active	---
Tuner Preset No.	No.	Tuner function is not active	---
OSD	status	SET MENU is active Test tone is ON	Memory Guard is ON
Sleep	status	Test tone is ON	---
Home	selected Bank	---	---
Home volume	selected Bank	---	---
Speaker A/B	ON/OFF Status	Headphone Mode	---

5.1 System Status Reports

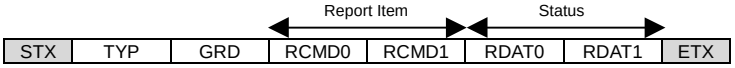


RCMD0, 1	Report Item	RDAT0, 1	Status	
00	system	00	OK	ready for accepting the control commands
		01	Busy	start of the term prohibits sending commands
		02	Power Off	report against the command which cannot be accepted when the Power is Off

*RX-VX00 sends this report when the system is reset or the power turns off.
It can be used for observation of the system revival.

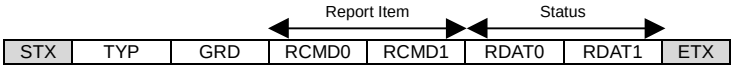
01	warning	00	over current	report of abnormal states
		01	DC Detect	(Only when it's possible to report)
		02	power trouble	
		03	over heat	

5.2 Playback Status Reports



RCMD0, 1	Report Item	RDAT0, 1	Status	
10	Playback	00	6CH Input	
		01	Analog	
		02	PCM	
		03	D.D.(except for 2/0)	When audio code mode is other than 2/0
		04	D.D.(2/0)	When audio code mode is 2/0
		05	D.D.karaoke	
		06	D.D.EX	
		07	DTS	
		08	DTS. ES	
		09	Other Digital	When waiting for decoding, etc.
		0A	DTS Analog Mute	.
		0B	DTS Discrete	
		0C	Other than AAC 2/0	
		0D	AAC 2/0	
11	Fs	00	Analog	
		01	32kHz	
		02	44.1kHz	
		03	48kHz	
		04	64kHz	
		05	88.2kHz	
		06	96kHz	
		07	Unknown	
		08	Unknown	
		09	Unknown	
		0A	Unknown	
		0B	48kHz (96kHz)	DTS 96/24 signal (A/B)
12	EX/EX	00	Off	Playback status
		01	Matrix On	
		02	Discrete ON	
13	Thr / Bypass	00	Off	Fs when other than 32/44.1/48kHz
		01	On	
14	RED dts	00	Release	RED dts status*
		01	Wait	After the signals of DTS CD/LD are stopped, the RED dts status keeps "Wait" for 30 sec., then turned to "Release" While the RED dts is "Wait", this can be released by changing the Input Mode.
15	Tuner tuned	00	Not tuned	This report will be sent in case of signal changed.
		01	Tuned	
16	Dts 96/24	00	Off	DTS 96/24 decode
		01	On	(A/B)

5.3 Operation Reports



RCMD0, 1	Report Item	RDAT0, 1	Status
20	Power	00	OFF(MAIN OFF/ZONE2 OFF)
		01	ON(MAIN ON/ZONE2 ON)
		02	MAIN ON/ZONE2 OFF
		03	MAIN OFF/ZONE2 ON
21	Input	x,0	PHONO
		x,1	CD
		x,2	TUNER
		x,3	CD-R
		x,4	MD/TAPE
		x,5	DVD
		x,6	D-TV/LD
		x,7	CBL/SAT
		x.8	SAT
		x,9	VCR1
		x,A	VCR2/DVR
		x,B	
		x.C	V-AUX
		0/1,x	6ch input OFF/ON
22	Input mode	00	AUTO
		02	DTS
		04	ANALOG
		05	ANALOG ONLY
		06	AAC
23	Mute	00	OFF
		01	ON
24	Zone2 Input	00	PHONO
		01	CD
		02	TUNER
		03	CD-R
		04	MD/TAPE
		05	DVD
		06	D-TV/LD
		07	CBL/SAT
		08	SAT
		09	VCR1
		0A	VCR2/DVR
		0B	
		0C	V-AUX
25	Zone2 Mute	00	OFF
		01	ON
26	Master vol.	00	-oo
		01	-99dB
		~	
		C7	0dB
27	Zone 2 Vol.	00	Min
		01	-79dB
		~	
		50	0dB

