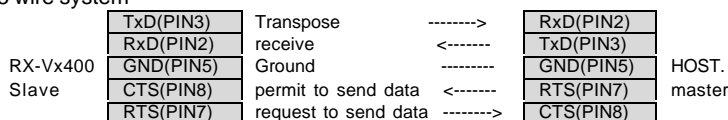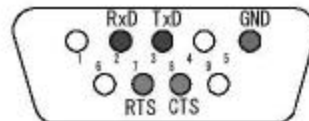## 1. Outline

In case no comments in particular as for the contents of this papers, the descriptions are effective for the RX-Vx400. RX-Vx400 in this paper means both RX-V2400 and RX-V1400.

1.1 Connection

5 wire system

	TxD(PIN3)	Transpose	-------->	RxD(PIN2)	
	RxD(PIN2)	receive	<-------	TxD(PIN3)	HOST.
RX-Vx400	GND(PIN5)	Ground	---------	GND(PIN5)	
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-Vx400 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-Vx400 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-Vx400 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.
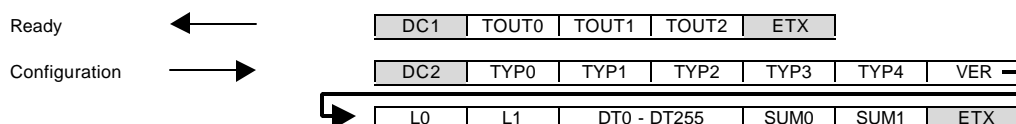
2. Start transactions

2.1 Starting Communication
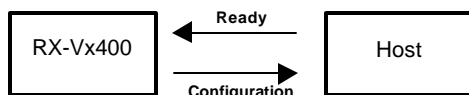
Ready command is the very first command to be sent to RX-Vx400 at the start of the communication. TOUT0 - 2 in Ready Command sets timeout of the communication.

RX-Vx400 sends Configuration command (Model ID, software version, and setting data) to the host in reply to the Ready command.

RX-Vx400 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-Vx400 won't send any Configuration commands after fifth retry, please cancel the transaction because there might be some problems.

Ready

DC1	TOUT0	TOUT1	TOUT2	ETX

Configuration

DC2	TYP0	TYP1	TYP2	TYP3	TYP4	VER

L0	L1	DT0 - DT255	SUM0	SUM1	ETX

*TYPx : Model ID = "R0161" (RX-V2400)
*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	0 - 1	Night mode	0: OFF / 1: ON
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		MAIN R	Upper 4bit
DT49			Lower 4bit
DT50		MAIN L	Upper 4bit
DT51			Lower 4bit
DT52		CENTER	Upper 4bit
DT53			Lower 4bit
DT54		REAR R	Upper 4bit
DT55			Lower 4bit
DT56		REAR L	Upper 4bit
DT57			Lower 4bit
DT58		SUR BACK	Upper 4bit
DT59		R	Lower 4bit
DT60		SUR BACK	Upper 4bit
DT61		L	Lower 4bit
DT62		FRONT R	Upper 4bit
DT63			Lower 4bit
DT64		FRONT L	Upper 4bit
DT65			Lower 4bit
DT66		SWFR 1	Upper 4bit
DT67			Lower 4bit

