1. Outline

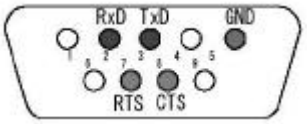
In case no comments in particular as for the contents of this papers, the descriptions are effective for the RX-Z9.

1.1 Connection

5 wire system

	TxD(PIN3)	Transpose	-------->	RxD(PIN2)		
	RxD(PIN2)	receive	<------	TxD(PIN3)		
RX-Z9	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-Z9 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

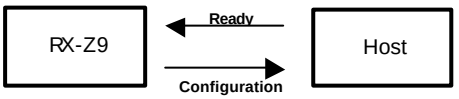
*RTS port of RX-Z9 outputs low level while the AC plug is disconnected.
If RTS output stays low even when the AC plug is connected, there might be some trouble.

1.3 Data block timeout

It takes RX-Z9 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

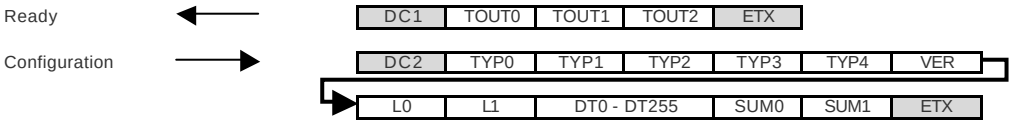
2.1 Starting Communication



Ready command is the very first command to be sent to RX-Z9 at the start of the communication. TOUT0 - 2 in Ready Command sets timeout of the communication.

RX-Z9 sends Configuration command (Model ID, software version, and setting data) to the host in reply to the Ready command.

RX-Z9 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-Z9 won't send any Configuration commands after fifth retry, please cancel the transaction because there might be some problems.



*TYPx : Model ID = "**R0161**" (RX-Z9)
*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,...,8 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 – 2**	**System**	**0: OK / 1: Busy / 2: Power OFF**
DT8	**0 - 3**	**Power**	**0: OFF / 1: ON / 2:Main ON-Zone2 OFF / 3:Main ON-Zone2 ON**
DT9	0 - C	Input	0: PHONO / 1: CD / 2: TUNER / 3: CD-R / 4: MD-TAPE / 5: DVD / 6: DTV-LD / 7: CABLE / 8:SAT / 9: VCR1 / A: VCR2 / B:DVR / C: V-AUX
DT10	0 / 1	Multi CH	0: OFF / 1: ON
DT11	0 - 7	Input Mode	0: AUTO / 2: DTS / 4: ANALOG / 5: ANALOG ONLY / 7:iLink
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: DTV-LD / 7: CABLE / 8:SAT / 9: VCR1 / A: VCR2/ B:DVR / C: V-AUX
DT14	0 / 1	Zone2 Mute	0: OFF / 1: ON
DT15	0 - F	Master Volume	Upper 4 bit Upper+Lower Digit Range:00-E8
DT16	0 - F	Master Volume	Lower 4 bit
DT17	0 - F	Zone2 Volume	Upper 4 bit Upper+Lower Digit Range:00-E8
DT18	0 - F	Zone2 Volume	Lower 4 bit
DT19	0 - F	Program	Upper 4 bit See attached List after
DT20	0 - F	Program	Lower 4 bit
DT21	0 / 1	Straight	0: OFF / 1: ON
DT22	0 - 3	6.1/ES key status	0: OFF / 1: MATRIX ON / 2: DISCRETE ON / 3: AUTO
DT23	1 / 2	OSD*	1: ON / 2: OFF
DT24	0 - 4	Sleep	0: 120 / 1: 90 / 2: 60 / 3: 30 / 4: 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: 48kHz / 4: 64kHz / 5: 88.2kHz / 6: 96kHz / 7: Unknown / 8: 128kHz / 9: 176.4kHz / A: 192kHz / B: DTS96/24(48kHz or 96kHz) 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	DTS-CD's Status	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	0 / 1	Audio Mute	0: mute / 1: -20dB
DT41		**Don't Care**	
DT42	0 - 2	DC1 TRG Ctrl.	0: Zone1&2 / 1: Zone1 / 2: Zone2
DT43	0 / 1	dts 96/24	0: OFF / 1: ON
DT44	0 - 2	DC2 TRG Ctrl.	0: Zone1&2 / 1: Zone1 / 2: Zone2
DT45	0 / 1	DC2 Trigger	0: LOW / 1: HIGH
DT46	0 / 1	SP B set	0: OFF / 1: ON
DT47	0 / 1	Zone 2 SP out	0: OFF / 1: ON
DT48		MAIN R	Upper 4bit Upper+Lower Digit Range:14-3C
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		SWFR 2	Upper 4bit
DT69			Lower 4bit