RCMD0, 1	Report Item	RDAT0, 1	Status
28	Program	00	Hall A (HALL1)
		01	Hall B
		02	Hall C
		04	Hall C
		05	Hall E
		06	Live Concert
		08	Tokyo
		09	Freiburg
		0A	Royaumont
		0C	Village Gate
		0D	Village Vanguard
		0E	The Bottom Line
		10	The Roxy Theater
		11	Warehouse Loft
		12	Arena
		14	Disco
		15	Party
		16	Game
		17	6/8CH Stereo
		18	Pop/Rock
		19	DJ
		1C	Opera
		1D	Pavillion
		20	Mono Movie
		21	Variety Sports
		24	Spectacre
		25	Sci-Fi
		28	Adventure
		29	General
		2C	Normal
		2D	Enhanced
		30	PLII Movie
		31	PLII Music
		32	Neo: 6 Movie
		33	Neo: 6 Music
		80-83	Stereo (Effect off*3)
		80	Stereo (Hall A)
		81	Stereo (Hall B)
		…	
		83	Stereo (Neo: 6 Music)
29	Tuner Page	00	A
		01	B
		02	C
		03	D
		04	E
2A	No.	00	1
		01	2
		02	3
		03	4
		04	5
		05	6
		06	7
		07	8
2B	OSD	00	Full
		01	Short
		02	Off
2C	Sleep	00	120
		01	90
		02	60
		03	30
		04	Off
2D	EX/ES(Key)	00	Off
		01	Matrix On
		02	Discrete On
		03	Auto
2E	SP Relay A	00	Off
		01	On
2F	SP Relay B	00	Off
		01	On

RCMD0, 1	Report Item	RDAT0, 1	Status
30	Home	01	Preset A
		02	B
		03	C
		04	D
		05	E
		06	F
31	Home	01	Memory A
		02	B
		03	C
		04	D
		05	E
		06	F
32	Home Vol.	01	Preset A
		02	B
		03	C
		04	D
		05	E
		06	F
33	Home Vol.	01	Memory A
		02	B
		03	C
		04	D
		05	E
		06	F
34	Headphone	00	Off
		01	On
35	FM/AM	00	FM
		01	AM

RCMD0, 1	Report Item	RDAT0, 1	Status
36	DC1 Trigger	00	Off (Due to the delay
		01	On (Due to the delay
37	Home	01	Preset A
	Zone 2 Vol.	02	B
		03	C
		04	D
		05	E
		06	F
38	Home	01	A
	Zone 2 Vol.	02	B
		03	C
		04	D
		05	E
		06	F
39	Dual	00	Main
	Mono	01	Sub
		02	All
3A	DC1 Trigger	00	Zone 1
	CTRL	01	Zone 2
		02	Zone 1&2
3B	DC2 Trigger	00	Zone 1
	CTRL	01	Zone 2
		02	Zone 1&2
3C	DC2 Trigger	00	Off (Due to the delay
	OUTPUT	01	On (Due to the delay
3D	Main Level	00	Normal
		01	-10dB
3E	SPB set	00	Zone 1
		01	Zone 2
3F	Zone 2	00	Off
	SP out	01	On

RCMD0, 1	Report Item	RDAT0, 1	Status
40	Effect	14	-10dB
	Level	15	
	Center	~	
		3C	+10dB
41	Effect	14	-10dB
	Level	15	
	Rear R	~	
		3C	+10dB
42	Effect	14	-10dB
	Level	15	
	Rear CT	~	
		3C	+10dB
43	Effect	14	-10dB
	Level	15	
	Rear L	~	
		3C	+10dB
44	Effect	14	-10dB
	Level	15	
	Front	~	
		3C	+10dB
45	Effect	00	-20dB
	Level	01	-19.5dB
	SWFR	~	
		28	0dB

RCMD0, 1	Report Item	RDAT0, 1	Status
48	Effect	14	-10dB
	Level	15	
	Center	~	
	6CH	3C	+10dB
49	Effect	14	-10dB
	Level	15	
	Rear R	~	
	6CH	3C	+10dB
4A	Effect	14	-10dB
	Level	15	
	Rear CT	~	
	6CH	3C	+10dB
4B	Effect	14	-10dB
	Level	15	
	Rear L	~	
	6CH	3C	+10dB
4C	Effect	14	-10dB
	Level	15	
	Front	~	
	6CH	3C	+10dB
4D	Effect	00	-20dB
	Level	01	-19.5dB
	SWFR	~	
	6CH	28	0dB

RCMD0, 1	Report Item	RDAT0, 1	Status
50	Main	00	Lch Max
	L/R	~	
	Balance	14	Mid
		~	
		28	Rch Max
51	LFE	00	-20dB
	Level	01	-19dB
	SP	~	
		14	0dB
52	LFE	00	-20dB
	Level	01	-19dB
	HP	~	
		14	0dB
53	Audio	00	0ms
	Delay	01	
		~	
		A0	160ms