DT68		**Don't Care**		
DT69		**Don't Care**		
DT70		**Don't Care**		
DT71		**Don't Care**		
DT72		**Don't Care**		
DT73		**Don't Care**		
DT74		LFE Lvl. SP		Upper 4bit
DT75				Lower 4bit
DT76		LFE Lvl. HP		Upper 4bit
DT77				Lower 4bit
DT78		Audio Delay		Upper 4bit
DT79				Lower 4bit
DT80		**Don't Care**		
DT81		**Don't Care**		
DT82		**Don't Care**		
DT83		**Don't Care**		
DT84		Input mode set		0: AUTO / 1: LAST
DT85		Dimmer		0: -4 / 1: -3 / 2: -2 / 3: -1 / 4: 0
DT86		OSD Message		
DT87		OSD shift		Upper 4bit
DT88				Lower 4bit
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
DT106				
DT107		LVL 6CH MAIN L		Upper 4bit
DT108				Lower 4bit
DT109		MAIN R		Upper 4bit
DT110				Lower 4bit
DT111		CENTER		Upper 4bit
DT112				Lower 4bit
DT113		SL		Upper 4bit
DT114				Lower 4bit
DT115		SR		Upper 4bit
DT116				Lower 4bit
DT117		SBL		Upper 4bit
DT118				Lower 4bit
DT119		SBR		Upper 4bit
DT120				Lower 4bit
DT121		FORNT L		Upper 4bit
DT122				Lower 4bit
DT123		FRONT R		Upper 4bit
DT124				Lower 4bit
DT125		SWFR		Upper 4bit
DT126				Lower 4bit
DT127	0 - C	Z3 Input		
DT128	0/1	Z3 Mute		
DT129	0 - F	Z3 Volume		Upper 4bit
DT130	0 - F			Lower 4bit
DT131				
DT132		MULTI_CH SELECT		00:6CH / 01:8CH TUNER / 02: 8CH CD / 04: 8CH CD-R / 05: 8CH DVD / 06: DTV / 07: 8CH CBL/SAT / 09: 8CH VCR1 / 0A: VCR2/DVR / 0C: VAUX
DT133		MULTI_CH SURROUND to		00: Surround / 01: Main
DT134		SP SET SW1		00: L-R / 01: F-R / 02: NONE
DT135		SP SET CROSSOVER		00: 40Hz / 01: 60Hz / 02: 80Hz / 03: 90Hz / 04: 100Hz / 05: 110Hz / 06: 120Hz / 07: 160Hz / 08: 200Hz
DT136		COMPONENT OSD		00: OFF / 01: ON
DT137		PB/SB SELECT		00: PR / 01: SB

*DD = Dolby Digital
*OSD = On Screen Display

3. Control Command

RX-Vx400 ← Control Command — Host

RX-Vx400 → Report Command → Host

*RX-Vx400 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-Vx400 reports OK
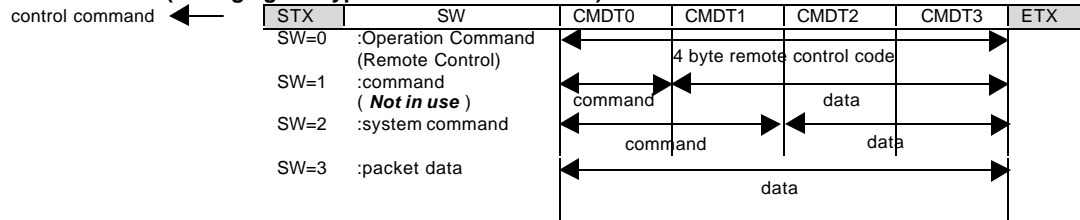
*RX-Vx400 will send a Report Command** within 1 sec of receiving the Control Command. If no Report Command is received, resend control command (max 5 times) If RX-Vx400 doesn't send a Report Commands after fifth retry, cancel the transaction because there might be some troubles.

*'SW' switches the type of the control command. When the 'SW' is set to '0', you can control RX-Vx400 remotely via RS-232C.

*RX-Vx400 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-Vx400 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-Vx400 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)

4

3.1 System Command (SW = '2')

STX	SW ('2')	CMDT0	CMDT1	CMDT2	CMDT3	ETX
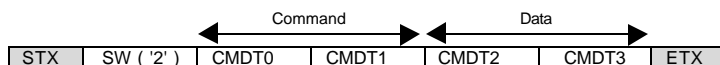
(← Command →) (← Data →)

System Command can be made by setting the 'SW' byte in the Control Command to '2'. With System command you can control RX-Vx400'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-Vx400 text data regarding tuner freq., master volume, input name, zone2 input name.