DT70		SP Balance		Upper 4bit	Upper+Lower Digit Range:08-20
DT71				Lower 4bit	
DT72		HP Balance		Upper 4bit	
DT73				Lower 4bit	
DT74		LFE Lvl.	SP	Upper 4bit	Upper+Lower Digit Range:00-28
DT75				Lower 4bit	
DT76			HP	Upper 4bit	
DT77				Lower 4bit	
DT78		Audio Delay		Upper 4bit	Upper+Lower Digit Range:00-C8
DT79				Lower 4bit	
DT80		**Don't Care**			
DT81		**Don't Care**			
DT82		**Don't Care**			
DT83		**Don't Care**			
DT84	0 / 1	Input mode set		0: AUTO / 1: LAST	
DT85	0 - 4	Dimmer		0: -4 / 1: -3 / 2: -2 / 3: -1 / 4: 0	
DT86		OSD Message			
DT87	0 - A	OSD Position		Horizontal Position	
DT88	0 - A			Vertical Position	
DT89		**Don't Care**			
DT90	0 / 1	Video Processor		0: OFF, 1: ON	
DT91	0 - 2	D. Range	SP	0: MAX / 1: STD / 2: MIN	
DT92	0 - 2		HP	0: MAX / 1: STD / 2: MIN	
DT93	0 / 1	Zone 2 vol. Out		0: Variable / 1: Fix	
DT94		**Don't Care**			
DT95		Memory guard		Lower 5bit (Bit 0 = INPUT, 1 = DSP, 2 = MANUAL, 3 = AUTO, 4 = iLINK)	
DT96	0 - 2	SP set	Center	0: Large / 1: Small / 2: None	
DT97	0 / 1		Main	0: Large / 1: Small	
DT98	0 - 2		Surroun LR	0: Large / 1: Small / 2: None	
DT99	0 - 4		Surround Back	0: Large x 2 / 1: Large x 1 / 2: Small x 2 / 3: Small x 1 / 4: None	
DT100	0 / 1		Presence	0: Yes / 1: None	
DT101	0 - 2		LFE/BASS	0: SWFR / 1: Main / 2: Both	
DT102	0 - 3		SW Phase	0: Normal / 1: L Reverse / 2: R Reverse / 3: L-R Reverse	
DT103	0 - 3		SW Config	0: None / 1: Mono / 2: L-R / 3: F-R	
DT104	0 - 8		Cross Over	0: 40Hz / 1: 60Hz / 2: 80Hz / 3: 90Hz / 4: 100Hz / 5: 120Hz / 7: 160Hz / 8: 200Hz	
DT105	0 - 2	Test mode		0: OFF / 1: Dolby / 2: DSP	
DT106		Memory Guard		Upper 4bit (Bit 0 = INPUT, 1 = DSP, 2 = MANUAL, 3 = AUTO, 4 = iLINK)	
DT107	0 - 2	WALL PAPER		0: Type1 / 1: Type2 / 3: Type3	
DT108	0 - 2	Picture mode		0: Cinema / 1: Standard / 2: Dynamic	
DT109	0 - 3	Resolution		0: 480P/576P / 1: 480i/576i / 2: 1080i / 3: 720p	
DT110	0 - 3	Aspect		0: Through / 1: Auto / 2: Normal / 3: Zoom	
DT111	0 / 1	Cross Color		0: Suppress / 1: Not Suppress	
DT112	0 / 1	TV Format		0: PAL / 1: NTSC	
DT113	0 - 3	S Video		0: S / 1: S1 / 2: S2	
DT114	0 / 1	Language		0: English / 2: Japanese	
DT115	0 / 1	ILink	Plug&Play	0: OFF / 1: ON	
DT116	0 - 3		Auto Play	0: OFF / 1: A<P / 2: A>P / 3: A<>P	
DT117	0 / 1	THX	SWFR	0: NO / 1: YES	
DT118	0 / 1		BGC	0: OFF / 1: ON	
DT119	0 - 2		ASA	0: Narrow / 1: Middle / 2: Wide	
DT120	0 - 2	MULTI CH Input Signal		0: 2CH / 1: 5.1CH / 2: 7.1CH	

*DD = Dolby Digital

*OSD = On Screen Display

3. Control Command

*RX-Z9 can receive control commands only while the power is on.
(Except Power commands and System commands*)

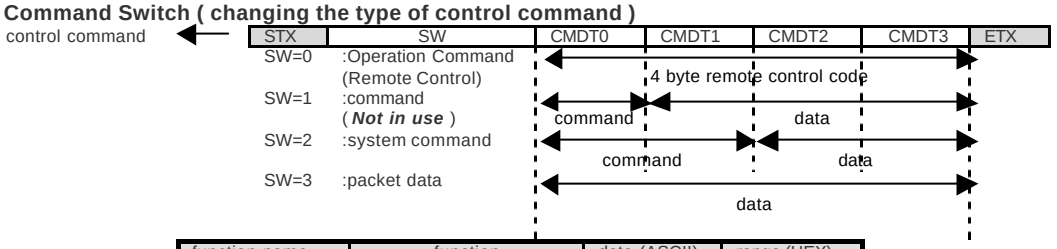
*Please do not send any control commands while the system status is in wait. No commands are permitted until RX-Z9 reports OK

*RX-Z9 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-Z9 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-Z9 remotely via RS-232C.

