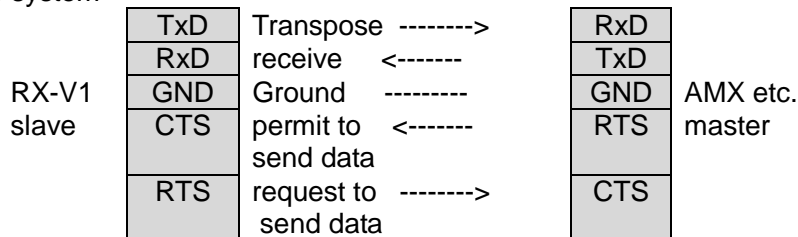


1 Outline

1.1 Connection 5 wire system



*When not connected, data sending to RX-V1 is prohibited (CTS port pull down).

1.2 Communication format

based on RS-232C format

Full duplex, start-stop synchronization communication

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

*RTS is keeps Low when the AC outlet are not plugged in.
 When RTS keeps Low for over 10 seconds in spite of the AC outlet connection, there are some troubles.

1.3 Data block timeout

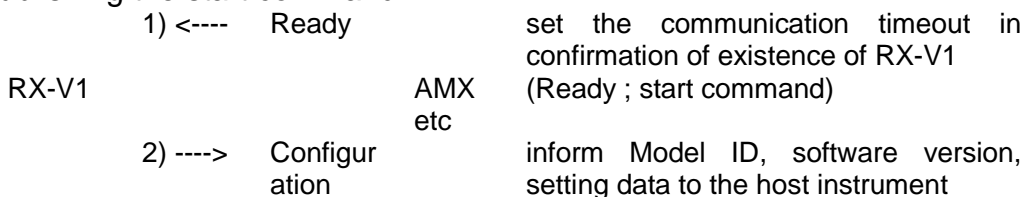
Please set the data sending timeout (from the start of the data block to the end) to 500msec.

That is, data block sending will finish at most in 500 msec.

When the data block sending doesn't finish in 500 msec, there are some troubles. Please cancel the data sent from the host instrument.

2 Start transactions

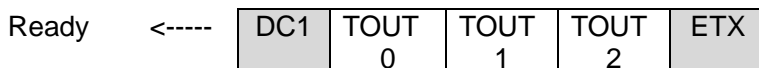
*Publishing the start command



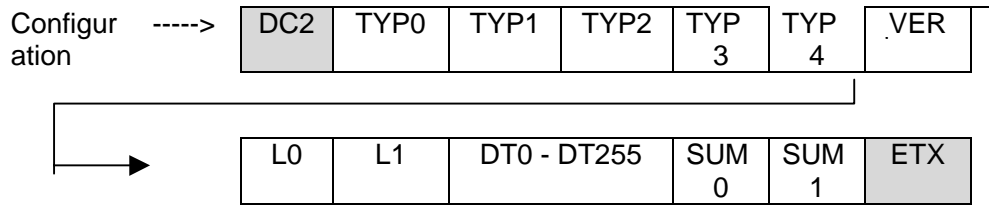
*Please retry sending data if RX-V1 won't send back Configuration in 1 sec. after sending Ready.

When no configuration is sent back after the 5th sending, Please do not send any data after that.

*Even while the system is wait, it is possible to corresponding with RX-V1.



RX-V1 RS-232C Interface



- *TYPx : Model ID
- *VER : Software Version
- *SUM : 2's complement of 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 - 0xFFFF

*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 if SUM	0 - 9, A - F	0 - 0xF
SUM1	lower 4 bit of SUM	0 - 9, A - F	0 - 0xF