(from RX-Vx400)

SW	CMDT0	CMDT1	Command	CDMT2	CMDT3	data	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				
			Zone2 volume value text request	0	2				
			Input name text request	0	3				
			Zone2 input name text request	0	4				
			Zone 2 volume value text request	0	5				
			Zone2 input name text request	0	6				
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	
2	3	4	Zone 3 volume direct setting	X	X				
2	4	0	LEVEL MAIN R	X	X		0	40	
2	4	1	MAIN L	X	X		0	41	
2	4	2	CENTER	X	X		0	42	
2	4	3	REAR R	X	X		0	43	
2	4	4	REAR L	X	X		0	44	
2	4	5	FRONT R	X	X		0	45	
2	4	6	FRONT L	X	X		0	46	
2	4	7	SUR BACK R	X	X		0	47	
2	4	8	SUR BACK L	X	X		0	48	
2	4	9	SWFR 1	X	X		0	49	
2	4	A	SWFR 2	X	X		0	4A	
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	6	A	Component OSD	0	0	Off	0	6A	
				0	1	On	0	6A	
2	6	B	Zone 3 Vol output	0	0	Var.	0	6B	
				0	1	Fix	0	6B	
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	SBACK	0	0	Large x2	0	73	
				0	1	Large x1	0	73	
				0	2	Small x2	0	73	
				0	3	Small x1	0	73	
				0	4	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	6	SUBWOOFER 1	0	0	L-R	0	76	
				0	1	F-R	0	76	
				0	2	None	0	76	
	7	7	SUBWOOFER 2	0	0	L-R	0	77	
				0	1	F-R	0	77	
				0	2	None	0	77	
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	
2	7	A	6CH Surround to	0	0	Surround	0	7A	
					1	Main	0	7A	
2	7	B	Multi CH select	0	0	6CH	0	7B	
				0	1	8CH	0	7B	
2	7	D	PR / SB select	0	0	Sur.Back	0	7D	
				0	1	Presence	0	7D	
2	7	E	Subwoofer Cross Over	0	0	40 Hz	0	7E	
				0	1	60 Hz	0	7E	
				0	2	80 Hz	0	7E	
				0	3	90 Hz	0	7E	
				0	4	100 Hz	0	7E	
				0	5	110 Hz	0	7E	
				0	6	120 Hz	0	7E	
				0	7	160 Hz	0	7E	
				0	8	200 Hz	0	7E	
2	8	0	Test	0	0	Off	0	80	
					1	Dolby	0	80	
					2	DSP	0	80	
2	9	0	6CH Level MAIN R	X	X		0	90	
	9	1	MAIN L	X	X		0	91	
	9	2	CENTER	X	X		0	92	
	9	3	REAR R	X	X		0	93	
	9	4	REAR L	X	X		0	94	
	9	5	FRONT R	X	X		0	95	
	9	6	FRONT L	X	X		0	96	
	9	7	SUR BACK R	X	X		0	97	
	9	8	SUR BACK L	X	X		0	98	
	9	9	SWFR 1	X	X		0	99	
	9	A	SWFR 2	X	X		0	9A	

▢ : Not supported by RX-Vx400 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-Vx400 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.

RX-Vx400	**Text Char.** →	Host

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	DDAT 0	DDAT 1	DDAT 2	DDAT 3	DDAT 4	DDAT 5	DDAT 6	DDAT 7	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')

4 Byte Remote Control Code

| STX | SW ('2') | CMDT0 | CMDT1 | CMDT2 | CMDT3 | ETX |
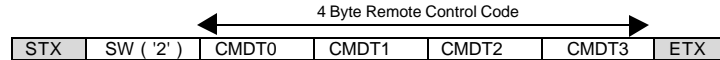
Operation Command supports all **direct codes** from the standard and extended IR code library for the RX-3200. **No toggle codes** are supported.