*RX-Z9 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-Z9 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)



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-Z9 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-Z9'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-Z9 text data regarding tuner freq., master volume, input name, zone2 input name.

(from RX-Z9)

	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				
			Zone2 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	L/R balance (SP)	X	X		0	50	
2	3	3	L/R balance (HP)	X	X		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	5	7	Dial Lift Enable	0	0	Off	0	59	
				0	1	On			
2	5	8	Wall Paper	0	0	Type 1	0	58	
				0	1	Type 2			
				0	2	Type 3			
2	5	9	Picture mode	0	0	CINEMA	0	59	
				0	1	Standard			
				0	2	DYNAMIC			
2	5	A	Resolution	0	0	480P/576P	0	5A	
				0	1	480I/576I			
				0	2	1080I			
				0	3	720P			
2	5	B	Aspect	0	0	NORMAL	0	5B	
				0	1	AUTO			
				0	2	SQUEZE			
				0	3	ZOOM			
2	5	C	Cross Color	0	0	Suppress	0	5C	
				0	1	Not Suppress			
2	5	D	TV Format	0	0	PAL	0	5D	
				0	1	NTSC			
2	5	E	S VIDEO	0	0	S	0	5E	
				0	1	S1			
				0	2	S2			
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 Position	X	X		0	62	
2	6	3	Color 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 All	0	68	
				0	1	On All	0	68	
				1	0	OFF Input	0	68	
				1	1	ON Input	0	68	
				2	0	OFF DSP	0	68	
				2	1	ON DSP	0	68	
				3	0	OFF Manual	0	68	
				3	1	ON Manual	0	68	
				4	0	OFF Auto	0	68	
				4	1	ON Auto	0	68	
				5	0	OFF iLink	0	68	
				5	1	ON iLink	0	68	
2	6	9	Video Processor	0	0	Off	0	69	
				0	1	On	0	69	
2	6	A	Zone 3 Vol output	0	0	VAR.	0	6A	
				0	1	FIX	0	6A	
2	6	B	OSD Message enable	0	0	ENABLE	0	6B	
				0	1	DISABLE	0	6B	
2	6	F	Language (only J)	0	0	ENG	0	6F	
				0	1	JAP	0	6F	
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	
2	7	5	LFE/Bass	0	1	Main	0	75	
				0	2	Both	0	75	
2	7	6	SUBWOOFER CONFIG	0	0	StereoLR	0	76	
				0	1	StereoFR	0	76	
				0	2	Mono x2	0	76	
				0	3	Mono x1	0	76	
				0	4	None	0	76	
	7	7	SUBWOOFER CROSS OVER	0	0	40 Hz	0	77	
				0	1	60 Hz	0	77	
				0	2	80 Hz	0	77	
				0	3	90 Hz	0	77	
				0	4	100 Hz	0	77	
				0	5	110 Hz	0	77	
				0	6	120 Hz	0	77	
				0	7	160 Hz	0	77	
				0	8	200 Hz	0	77	
2	7	8	Multi Ch CENTER to	0	0	CENTER	0	78	
				0	1	MAIN	0	78	
2	7	9	Multi Ch SWFR to	0	0	SWFR	0	79	
				0	1	MAIN	0	79	
2	8	0	Test	0	0	Off	0	80	
				0	1	Dolby	0	80	
				0	2	DSP	0	80	
	8	3	iLINK P&P	0	0	OFF	0	83	
				0	1	ON	0	83	
	8	4	iLINK Auto Play	0	0	OFF	0	84	
				0	1	A<P	0	84	
				0	2	A>P	0	84	
				0	3	A<>P	0	84	
2	8	8	THX SWFR	0	0	No	0	88	
				0	1	Yes	0	88	
	8	9	THX BGC	0	0	Off	0	89	
				0	1	On	0	89	
	8	A	THX ASA	0	0	Nallow	0	8A	
				0	1	Middle	0	8A	
				0	2	Wide	0	8A	
	9	E	MULTI CH Input Signal	0	1	2CH	0	9E	
				0	2	5.1CH	0	9E	
				0	3	7.1CH	0	9E	
	9	F	MULTI CH Output Mode	0	1	5.1CH	0	9F	
				0	2	7.1CH	0	9F	

: Not supported by RX-Z9 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.

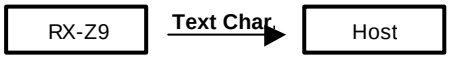
The available characters to display the message are as follows.
""(SPACE)"!""#""%""&""(")""*""+","-"."0""1""2""3""4""5""6""7""8""9":""<""="">""?""A""B""C""D""E""F""G""H""I""J""K""L""M""N""O""P""Q""R""S""T""U""V""W""X""Y""Z""[""]""_""a""b""c""d""e""f""g""h""i""j""k""l""m""n""o""p""q""r""s""t"u""v""w""x""y""z"

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

This command can get certain of text data(ASCII) from the RX-Z9 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.