RCMD0, 1	Report Item	RDAT0, 1	Status
54	SP	00	0ms
	Delay	01	0.5ms
	Center	~	
		0A	5ms
55	SP	00	0ms
	Delay	01	0.5ms
	Rear CT	~	
		3C	30ms

RCMD0, 1	Report Item	RDAT0, 1	Status
60	Input	00	Auto
	Mode	01	Last
61	Dimmer	00	-4
		01	-3
		02	-2
		03	-1
		04	0
62	OSD	00	-5
	Shift	01	-4
		02	-3
		03	-2
		04	-1
		05	0
		06	+1
		07	+2
		08	+3
		09	+4
		0A	+5

RCMD0, 1	Report Item	RDAT0, 1	Status
63	Gray	00	Off
	Back	01	Auto
64	Dynamic	00	Max.
	Range	01	Std.
	SP	02	Min.
65	Dynamic	00	Max.
	Range	01	Std.
	HP	02	Min.
66	Zone 2	00	Var.
	Vol. out	01	Fix
67	Zone 2	00	Mode 1
	Mode	01	Mode 2
68	MEM	00	Off
	Guard	01	On
69	Video	00	Off
	Conv.	01	On

RCMD0, 1	Report Item	RDAT0, 1	Status
70	Center	00	Large
	SP	01	Small
		02	None
71	Main	00	Large
		01	Small
72	Rear LR	00	Large
	SP	01	Small
		02	None
73	Rear	00	Large
	Center	01	Small
	SP	02	None
74	Front	00	Yes
		01	None
75	LFE	00	SWFR
	Bass	01	Main
	Out	02	Both

RCMD0, 1	Report Item	RDAT0, 1	Status
78	6CH	00	Center
	Center	01	Main
79	6CH	00	SWFR
	SWFR	01	Main

RCMD0, 1	Report Item	RDAT0, 1	Status
80	Test	00	Off
		01	Dolby
		02	DSP

Attention

*When the Input is changed, RX-Vx300 sends Operation Report for Input (RCMD0,1="21") and Input mode(RCMD0,1="22").

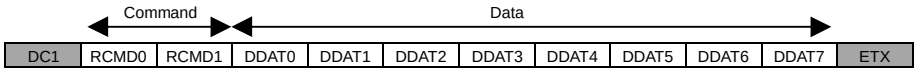
*When the Home bank is changed, RX-Vx300 sends Operation Report for Home bank (RCMD0,1="30") and Configuration Command.

*When a headphone is plugged into the headphone jack and Speaker Relay turned off, RX-Vx300 send the Operation Report for Speaker Relay A and B (RCMD0,1="2E","2F", RDAT="00(OFF)"). RX-Vx300 sends the Operation Command for Speaker Relay A and B when the headphone is removed also.

*Each time the source from the Inputs or playback status (ex. 6.1/ES, RED dts etc.) of the system changes, RX-Vx300 send a Playback Status report.

*Each time the busy status of the system changes, RX-Vx300 send the System Status report.

5.4 Display Text Data Report



0CMD0,1	ITEM	DDAT0,1	DDAT2 -7
00	Tuner Frequency	SP	6digits <Upper Lower>

(example)
AM 1710kHz = 'SP' 'SP' '1' '7' '1' '0'
FM 108.5MHz = 'SP' 'SP' '1' '0' '8' '.' 5' '0'

OCMD0,1	ITEM	DDAT 0	DDAT1 –7
01	Master Volume	SP	5digits <Upper Lower>

(example)
-99dB = 'SP' '-' '9' '9' '.' '0' 'd' 'B'

OCMD0,1	ITEM	DDAT0 –2	DDAT3 –7
02	Zone2 Volume	SP 02	3digits <Upper Lower>

DCMD0,1	ITEM	DDAT0 -7
03	Input name SP	8letters <Right Left>

(example)
D-TV/LD = 'SP' 'D' '-' 'T' 'V' '/' 'L' 'D'

OCMD0, 1	ITEM	DDATO -7
04	Zone 2 Input name	8letters <Right Left>

FUNCTION	ITEM	DATA (ADCII)	RANGE
RCMD0,1	Command	0-9, A-F	0~0xFF
DDAT 0-7	Data	0-9, A-Z SP, other ASCII	ASCII Space, dots

Example of RX-Vx300 Control Procedure

[1] Connection Start procedure (AC Plug / RS-232C cable connection)