*Structure of the data in Configuration command

data			When the power is OFF, only DT0 and DT1 are sent to the Host.
DT0	0/1	System	OK/Busy
DT1	0/1	Power	OFF/ON
DT2	0 - C	Input	PHONO/CD/TUNER/TAPE/MD/DVD/LD/ D-TV/CBL-SAT/VCR1/VCR2/VCR3/V-AUX
DT3	0/1	6ch input	OFF/ON
DT4	0 - 4	Input Mode	AUTO/D.D.RF/DTS/DIGITAL/ANALOG
DT5	0/1	Audio Mute	OFF/ON
DT6	0 - C	Zone2 Input	PHONO/CD/TUNER/TAPE/MD/DVD/LD/ D-TV/CBL-SAT/VCR1/VCR2/VCR3/V-AUX
DT7	0/1	Zone2 Mute	OFF/ON
DT8	0 - F	Master Volume	Upper 4 bit
DT9	0 - F	Master Volume	Lower 4 bit
DT10	0 - F	Zone2 Volume	Upper 4 bit
DT11	0 - F	Zone2 Volume	Lower 4 bit
DT12	0 - F	Program	Upper 4 bit
DT13	0 - F	Program	Lower 4 bit
DT14	0/1	Effect	OFF/ON
DT15	0/1	EX/ES key status	OFF/ON
DT16	0 - 2	OSD	FULL/SHORT/OFF
DT17	0 - 3	Sleep	120/90/60/30/OFF
DT18	0 - 4	Tuner Page	A/B/C/D/E
DT19	0 - 7	Tuner No.	1/2/3/4/5/6/7/8
DT20	0 - 6	Home bank	Main/A/B/C/D/E/F
DT21	0 - 6	Volume bank	Main/A/B/C/D/E/F
DT22	0/1	Speaker relay A	OFF/ON
DT23	0/1	Speaker relay B	OFF/ON
DT24	0 - 8	Playback	6ch input/Analog/PCM/DD*(except for 2.0)/DD(2.0)/DD.Karaoke/DD.EX/DTS/DTS-ES/DIGITAL
DT25	0 - 7	Fs	Analog/32kHz/44.1kHz/48kHz/64kHz/88.2kHz/96kHz/Unknown
DT26	0/1	EX/ES playback	OFF/ON
DT27	0/1	Thr/Bypass	Normal / Bypass
DT28	0/1	RED dts	Release/Wait
DT29	0/1	Head Phone	OFF/ON

*DD = Dolby Digital

3 Commands

*Control commands

RX-V1 <----- control commands AMX control commands from external
 etc instruments

*RX-V1 accepts control commands only while the power is on.
 (except for Power commands and System commands*)

*Please do not send control commands while the system status is wait. It is permitted to send commands after RX-V1 reports that the system status turned into OK.

*No cancel command for a command which has already sent to RX-V1, basically.

*Please retry sending the same command when RX-V1 sends no Report command** for over 1 sec. after Host send a control command.

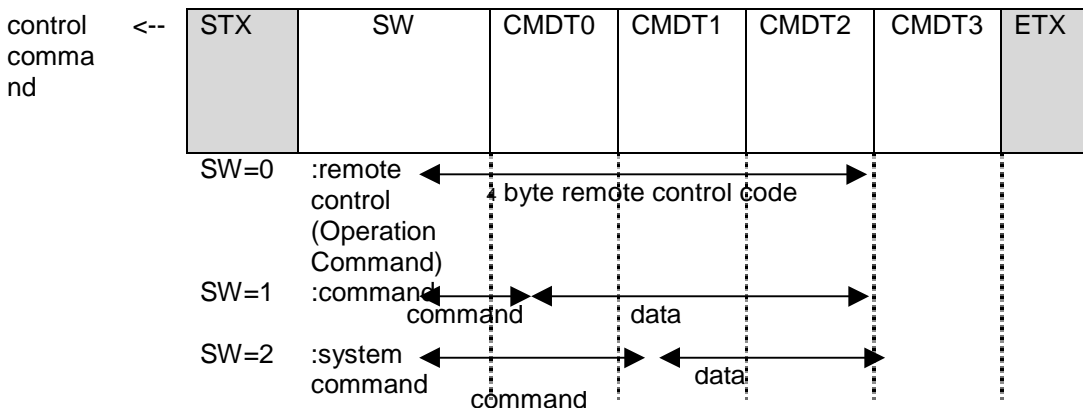
In this case, if there are no Report commands from RX-V1 after the 5th re-sending, please abort sending commands and re-start communication from the start transactions.