	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	A	E	D	Zone 3 Power	ON		27
	7	A	E	E		STANDBY		
	7	E	2	6	Zone 3 Mute	ON		91
	7	E	6	6		OFF		
	7	A	F	D	Zone 3 Vol.	UP		92
	7	A	F	E		DOWN		
	7	A	F	1	Zone 3 Input	PHONO		90
	7	A	F	2		CD		
	7	A	F	3		TUNER		
	7	A	F	5		CD-R		
	7	A	F	4		MD/TAPE		
	7	A	F	C		DVD		
	7	A	F	6		DTV/LD		
	7	A	F	7		CBL/SAT (cable)		
	7	A	F	8		SAT		
	7	A	F	9		VCR1		
	7	A	F	A		VCR2		
	7	A	F	B		DVR		
	7	A	F	0		V-AUX		
	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	9	B	Night mode	ON		82
	7	E	9	C		OFF		82
	7	E	2	7	Effect	**ON**		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		7ch 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		
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	E	C	1		2CH DIRECT STEREO		
7	E	C	0		2CH STEREO		
7	E	C	2		THX (ULTRA2) CINEMA + PL		
7	E	C	3		THX MUSIC		
7	E	C	7		THX (ULTRA2) CINEMA + PL2		
7	E	C	8		THX (ULTRA2) CINEMA + NEO6		
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						
7	E	9	2		F		
7	E	2	0	Z3 Vol. Memory	A		94
7	E	2	1		B		
7	E	2	2		C		
7	E	2	3		D		
7	E	2	4		E		
7	E	2	5		F		
7	E	6	0	Z3 Vol. Recall	A		93
7	E	6	1		B		
7	E	6	2		C		
7	E	6	3		D		
7	E	6	4		E		
7	E	6	5		F		
7	E	3	2	DC1 TRG Control	Zone 1		3A
7	E	3	3		Zone 2		
7	E	3	1		Zone 3		
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	8	3	Zone 3 DC1 TRG	On		36
7	E	8	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	F		Zone 3		
7	E	9	8		Zone OR		
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	8	5	Zone 3 DC2 TRG	On		3C
7	E	8	6		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.

RX-Vx400 ← **Reset** — Host
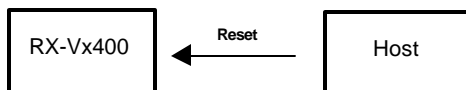
After the system is reset, please request the Configuration Command using Ready Command (see section 2) in order to get accurate feedback of status of RX-Vx400 to your touch panel system.

Ready ← | DC3 | DEL | DEL | DEL | ETX | *recall factory preset of all data

5. **Report Command**

RX-Vx400 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-Vx400.
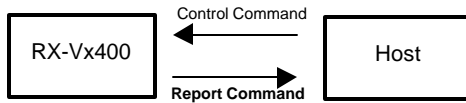

There are three types of Report Command classified by their information type.

- System Status Report : RX-Vx400 reports a System Status Report when the system status changed.

- Playback Status Report : RX-Vx400 reports a Playback Status Report when the internal playback status changed.

- Operation Report : When the RX-Vx400 is controlled by remote controller, front panel, RS-232C or by system controller, RX-Vx400 sends a Operation Report, which includes the latest setting status of the controlled function.

*RX-Vx400 reports a System State Report with system guard to inform its power status (power off) when a control command was sent to RX-Vx400 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-Vx400, 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-Vx400 report only one report command.
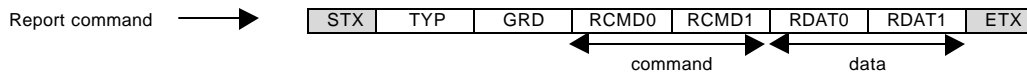
function name	function	data (ASCII)	range (HEX)
TYP	control type	0 - 9	0 - 9
GRD	guard status	0 - 9	0 - 9
RCMD0, 1	command	0 - 9, A - F	0 - 0xFF
RDAT0, 1	data	0 - 9, A - F	0 - 0xFF