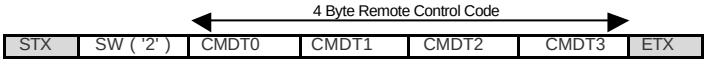


RCMD0,1	COMMAND	0 – 9,A - F	0...0xFF
DDAT 0 - 7	DATA	0 – 9,A - Z SP	ASCII char. Space char.

Report Command

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

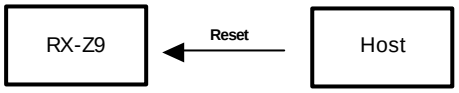
Operation Command							Report Command	
SW	CMDT0	CMDT1	CMDT2	CMDT3	function	setting	Type	RCMD1,2
0	7	A	1	A	master volume	Up	0	26
	7	A	1	B		Down		
	7	E	A	2	Audio Mute	ON		23
	7	E	A	3		OFF		
	7	E	D	F		-20dB		
	7	A	1	4	Input	PHONO		21
	7	A	1	5		CD		
	7	A	1	6		TUNER		
	7	A	1	9		CD-R		
	7	A	C	9		MD/TAPE		
	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		
	7	A	C	8		DVR		
	7	A	5	5		V-AUX		
	7	E	A	4	MULTI CH	On		
	7	E	A	5	NORMAL INPUT	On		
	7	E	8	0	2CH SPECIAL	On		81
	7	E	8	1	6CH SPECIAL	On		
	7	E	8	2	ALL SPECIAL	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	7	B		i.Link		
	7	E	9	D	Input mode allow	ENABLE		56
	7	E	9	E		DISABLE		56
	7	A	D	A	Zone 2 Vol.	Up		27
	7	A	D	B		Down		27
	7	E	A	0	Zone 2 Mute	ON		25
	7	E	A	1		OFF		25
	7	A	D	0	Zone 2 Input	PHONO		
	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		DTV/LD		
	7	A	C	C		CABLE		
	7	A	C	B		SAT		
	7	A	D	6		VCR1		
	7	A	D	7		VCR2		
	7	A	C	E		DVR		
	7	A	D	8		V-AUX		
	7	A	1	D	Power	ON		20
	7	A	1	E		STANDBY		
	7	E	7	E	Main Power	ON		20
	7	E	7	F		STANDBY		
	7	E	B	A	Zone 2 Power	ON		20
	7	E	B	B		STANDBY		
	7	E	2	6	Zone 3 Mute	ON		91
	7	E	2	7		OFF		91
	7	A	E	D	Zone 3 Vol.	Up		92
	7	A	E	E		Down		92
	7	A	E	1	Zone 3 Input	PHONO		90
	7	A	E	2		CD		
	7	A	E	3		TUNER		
	7	A	E	5		CD-R		
	7	A	E	4		MD/TAPE		
	7	A	E	C		DVD		
	7	A	E	6		DTV/LD		
	7	A	E	1		CABLE		
	7	A	E	B		SAT		
	7	A	E	9		VCR1		
	7	A	E	A		VCR2		
	7	A	E	F		DVR		
	7	A	E	0		V-AUX		
	7	A	E	D	Zone 3 Power	ON		20
	7	A	E	E		STANDBY		
	7	E	B	0	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	EX/ES ON		2D
	7	E	B	9		OFF		
	7	E	7	C		AUTO		
	7	E	7	D		DISCRETE ON		
	7	E	D	C		EX ON		