*When the switch of control command (SW) is set to be 0 (remote controller), RX-V1 act the same action and indicates the same FL/On screen displays, as it does when it receive a command from I/R.

*RX-V1 send only one Report command for each types of control after the control command is sent to RX-V1, which reports the last state of the setting as a result of a series of transactions.

For example, If a user set the input selector in the unit to LD just after the host send commands to change input to CD, RX-V1 report only that the input was changed to LD by the system operation.

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



function name	function	data (ASCII)	Range (HEX)
---------------	----------	--------------	-------------

RX-V1 RS-232C Interface

SW	command switch	0 - 9	0 - 9
CMDT0 - 3	command & data	0 - 9, A - F	variable

*Changing the SW, the data number of the command/data can be varied.

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)

*System Command

System command controls RX-V1's system settings like report command.

*System Commands

SW	command			data			Report Command		
	CMDT 0	CMDT 1		CDMT 2	CMDT 3		Type	RCMD 1, 2	RDAT 1, 2
2	0	0	report command enable	0	0	enable	0	00	00 (OK)
				0	1	disable	0	00	00 (OK)
	0	1	time between two report commands	0	0	real time	0	00	00 (OK)
				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)

***Operation Command**

Operation command can control all functions that standard or extended I/R can control.

***Operation Commands**

Operati on Command							Report Command	
S W	CMDT 0	CMDT 1	CMDT 2	CMDT 3	functi on	setting	Type	RCMD 1, 2
0	7	A	1	A	master volume	Up	0	26
	7	A	1	B		Down		
	7	E	A	2	master volume Mute	ON		23
	7	E	A	3		OFF		
	7	A	1	4	I nput	PHONO		21
	7	A	1	5		CD		
	7	A	1	6		TUNER		
	7	A	1	8		TAPE		
	7	A	C	9		MD		
	7	A	1	7		LD		
	7	A	C	1		DVD		
	7	A	5	4		D-TV		
	7	A	C	0		CBL/SAT		
	7	A	0	F		VCR1		
	7	A	1	3		VCR2		
	7	A	C	8		VCR3		
	7	A	5	5		V-AUX		
	7	E	A	4	6ch i nput	ON		
	7	E	A	5		OFF		
	7	E	A	6	I nput Mode	AUTO		22
	7	E	A	7		D. D. RF		
	7	E	A	8		DTS		
	7	E	A	9		DI GI TAL		
	7	E	A	A		ANALOG		
	7	A	D	A	Zone2 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		PHONO		
	7	A	D	1		CD		
	7	A	D	2		TUNER		
	7	A	D	3		TAPE		
	7	A	C	F		MD		
	7	A	D	5		LD		
	7	A	C	D		DVD		
	7	A	D	9		D-TV		
	7	A	C	C		CBL/SAT		

RX-V1 RS-232C Interface

	7	A	D	6		VCR1		
	7	A	D	7		VCR2		
	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	B	0	On screen(0 SD)	OFF		2B
	7	E	B	1		SHORT		
	7	E	B	2		FULL		
	7	E	B	3	Sl eep	OFF		2C
	7	E	B	4		120		
	7	E	B	5		90		2D
	7	E	B	6		60		
	7	E	B	7		30		
	7	E	B	8	EX/ES Key	ON		
	7	E	B	9		OFF		
	7	E	E	0	effect	OFF		28
	7	E	E	1		Hal l A		
	7	E	E	2		Hal l B		
	7	E	E	3		Hal l C		
	7	E	E	4		Hal l D		
	7	E	E	5		Hal l E		
	7	E	E	6		Li ve Concert		
	7	E	E	7		Tokyo		
	7	E	E	8		Frei burg		
	7	E	E	9		Royaumont		
	7	E	E	A		Vi ll age Gate		
	7	E	B	B		Vi ll age Vanguard		
	7	E	E	C		The Bottom Li ne		
	7	E	E	D		The Roxy Theatre		
	7	E	E	E		Warehouse Loft		
	7	E	E	F		Arena		
	7	E	F	0		Di sco		
	7	E	F	1		Party		
	7	E	F	2		Game/ Amusement		
	7	E	F	3		Pop/ Rock		
	7	E	F	4		DJ		
	7	E	F	5		Cl assi cal /Opera		