<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

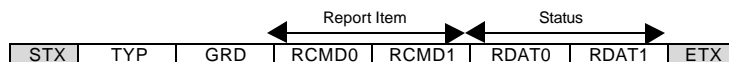<Guard status> This indicates guard status against all control command

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

| STX | TYP | GRD | RCMD0 | RCMD1 | RDAT0 | RDAT1 | ETX |

Report Item: RCMD0, RCMD1
Status: RDAT0, RDAT1

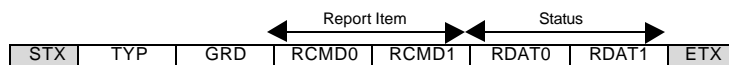| RCMD0, 1	Report Item	RDAT0, 1	Status	
00	system	00	OK	ready for accepting the control commands
		01	Busy	start of the term prohibits sending commands
		02	Power Off	report against the command which cannot be accepted when the Power is Off

*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.

RCMD0, 1	Report Item	RDAT0, 1	Status	
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

| STX | TYP | GRD | RCMD0 | RCMD1 | RDAT0 | RDAT1 | ETX |

Report Item: RCMD0, RCMD1
Status: RDAT0, RDAT1

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	128.0 kHz Unknown	
		09	176.4 kHz Unknown	
		0A	192.0 kHz 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

STX	TYP	GRD	RCMD0	RCMD1	RDAT0	RDAT1	ETX

Report Item ← RCMD0 RCMD1 → Status ← RDAT0 RDAT1 →

RCMD0, 1	Report Item	RDAT0, 1	Status	RCMD0, 1	Report Item	RDAT0, 1	Status
20	Power	00	ALL(Main/Zone2/3) OFF	28	Program	00	Hall A (HALL1)
		01	ALL(Main/Zone2/3) ON			01	Hall B
		02	MainON / Zone2 OFF / Zone3 OFF			02	Hall C
		03	MainOFF / Zone2 ON / Zone3 ON			04	Hall C
			MainON / Zone2 ON / Zone3 OFF			05	Hall E
			MainON / Zone2 OFF / Zone3 OFF			06	Live Concert
			MainOFF / Zone2 ON / Zone3 ON			08	Tokyo
			MainOFF / Zone2 OFF / Zone3 ON			09	Freiburg
21	Input	x,0	PHONO			0A	Royaumont
		x,1	CD			0C	Village Gate
		x,2	TUNER			0D	Village Vanguard
		x,3	CD-R			0E	The Bottom Line
		x,4	MD/TAPE			10	The Roxy Theater
		x,5	DVD			11	Warehouse Loft
		x,6	D-TV/LD			12	Arena
		x,7	CBL/SAT			14	Disco
		x,8	SAT			15	Party
		x,9	VCR1			16	Game
		x,A	VCR2/DVR			17	6/8CH Stereo
		x,B	VCR3/DVR			18	Pop/Rock
		x,C	V-AUX			19	DJ
		0/1,x	6ch input OFF/ON			1C	Opera
22	Input mode	00	AUTO			1D	Pavillion
		02	DTS			20	Mono Movie
		04	ANALOG			21	Variety Sports
		05	ANALOG ONLY			24	Spectacre
		06	AAC			25	Sci-Fi
23	Mute	00	OFF			28	Adventure
		01	ON			29	General
24	Zone2 Input	00	PHONO			2C	Normal
		01	CD			2D	Enhanced
		02	TUNER			30	PLII Movie
		03	CD-R			31	PLII Music
		04	MD/TAPE			32	Neo: 6 Movie
		05	DVD			33	Neo: 6 Music
		06	D-TV/LD			36	THX A Cinema
		07	CBL/SAT			37	THX B Music
		08	SAT			34	STREO A 2CH Streo
		09	VCR1			35	STREO B 2CH Direct Streo
		0A	VCR2/DVR			80-B3	STRAIGHT
		0B	VCR3/DVR			80	STRAIGHT (HALL A)
		0C	V-AUX			81	STRAIGHT (HALL B)
25	Zone2 Mute	00	OFF			…	…
		01	ON			B3	STRAIGHT (NEO:6 MUSIC)
26	Master vol.	00	-oo	29	Tuner Page	00	A
		39	-80dB			01	B
		…				02	C
		C7	0dB			03	D
		…				04	E
		E8	16.5dB	2A	No.	00	1
27	Zone 2 Vol.	00	-oo			01	2
		39	-80dB			02	3
		…				03	4
		C7	0dB			04	5
		…				05	6
		E8	16.5dB			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		RCMD0, 1	Report Item	RDAT0, 1	Status	
30	Home	01	Preset	A	36	DC1 Trigger	00	Off (Due to the delay	
		02		B			01	On (Due to the delay	
		03		C	37	Home	01	Preset	A
		04		D		Zone 2 Vol.	02		B
		05		E			03		C
		06		F			04		D
31	Home	01	Memory	A			05		E
		02		B			06		F
		03		C	38	Home	01		A
		04		D		Zone 2 Vol.	02		B
		05		E			03		C
		06		F			04		D
32	Home Vol.	01	Preset	A			05		E
		02		B			06		F
		03		C	39	Dual	00	Main	
		04		D		Mono	01	Sub	
		05		E			02	All	
		06		F	3A	DC1 Trigger	00	ALL ZONE OR	
33	Home Vol.	01	Memory	A		CTRL	01	ZONE1	
		02		B			02	ZONE2	
		03		C			03	ZONE3	
		04		D	3B	DC2 Trigger	00	ALL ZONE OR	
		05		E		CTRL	01	ZONE1	
		06		F			02	ZONE2	
34	Headphone	00	Off				03	ZONE3	
		01	On		3C	DC2 Trigger	00	Off (Due to the delay	
35	FM/AM	00	FM			OUTPUT	01	On (Due to the delay	
		01	AM		3D	MAIN	00	Normal	
						LEVEL	01	-10dB	
					3E	SP B	00	MAIN	
						SET	01	ZONE B	
					3F	ZONE2	00	OFF	
						SP OUT	01	ON	