	7	E	D	D		PL2 Movie		
	7	E	D	E		PL2 Music		
	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	STRAIGHT			28
	7	E	E	1	DSP	HALL A		
	7	E	E	2		HALL B		
	7	E	E	3		HALL C		
	7	E	E	4		HALL D		
	7	E	E	5		HALL E		
	7	E	C	4		HALL F		
	7	E	C	5		HALL G		
	7	E	C	6		HALL H		
	7	E	E	6		LIVE CONCERT		
	7	E	E	7		TOKYO		
	7	E	E	8		FREIBURG		
	7	E	E	9		ROYAUMONT		
	7	E	E	A		VILLAGE GATE		
	7	E	E	B		VILLAGE VANGUARD		
	7	E	E	C		THE BOTTOM LINE		
	7	E	E	D		THE ROXY THEATRE		
	7	E	E	E		WAREHOUSE LOFT		
	7	E	F	F		ARENA		
	7	E	F	0		DISCO		
	7	E	F	1		PARTY		
	7	E	F	2		GAME		
	7	E	F	F		XCH STEREO		
	7	E	C	1		2CH DIRECT STEREO		
	7	E	C	0		2CH STEREO		
	7	E	F	3		POP/ROCK		
	7	E	F	4		DJ		
	7	E	F	5		OPERA		
	7	E	F	6		PAVILLION		
	7	E	F	7		MONO MOVIE		
	7	E	F	8		VARIETY/SPORTS		
	7	E	F	9		SPECTACRE		
	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	2		THX (ULTRA2) CINEMA		
	7	E	C	3		THX MUSIC		
	7	A	E	0	Tuner Preset Page	A		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 Number	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	FM/AM	FM		35
	7	E	B	D		AM		
	7	E	B	E	AUTO TUNING	UP		15
	7	E	B	F		DOWN		
	7	E	A	B	SP RELAY A	ON		2E
	7	E	A	C		OFF		
	7	E	A	D	SP RELAY B	ON		2F
	7	E	A	E		OFF		
	7	E	2	B	HOME Memory	A		31
	7	E	2	C		B		
	7	E	2	D		C		
	7	E	2	E		D		
	7	E	2	F		E		
	7	E	3	0		F		
	7	E	3	5	HOME Recall	A		30
	7	E	3	6		B		
	7	E	3	7		C		
	7	E	3	8		D		
	7	E	3	9		E		
	7	E	3	A		F		
	7	E	6	B	VOLMemory	A		33
	7	E	6	C		B		
	7	E	6	D		C		
	7	E	6	E		D		
	7	E	6	F		E		
	7	E	7	0		F		
	7	E	7	5	VOL Recall	A		32
	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 Mmory	A		38
	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		37
	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	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	ZONE1		3A
	7	E	3	3		ZONE2		
	7	E	3	1		ZONE3		
	7	E	3	4		ZONE ALL OR		
	7	E	7	1	ZONE2	ON		36
	7	E	7	2		OFF		
	7	E	7	3	ZONE1	ON		36
	7	E	7	4		OFF		
	7	E	8	3	ZONE3	ON		36
	7	E	8	4		OFF		
	7	E	9	6	DC2 TRG CONTROL	ZONE1		3B
	7	E	9	7		ZONE2		
	7	E	9	F		ZONE3		
	7	E	9	8		ZONE ALL OR		
	7	E	3	C	ZONE2	ON		3C
	7	E	3	D		OFF		
	7	E	3	E	ZONE1	ON		3C
	7	E	3	F		OFF		
	7	E	8	5	ZONE3	ON		3C
	7	E	8	6		OFF		
	7	E	2	8	SP B SET	ZONE1		3E
	7	E	2	9		ZONE2		
	7	E	9	9	ZONE2 SP OUT	ON		3F
	7	E	9	A		OFF		
	7	E	9	3	DUAL MONO	MAIN		39
	7	E	9	4		SUB		
	7	E	9	5		ALL		

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-Z9 to your touch panel system.

*recall factory preset of all data

5. Report Command

RX-Z9 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-Z9.

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

- System Status Report : RX-Z9 reports a System Status Report when the system status changed.
- Playback Status Report : RX-Z9 reports a Playback Status Report when the internal playback status changed.
- Operation Report : When the RX-Z9 is controlled by remote controller, front panel, RS-232C or by system controller, RX-Z9 sends a Operation Report, which includes the latest setting status of the controlled function.

*RX-Z9 reports a System State Report with system guard to inform its power status (power off) when a control command was sent to RX-Z9 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-Z9, 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-Z9 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 - 2
RCMD0, 1	command	0 - 9, A - F	0 - 0xFF
RDAT0, 1	data	0 - 9, A - F,SP	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

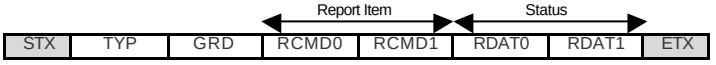
GRD	Guard status*
0	no guard
1	system guard
2	setting guard

*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	Analog Input or Input source doesn't have the designated Input mode	---
Zone2 Input	selected input	zone2 selector is not at "PLAYING SOURCE"	---
Mute	mute status	---	---
Zone2 mute	mute status	---	---
master volume	volume value	---	---
Zone2 volume	Volume value	---	Zone2 Volume is Fixed
Program	Program ID	6ch input is ON or source is not 32kHz,44.1kHz or 48kHz	---
6.1/ES Key	status	6ch input is ON STRAIGHT 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 or 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

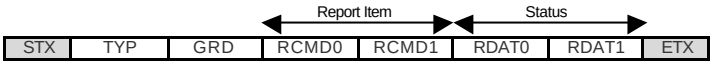


RCMD0, 1	Report Item	RDAT0, 1	Status	
00	system	00	OK	ready for accepting the control commands
		01	Busy	start of the term prohibits sending commands
		02	Power Off	report against the command which cannot be accepted when the Power is Off

*RX-Z9 sends this report when the system is reset or the power turns off.
It can be used for observation of the system revival.