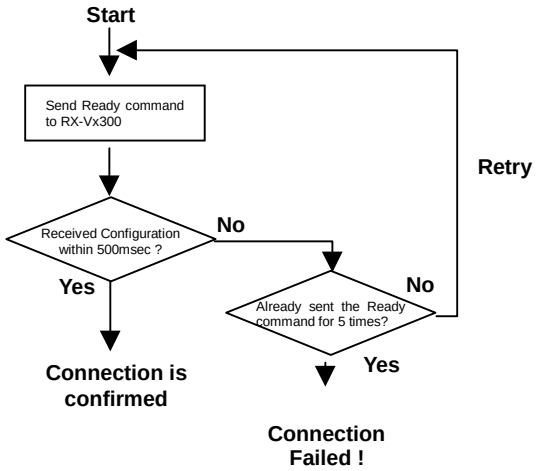
When the AC plug / RS-232C cable are not connected, RX-Vx300 cannot send any data to host. If the host doesn't receive a configuration command after sending Ready command 5 times, host should disable the RS-232C communication of the host and send alert to the graphic user interface (GUI).

[2] AC plug / RS-232C connection check sequence after the connection has been confirmed in the procedure [1].

If the host doesn't receive a Report Command within 500ms of sending a command, the host should resend the command. If no Report Command is received after sending 5 times, check AC plug/RS-232 cable (see [1]).

When the RS-232C cable is disconnected, the commands generated inside RX-Vx300 are stored in the sending buffer. If the stored commands exceed the bufer memory size (buffer overflow), RX-Vx300 stops reporting any commands. In this case, reconnecting AC plug or Connection Start procedure [1] will be needed in order to enable the command report.

[1] : AC Plug / RS-232C connection check (Start transaction)

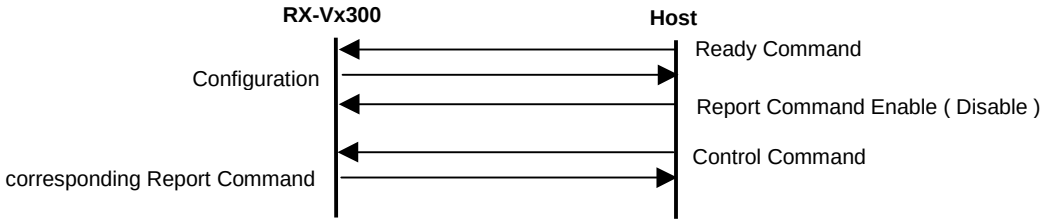


[3] AC plug connection detection (after [1],[2])

When the AC connection is reset, RX-Vx300 send Configuration Command to the host.
Host can feedback the status of RX-Vx300 to its GUI.

[4] Getting the status of the RX-Vx300 when the host boot up

At first, host should send Ready command and receive the Configuration Command from RX-Vx300 (see [1]).
Once the connection is confirmed, host can send Control Commands to the host. While the RX-Vx300 is turned off, RX-Vx300 only accept System Command and Power ON command.



[5] Error transactions after [4]

While sending control command, if RX-Vx300 didn't send any corresponding Report Commands regardless of re-trying for 5 times, host should clear its send buffer and then check AC plug / RS-232C connection sequence (see [1]). When the RX-Vx300 responded, the host can feedback the RX-Vx300 status to its GUI then return to the normal communication sequence. If not, the host should cancel the communication and report the alert to its GUI.

1 Appendix

* ASCII Chart

	0	1	2	3	4	5	6	7
0	NUL	DLE	SP	0	@	P	`	p
1	SOH	DC1	!	1	A	Q	a	q
2	STX	DC2	"	2	B	R	b	r
3	ETX	DC3	#	3	C	S	c	s
4	EOT	DC4	$	4	D	T	d	t
5	ENQ	NAK	%	5	E	U	e	u
6	ACK	SYN	&	6	F	V	f	v
7	BEL	ETB	'	7	G	W	g	w
8	BS	CAN	(	8	H	X	h	x
9	HT	EM	)	9	I	Y	I	y
A	LF	SUB	*	:	J	Z	j	z
B	VT	EXC	+	;	K	[	k	{
C	FF	FS	,	<	L	¥	l	|
D	CR	GS	-	=	M	]	m	}
E	SO	RS	.	>	N	^	n	~
F	SI	US	/	?	O	_	o	DEL

* the column number = the first hexadecimal digit
  the row number = the second hexadecimal digit

* The characters in the gray sells are available in the RS-232C communications.