RCMD0, 1	Report Item	RDAT0, 1	Status		RCMD0, 1	Report Item	RDAT0, 1	Status	
40	LEVEL	14	-10dB		46	LEVEL	14	-10dB	
	MAIN R	15				SUR	15		
		…				BACK L	…		
(*4)		3C	+10dB		(*4)		3C	+10dB	
41	LEVEL	14	-10dB		47	LEVEL	14	-10dB	
	MAIN L	…				FRONT R	15		
(*4)		3C	+10dB				…		
42		14	-10dB		(*4)		3C	+10dB	
	LEVEL	15			48	LEVEL	14	-10dB	
	CENTER	…				FRONT	15		
(*4)		3C	+10dB			L	…		
43		14	-10dB		(*4)		3C	+10dB	
	LEVEL	15			49	LEVEL	00	-20dB	
	REAR R	…				SWFR 1	01	-19.5dB	
(*4)		3C	+10dB				…		
44		14	-10dB		(*4)		28	0dB	
	LEVEL	15			4A	LEVEL	00	-20dB	
	REAR L	...				SWFR	01	-19.5dB	
(*4)		3C	+10dB			2	…		
45		14	-10dB		(*4)		28	0dB	
	LEVEL	15							
	SUR BACK	...							
(*4)	R	3C	+10dB						

RCMD0, 1	Report Item	RDAT0, 1	Status		RCMD0, 1	Report Item	RDAT0, 1	Status	
50	Main	00	Lch Max		54	SP	00	0ms	
	L/R	...				Delay	01	0.5ms	
	Balance	14	Mid			Center	...		
		...					0A	5ms	
		28	Rch Max		55	SP	00	0ms	
51	LFE	00	-20dB			Delay	01	0.5ms	
	Level	01	-19dB			Rear CT	...		
	SP	...					3C	30ms	
		14	0dB						
52	LFE	00	-20dB						
	Level	01	-19dB						
	HP	...							
		14	0dB						
53	Audio	00	0ms						
	Delay	01							
		...							
		A0	160ms						