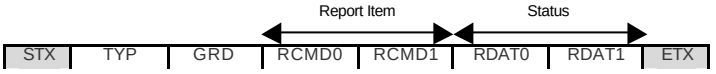
01	warning	00	over current	report of abnormal states
		01	DC Detect	(Only when it's possible to report)
		02	power trouble	
		03	over heat	

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	
		0E	DSD	
11	Fs	00	Analog	
		01	32kHz	
		02	44.1kHz	
		03	48kHz	
		04	64kHz	
		05	88.2kHz	
		06	96kHz	
		07	Unknown	
		08	128kHz	
		09	176.4kHz	
		0A	192kHz	
		0B	48kHz (96kHz)	DTS 96/24 signal (A/B)
12	EX/ES	00	Off	Playback status
		01	Matrix On	
		02	Discrete ON	
		03	EX	
		04	PLII Movie	
		05	PLII Music	
13	Thr / Bypass	00	Off	Fs when other than 32/44.1/48kHz
		01	On	
14	RED dts	00	Release	DTS-CD status*
		01	Wait	After the signals of DTS CD/LD are stopped, the DTS-CD status keeps "Wait" for 30 sec., then turned to "Release" While the DTS-CD 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	ALL(Main/Zone2) OFF
		01	ALL(Main/Zone2) ON
		02	MainON / Zone2 OFF
		03	MainOFF / Zone2 ON
			MainON / Zone2 ON / Zone3 OFF
			MainON / Zone2 OFF / Zone3 OFF
			MainOFF / Zone2 ON / Zone3 ON
			MainOFF / Zone2 OFF / Zone3 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	CABLE
		x.8	SAT
		x,9	VCR1
		x,A	VCR2
		x,B	DVR
		x.C	V-AUX
		0/1 x	Multi CH OFF/ON
22	Input mode	00	AUTO
		01	D.D.RF
		02	DTS
		03	DIGITAL
		04	ANALOG
		05	ANALOG ONLY
		06	i.LINK
		07	i.Link
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	CABLE
		08	SAT
		09	VCR1
		0A	VCR2
		0B	DVR
		0C	V-AUX
25	Zone2 Mute	00	OFF
		01	ON
26	Master vol.	00	-oo
		27	-80dB
		...	
		C7	0dB
		...	
		E8	16.5dB
27	Zone 2 Vol.	00	-oo
		27	-80dB
		...	
		C7	0dB
		...	
		E8	16.5dB

RCMD0, 1	Report Item	RDAT0, 1	Status
28	Program	34	2CH Streo
		35	2CH Direct Streo
		17	9CH Streo
		00	Hall A
		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
		18	Pop/Rock
		19	DJ
		1C	Opera
		1D	Pavilion
		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
		36	THX A Cinema
		37	THX B Music
		39	Hall F
		3A	Hall G
		3B	Hall H
		80-B3	STRAIGHT
		80	STRAIGHT (HALL A)
		81	STRAIGHT (HALL B)
		...	...
		B3	STRAIGHT (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
		04	EX
		05	PLII MUSIC
		06	PLII MOVIE
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
		01	On
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 ALL OR
	CTRL	01	ZONE1
		02	ZONE2
		03	Reserve
3B	DC2 Trigger	00	ZONE ALL OR
	CTRL	01	ZONE1
		02	ZONE2
		03	Reserve
3C	DC2 Trigger	00	Off (Due to the delay
	OUTPUT	01	On (Due to the delay
3D	L/R Balance (HP)	00	Lch MAX
		...	
		14	MID
		...	
		28	Rch MAX
3E	SP B	00	Off
	SET	01	On
3F	ZONE2	00	OFF
	SP OUT	01	ON

RCMD0, 1	Report Item	RDAT0, 1	Status
40	LEVEL	14	-10dB
	MAIN R	15	
		.	
(*4)		3C	+10dB
41	LEVEL	14	-10dB
	MAIN L	...	
(*4)		3C	+10dB
42	LEVEL	14	-10dB
	CENTER	15	
		...	
(*4)		3C	+10dB
43	LEVEL	14	-10dB
	REAR R	15	
		...	
(*4)		3C	+10dB
44	LEVEL	14	-10dB
	REAR L	15	
		...	
(*4)		3C	+10dB
45	LEVEL	14	-10dB
	SUR BACK R	15	
		...	
(*4)		3C	+10dB

RCMD0, 1	Report Item	RDAT0, 1	Status
46	LEVEL	14	-10dB
	SUR	15	
	BACK L	...	
(*4)		3C	+10dB
47	LEVEL	14	-10dB
	FRONT R	15	
		...	
(*4)		3C	+10dB
48	LEVEL	14	-10dB
	FRONT	15	
	L	...	
(*4)		3C	+10dB
49	LEVEL	14	-10dB
	SWFR 1		
		...	
(*4)		3C	+10dB
4A	LEVEL	14	-10dB
	SWFR		
	2	...	
(*4)		3C	+10dB

RCMD0, 1	Report Item	RDAT0, 1	Status
50	LR Balance (SP)	08	Lch Max
		...	
		14	Mid
		...	
		20	Rch Max
51	LFE Level SP	00	-20dB
		...	
		28	0dB
52	LFE Level HP	00	-20dB
		...	
		28	0dB
53	Audio Delay	00	0ms
		01	
		...	
		C8	200ms
54	L/R BALANCE (HP)	08	Lch MAX
		...	
		14	MID
		...	
		20	Rch MAX
55	SP Delay Rear CT	00	0ms
		01	0.5ms
		...	
		3C	30ms
56	INPUT MODE ENABLE	00	ENABLE
		01	DISABLE
57	DIAL. LIFT ENABLE	00	OFF
		01	ON