RX-V1 RS-232C Interface

	7	E	F	6		Pavilion		
	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	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 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		

RX-V1 RS-232C Interface

SW	CMDT 0	CMDT 1	CMDT 2	CMDT 3	functi on	setting	Type	RCMD 1, 2
0	7	E	A	B	speaker rel ay A	ON	0	2E
	7	E	A	C		OFF		
	7	E	A	D	speaker rel ay B	ON		2F
	7	E	A	E		OFF		
	7	E	2	0	Home bank	Mai n		30
	7	E	2	1		A		
	7	E	2	2		B		
	7	E	2	3		C		
	7	E	2	4		D		
	7	E	2	5		E		
	7	E	2	6		F		
	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	3	0		F		
	7	E	3	5	Home preset recal l	A		
	7	E	3	6		B		
	7	E	3	7		C		
	7	E	3	8		D		

RX-V1 RS-232C Interface

	7	E	3	9		E		
	7	E	3	A		F		
	7	E	6	0	Vol ume bank	Mai n		31
	7	E	6	1		A		
	7	E	6	2		B		
	7	E	6	3		C		
	7	E	6	4		D		
	7	E	6	5		E		
	7	E	6	6		F		
	7	E	6	B	Vol ume 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	7	0		F		
	7	E	7	5	Vol ume preset	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		

4 Reset Command

*This command reset RX-V1's all current settings which can be controlled by RS-232C commands to factory presets.

*Resetting the stored settings should be thought to be a final solution.

RX-V1 <----- reset AMX etc

*Please confirm the RX-V1 settings from the Configuration after the reset transaction with 500msec's wait.

Ready <-----

DC3	DEL	DEL	DEL	ETX
-----	-----	-----	-----	-----

*recall factory preset of all data

RX-V1 RS-232C Interface

0	no guard
1	guarded by system
2	guarded by setting

*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	---
Zone2 Input	selected input	zone2 selector is not at "REMOTE"	---
Mute	mute status	---	---
Zone2 mute	mute status	---	---
master volume	volume value	---	---
Zone2 volume	volume value	---	Zone2 volume is set to "FIX"
Program	Program ID	6ch input is ON	---
EX/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	SETMENU is active Test tone is ON	Memory Guard is ON
Sleep	status	Test tone is ON	---
Home	selected Bank	---	---
Home volume	selected Bank	---	---

<Contents of report>

*System status reports

RCMD0, 1	content	RDAT0, 1	state	
00	no guard	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-V1 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 (Only when it's possible to report)
		01	DC	
		02	power trouble	
		03	over heat	

*Playback status reports

RX-V1 RS-232C Interface

RCMD0, 1	content	RDAT0, 1	state	
10	Playback	00	external decoder	audio code mode excepting for 2/0 audio code 2/0 waiting to decode, etc.
		01	Analog	
		02	PCM	
		03	D.D.(except for 2/0)	
		04	D.D.(2/0)	
		05	D.D.karaoke	
		06	D.D.EX	
		07	DTS	
		08	DTS.ES	
		09	Other digital	
0A	dts analog mute			
11	Fs	00	Analog	
		01	32kHz	
		02	44.1kHz	
		03	48kHz	
		04	64kHz	
		05	88.2kHz	
		06	96kHz	
		07	Unknown	
12	EX/ES	00	ON	EX/ES Playback status
		01	OFF	
13	Thr / Bypass	00	Normal	DSP Through status
		01	Bypass	
14	RED dts	00	Release	RED dts status*
		01	Wait	

*After the signals of DTS CD or DTS 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.