15

RCMD0, 1	Report Item	RDAT0, 1	Status	RCMD0, 1	Report Item	RDAT0, 1	Status
60	Input Mode	00	Auto	63	Gray Back	00	Off
		01	Last			01	Auto
61	Dimmer	00	-4	64	Dynamic Range SP	00	Max.
		01	-3			01	Std.
		02	-2			02	Min.
		03	-1	65	Dynamic Range HP	00	Max.
		04	0			01	Std.
62	OSD Shift	00	-5			02	Min.
		01	-4	66	Zone 2 Vol. out	00	Var.
		02	-3			01	Fix
		03	-2	67	Zone 2 Mode	00	Mode 1
		04	-1			01	Mode 2
		05	0	68	MEM Guard	00	Off
		06	+1			01	On
		07	+2	69	Video Conv.	00	Off
		08	+3			01	On
		09	+4	6A	COMP OSD	00	Off
		0A	+5			01	On
				6B	Zone 3 Vol. out	00	Var.
						01	Fix

RCMD0, 1	Report Item	RDAT0, 1	Status	RCMD0, 1	Report Item	RDAT0, 1	Status
70	Center SP	00	Large	76	SW1	00	L-R
		01	Small			01	F-R
		02	None			02	NONE
71	Main	00	Large	78	6CH Center	00	Center
		01	Small			01	Main
72	Rear LR SP	00	Large	79	6CH SWFR	00	SWFR
		01	Small			01	Main
		02	None	7A	6CH SUR	00	SURROUND
73	SUR BACK	00	Large x2			01	MAIN
		01	Large x1	7B	MULTI CH SELECT	00	6CH
		02	Small x2			01	8CH
		03	Small x1	7E	SW CROSS OVER	00	40 Hz
		04	None			01	60 Hz
74	Front	00	Yes			02	80 Hz
		01	None			03	90 Hz
75	LFE Bass Out	00	SWFR			04	100 Hz
		01	Main			05	110 Hz
		02	Both			06	120 Hz
						07	160 Hz
						08	200 Hz

RCMD0, 1	Report Item	RDAT0, 1	Status
80	Test	00	Off
		01	Dolby
		02	DSP
81	ANALOG SPECIAL	00	OFF
		01	ON (2ch)
		02	ON (Multi)
82	NIGHT MODE	00	OFF
		01	ON

RCMD0, 1	Report Item	RDAT0, 1	Status	RCMD0, 1	Report Item	RDAT0, 1	Status
90	MULTI CH	14	-10dB	96	MULTI CH	14	-10dB
	LEVEL	15			LEVEL	15	
	MAIN R	...			SUR	...	
(*4)		3C	+10dB	(*4)	BACK L	3C	+10dB
91	MULTI CH	14	-10dB	97	MULTI CH	14	-10dB
	MAIN L	...			LEVEL	15	
(*4)		3C	+10dB		FRONT R	...	
92	MULTI CH	14	-10dB	(*4)		3C	+10dB
	LEVEL	15		98	MULTI CH	14	-10dB
	CENTER	...			FRONT	15	
(*4)		3C	+10dB		L	...	
93	MULTI CH	14	-10dB	(*4)		3C	+10dB
	LEVEL	15		99	MULTI CH	00	-20dB
	REAR R	...			LEVEL	01	-19.5dB
(*4)		3C	+10dB		SWFR 1	...	
94	MULTI CH	14	-10dB	(*4)		28	0dB
	LEVEL	15		9A	MULTI CH	00	-20dB
	REAR L	...			LEVEL	01	-19.5dB
(*4)		3C	+10dB		SWFR	...	
95	MULTI CH	14	-10dB	(*4)	2	28	0dB
	LEVEL	15					
	SUR BACK	...					
(*4)	R	3C	+10dB				

Attention
*When the Input is changed, RX-Vx400 sends Operation Report for Input (RCMD0,1="21") and Input mode(RCMD0,1="22").