RCMD0, 1	Report Item	RDAT0, 1	Status
58	WALL PAPER	00	TYPE 1
		01	TYPE 2
		02	TYPE 3
59	PICTURE MODE SELECT	00	CINEMA
		01	STANDARD
		02	DYNAMIC
5A	RESOLUTION	00	480P/576P
		01	480i/576i
		02	1080i
		03	720P
5B	ASPECT	00	THROUGH
		01	AUTO
		02	NORMAL
		03	ZOOM
5C	CROSS COLOR	00	Suppress
		01	Not Suppress
5D	TV FORMAT	00	PAL
		01	NTSC
5E	S VIDEO	00	S
		01	S1
		02	S2

RCMD0, 1	Report Item	RDAT0, 1	Status
60	Input Mode	00	Auto
		01	Last
61	Dimmer	00	-4
		01	-3
		02	-2
		03	-1
		04	0
62	OSD POSITION	x,0	Horizontal -5
		...	
		x,A	+5
		0,x	Vertical -5
		...	
		A,x	+5
63	Color Back	00	Off
		01	Auto
64	Dynamic Range SP	00	Max.
		01	Std.
		02	Min.

RCMD0, 1	Report Item	RDAT0, 1	Status
65	Dynamic Range HP	00	Max.
		01	Std.
		02	Min.
66	Zone 2 Vol. out	00	Var.
		01	Fix
67	Zone 2 Mode	00	Mode 1
		01	Mode 2
68	MEM GURDE	XX	BIT 0 INPUT (All gurde : 0x1F) BIT 1 DSP BIT 2 MANUAL BIT 3 AUTO BIT 4 iLINK
69	VIDEO PROCESSOR	00	OFF
		01	ON
6A	ZONE3 VOL OUT	00	VAR
		01	FIX
6B	OSD MESSAGE	00	ENABLE
		01	DISABLE

RCMD0, 1	Report Item	RDAT0, 1	Status
70	Center SP	00	Large
		01	Small
		02	None
71	Main SP	00	Large
		01	Small
72	Surround LR	00	Large
		01	Small
		02	None
73	SUR BACK SP	00	Large x2
		01	Large x1
		02	Small x2
		03	Small x1
		04	None
74	Presence SP	00	Yes
		01	None
75	LFE/Bass	00	SWFR
		01	Main
		02	Both

RCMD0, 1	Report Item	RDAT0, 1	Status
76	SW CONFIG	X0	NONE
		X1	MONO
		X2	L-R
		X3	F-R
	SW PHASE	0X	Normal
		1X	L Reverse
		2X	R Reverse
		3X	L/R Revers
77	SW CROSS OVER	00	40 Hz
		01	60 Hz
		02	80 Hz
		03	90 Hz
		04	100 Hz
		05	110 Hz
		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	00	OFF
	SPECIAL	01	ON (2ch)
		02	ON (Multi)
82	NIGHT	00	OFF
	MODE	01	ON
83	iLINK	00	OFF
	P&P	01	ON
84	iLINK	00	OFF
	Auto	01	A<P
	Play	02	A>P
		03	A<>P

RCMD0, 1	Report Item	RDAT0, 1	Status
88	THX	00	NO
	SWFR	01	YES
89	THX	00	OFF
	BGC	01	ON
8A	THX	00	NALLOW
	ASA	01	MIDDLE
		02	WIDE

RCMD0, 1	Report Item	RDAT0, 1	Status
90	MULTI CH	14	-10dB
	LEVEL	15	
	MAIN R	...	
(*4)		3C	+10dB
91	MULTI CH	14	-10dB
	MAIN L	...	
(*4)		3C	+10dB
92	MULTI CH	14	-10dB
	LEVEL	15	
	CENTER	...	
(*4)		3C	+10dB
93	MULTI CH	14	-10dB
	LEVEL	15	
	REAR R	...	
(*4)		3C	+10dB
94	MULTI CH	14	-10dB
	LEVEL	15	
	REAR L	...	
(*4)		3C	+10dB
95	MULTI CH	14	-10dB
	LEVEL	15	
	SUR BACK	...	
(*4)	R	3C	+10dB

RCMD0, 1	Report Item	RDAT0, 1	Status
96	MULTI CH	14	-10dB
	LEVEL	15	
	SUR	...	
(*4)	BACK L	3C	+10dB
97	MULTI CH	14	-10dB
	LEVEL	15	
	FRONT R	...	
(*4)		3C	+10dB
98	MULTI CH	14	-10dB
	FRONT	15	
	L	...	
(*4)		3C	+10dB
99	MULTI CH	00	-20dB
	LEVEL	01	-19.5dB
	SWFR 1	...	
(*4)		28	0dB
9A	MULTI CH	00	-20dB
	LEVEL	01	-19.5dB
	SWFR	...	
(*4)	2	28	0dB
9E	MULTI CH	00	2CH
	INPUT	01	5.1CH
	SIGNAL	02	7.1CH
9F	MULTI CH	00	2CH
	OUTPUT LFO SIG	01	7.1CH