RX-V1 RS-232C Interface

*Operation reports

RCMD0, 1	content	RDAT0, 1	state	RCMD0, 1	content	RDAT0, 1	state
20	Power	00 01	OFF ON	29	Tuner Page	00 01 02 03 04	A B C D E
21	Input	x,0 x,1 x,2 x,3 x,4 x,5 x,6 x,7 x,8 x,9 x,A x,B x,C 0/1,x	PHONO CD TUNER TAPE MD DVD LD D-TV CBL/SAT VCR1 VCR2 VCR3 V-AUX 6ch input OFF/ON	2A	Tuner Preset No.	00 01 02 03 04 05 06 07	1 2 3 4 5 6 7 8
22	Input mode	00 01 02 03 04	AUTO D.D.RF DTS DIGITAL ANALOG	2B	OSD	00 01 02	FULL SHORT OFF
23	Mute	00 01	OFF ON	2C	SLEEP	00 01 02 03 04	120 90 60 30 OFF
24	Zone2 Input	00 01 02 03 04 05 06 07 08 09 0A 0B 0C	PHONO CD TUNER TAPE MD DVD LD D-TV CBL/SAT VCR1 VCR2 VCR3 V-AUX	2D	EX/ES Key	00 01	OFF ON
25	Zone2 Mute	00 01	OFF ON	2E	Speaker relay A	00 01	OFF ON
26	Master volume	00 01 02 C7	-∞ -99dB -98.5dB 0dB	2F	Speaker relay B	00 01	OFF ON
27	Zone2 volume	00 01 02 50	-∞dB -79dB -78dB 0dB	30	Home bank	00 01 02 03 04 05 06	Main A B C D E F
28	Program	80 00 01 02 04 05 06 08 09 0A 0C 0D 0E 10 11 12 14 15 16 18 19 1C 1D 20 21 24 25 28 29 2C 2D	OFF Hall A Hall B Hall C Hall D Hall E Live Concert Tokyo Frei burg Royaumont Village Gate Village Vanguard The Bottom Line The Roxy Theatre Warehouse Loft Arena Di sco Party Game/ Amusement Pop/Rock DJ Cl assical /Opera Pavi lion Mono Movie Variety Sports Spectacle Sci -Fi Adventure General Normal Enhanced	31	Home Preset memory	01 02 03 04 05 06	A B C D E F
				32	volume bank	00 01 02 03 04 05 06	Main A B C D E F
				33	Volume Preset Memory	01 02 03 04 05 06	A B C D E F
				34	Head Phone	0 1	OFF ON

Attentions

*When the Input is changed, RX-V1 sends Operation Report for Input (RCMD0,1="21") and Input mode(RCMD0,1="22").

*When the Home bank is changed, RX-V1 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-V1 send the Operation Report for Speaker Relay A and B (RCMD0,1="2E", "2F", RDAT="00(OFF)").
RX-V1 sends the Operation Command for Speaker Relay A and B when the headphone is jacked off, too.

*Each time the source from the Inputs or playback status (ex. EX/ES, RED dts etc.) of the system changes, RX-V1 send the Playback Status report.

*Each time the busy status of the system change, RX-V1 send the System Status report.

Communications

- [1] No connection of the AC Outlet of the RX-V1 / no connection of RS-232C cable
Because RX-V1 can not send a configuration after the 5th re-sending of Ready, please let host report trouble.
RX-V1 <---X----- AMX etc
- [2] AC outlet / RS-232C cable is plugged off after the communication has started
In this case, when host detected a data block timeout or 5th re-sending, please let host prohibit publishing any commands and clear send buffer. After that, re-start communication from sending Ready (start transactions) and check the [1].
However this cannot be detected when the report command is set to disable.
When the RS-232C cable is plugged off, though RX-V1 try to send report commands for the operations by the remote controller or keys, the reports data are only stocked in the send buffer, which make it overflow.
When the send buffer overflowed, RX-V1 clears the send buffer and stop sending report commands.
*In this case, RX-V1 sends no report commands even after the RS-232C cable is re-connected.
Please plug off and on the AC outlet, or re-start communication from sending Ready (start transactions).
- [3] AC outlet is plugged in after [1],[2]
RX-V1 report that the system is reset.
When the host receives the report, please let host send Ready to start communication.
- [4] Host turns on after the RX-V1 turned on
- [5] Error transactions after [4]
When host detect a timeout of report command or 5th re-sending of control command, please clear the send buffer and re-start from the start transactions.

6 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.