*When the Home bank is changed, RX-Vx400 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-Vx400 send the Operation Report for Speaker Relay A and B (RCMD0,1="2E","2F", RDAT="00(OFF)").   RX-Vx400 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-Vx400 send a Playback Status report.

*Each time the busy status of the system changes, RX-Vx400 send the System Status report.

5.4 Display Text Data Report

DC1	RCMD0	RCMD1	DDAT0	DDAT1	DDAT2	DDAT3	DDAT4	DDAT5	DDAT6	DDAT7	ETX
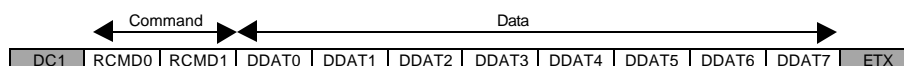
0CMD0,1	ITEM	DDAT0,1	DDAT2 -7
00	Tuner Frequency	SP	6digits <Upper Lower>

(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	Data	0-9, A-Z	ASCII
0-7		SP, other ASCII	Space, dots

Example of RX-Vx400 Control Procedure

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

When the AC plug / RS-232C cable are not connected, RX-Vx400 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-Vx400 are stored in the sending buffer. If the stored commands exceed the bufer memory size (buffer overflow), RX-Vx400 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.

[3] AC plug connection detection (after [1],[2])
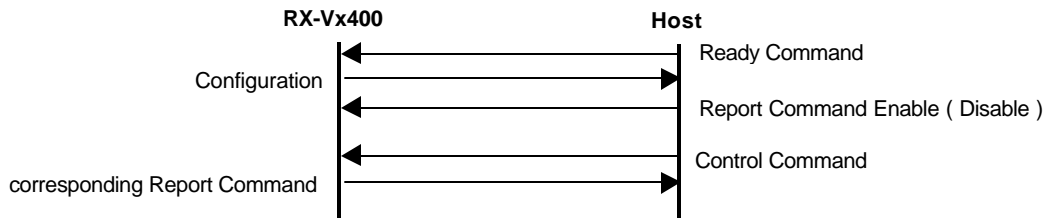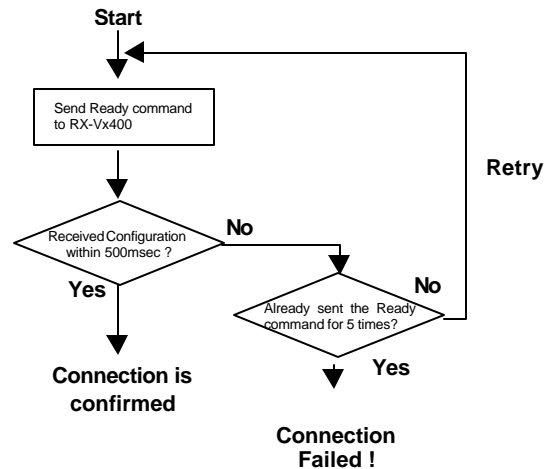When the AC connection is reset, RX-Vx400 send Configuration Command to the host.
Host can feedback the status of RX-Vx400 to its GUI.

[4] Getting the status of the RX-Vx400 when the host boot up
At first, host should send Ready command and receive the Configuration Command from RX-Vx400 (see [1]).
Once the connection is confirmed, host can send Control Commands to the host. While the RX-Vx400 is turned off, RX-Vx400 only accept System Command and Power ON command.

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

RX-Vx400 ... **Host**

Configuration — Ready Command
Report Command Enable (Disable)
Control Command
corresponding Report Command

[5] Error transactions after [4]
While sending control command, if RX-Vx400 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-Vx400 responded, the host can feedback the RX-Vx400 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.

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.