RCMD0, 1	Report Item	RDAT0, 1	Status
A0	Z3	00	PHONO
	Input	01	CD
		02	TUNER
		03	CD-R
		04	TAPE/MD
		05	DVD
		06	DTV/STB
		07	CABLE
		08	SAT
		09	VCR1
		0A	VCR2
		0B	DVR
		0C	DOCK
A1	Z3 Mute	00	OFF
		01	ON

RCMD0, 1	Report Item	RDAT0, 1	Status
A2	Z3 VOL	00	00
	(*2)	39	-80dB
		...	
		C7	0dB
		...	
		E8	+16.5dB
A3	HDMI	01	HDMI 1
	Z3 VOL	02	2
		03	3
		04	4
		05	5
		06	6
A4	HDMI	01	HDMI MCH IN
	Z3 VOL	02	2
		03	3
		04	4
		05	5
		06	6
A5	MUTE	00	MUTE
		01	-20dB

Note

*When the Input is changed, RX-Z9 sends Operation Report for Input (RCMD0,1="21") and Input mode(RCMD0,1="22").

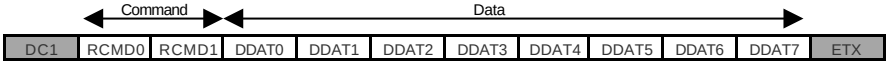
*When the Home bank is changed, RX-Z9 sends Operation Report for Home bank (RCMD0,1="30") and Configuration Command.

*When a headphone is plugged into the headphone jack and Speaker Relay turned off, RX-Z9 send the Operation Report for Speaker Relay A and B (RCMD0,1="2E","2F", RDAT="00(OFF)"). RX-Z9 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-Z9 send a Playback Status report.

*Each time the busy status of the system changes, RX-Z9 send the System Status report.

5.4 Display Text Data Report



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

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

OCMD0,1	ITEM	DDAT0 –2	DDAT3 –7
02	Zone2 Volume	SP 02	5characters <Upper Lower>

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

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

OCMD0, 1	ITEM	DDATO -7
04	Zone 2 Input name	8characters <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-Z9 Control Procedure

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

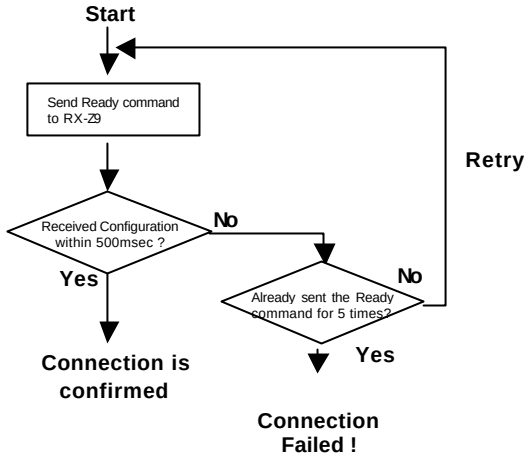
When the AC plug / RS-232C cable are not connected, RX-Z9 cannot send any data to host. If the host doesn't receive a configuration command after sending Ready command 5 times, host should disable the RS-232C communication of the host and send alert to the graphic user interface (GUI).

[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-Z9 are stored in the sending buffer. If the stored commands exceed the bufer memory size (buffer overflow), RX-Z9 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)

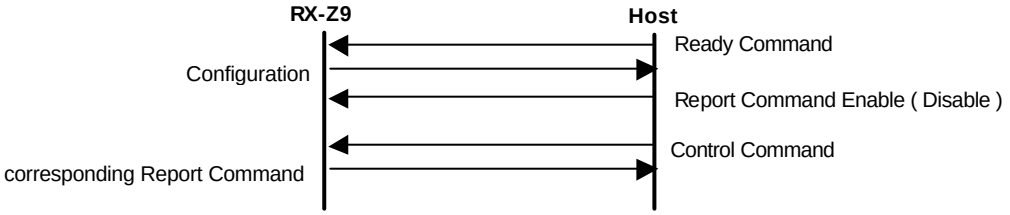


[3] AC plug connection detection (after [1],[2])

When the AC connection is reset, RX-Z9 send Configuration Command to the host.
Host can feedback the status of RX-Z9 to its GUI.

[4] Getting the status of the RX-Z9 when the host boot up

At first, host should send Ready command and receive the Configuration Command from RX-Z9 (see [1]).
Once the connection is confirmed, host can send Control Commands to the host. While the RX-Z9 is turned off, RX-Z9 only accept System Command and Power ON command.



[5] Error transactions after [4]

While sending control command, if RX-Z9 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-Z9 responded, the host can feedback the RX-Z9 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.