

RV-5/MV-5

Serial Protocol Definitions

Software Version: V4.0x

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1 Documents

The following documents should also be used with this document to understand how this protocol can be used with an RV-5 Receiver and the MV-5 Processor.

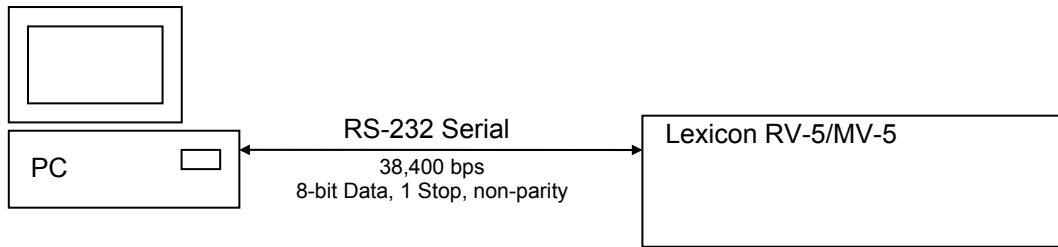
- 070-18144 RV-5 User Guide**
- 070-18137 MV-5 User Guide**

1.1 Change List

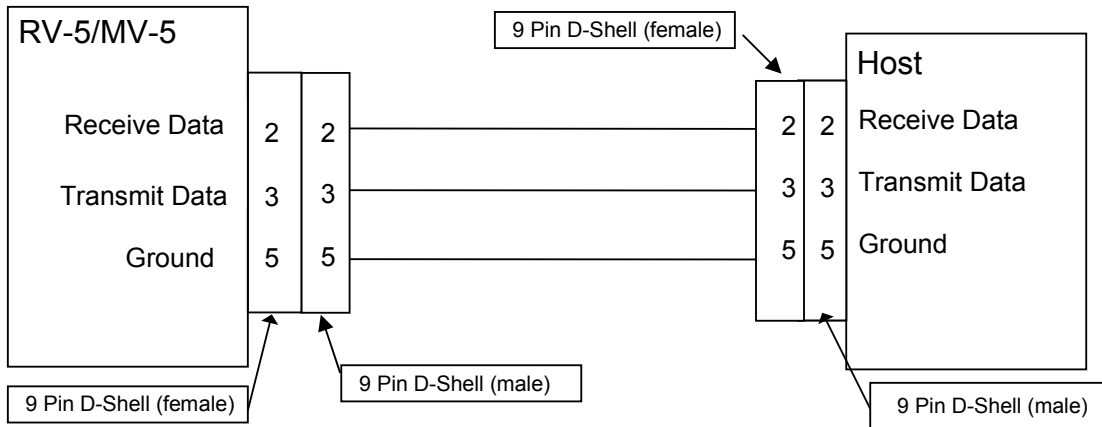
No changes have been made.

2 General Description

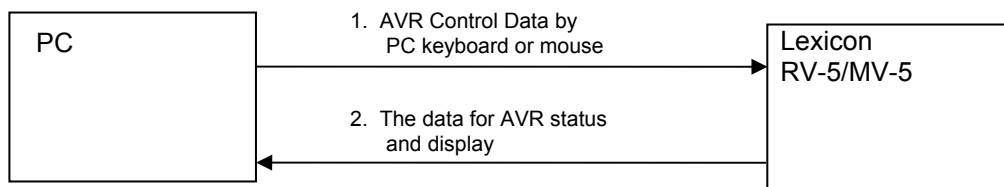
The intention of the RV-5/MV-5 serial port and protocol communication is for an external connected PC to control and obtain status from the RV-5/MV-5.



2.1 DB-9 RS232 Connector



2.2 Command Block Map



3 Data Communication Format

Start Code	Data Type	Data Length	Information Field
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3.1 Start Code

- PC -> AVR: “**0xFF**”
- AVR -> PC: “**0xFE**”

3.2 Data Type

- Remote Control through PC: **0x02**
- AVR Display Status: **0x03**
- AVR Ram Status: **0x04**
- AVR Flag Status: **0x05**

3.3 Data Length

Information Field's Byte

- Remote Control through PC: **4byte**
- AVR Status Display on PC: variable

3.4 Information Field

In **hex** code's Data

4 Command Data

PC -> AVR, Data length: 4 byte

Selected Input	COMMAND	Information Field (HEX)			
		1st	2nd	3rd	4th
	Standby Power On	82	0B	9A	65
	Standby Power Off	82	0B	9B	64
	Main MUTE (toggle)	82	0B	15	EA
	Main HD select	82	0B	20	DF
	Main DVD select	82	0B	21	DE
	Main Game select	82	0B	34	CB
	Main SAT select	82	0B	24	DB
	Main CABLE select	82	0B	23	DC
	Main DVR select	82	0B	25	DA
	Main CD select	82	0B	26	D9
	Main Dock select	82	0B	38	C7
	Main PC select	82	0B	39	C6
	Main Tuner select	82	0B	2A	D5
	Main Aux1 select	82	0B	2B	D4
	Main Aux2 select	82	0B	32	CD
	Main Volume + (cw)	82	0B	17	E8
	Main Volume - (ccw)	82	0B	16	E9
√	Mode <	82	0B	1B	E4
√	Mode >	82	0B	1A	E5
√	Video Status (toggle)	82	0B	5C	A3
√	Audio status (toggle)	82	0B	1C	E3
	MENU select	82	0B	09	F6
	(Menu) UP	82	0B	01	FE
	(Menu) DOWN	82	0B	1D	E2
	(Menu) LEFT	82	0B	0A	F5
	(Menu) RIGHT	82	0B	08	F7

Selected Input	COMMAND	Information Field (HEX)			
		1st	2nd	3rd	4th
	(Menu) SELECT	82	0B	3A	C5
	(Menu) Exit	82	0B	95	6A
	Main Z1:OFF	82	0B	06	C9
	FPD Brightness (toggle)	82	0B	31	CE
√	LOGIC 7	82	0B	0D	F2
√	STEREO	82	0B	1F	E0
√	DOLBY	82	0B	0C	F3
√	DTS	82	0B	0F	F0
√	DSP	82	0B	90	6F
√	ANALOG/DIGITAL IN (toggle)	82	0B	9E	61
√	TONE ON/OFF (toggle)	82	0B	9F	60
	EQ ON/OFF (toggle)	82	0B	0E	F1
	EQ PRESET 1	82	0B	D7	28
	EQ PRESET 2	82	0B	D6	29
	EQ PRESET 3	82	0B	D5	2A
√	TREBLE -1dB	82	0B	AA	55
√	TREBLE +1dB	82	0B	A7	58
√	BASS -1dB	82	0B	A9	56
√	BASS +1dB	82	0B	A6	59
	(Tuner RV-5 only) PRESET -	82	0B	3B	C4
	(Tuner RV-5 only) PRESET +	82	0B	3C	C3
	(Tuner RV-5 only) TUNE -	82	0B	3F	C0
	(Tuner RV-5 only) TUNE +	82	0B	3E	C1
	(Tuner RV-5 only) AUTO/MAN (toggle)	82	0B	33	CC
	(Tuner RV-5 only) SAVE	82	0B	35	CA
	(Tuner RV-5 only) ST/MONO (toggle)	82	0B	36	C9
	(Tuner RV-5 only)FM/AM (toggle)	82	0B	3D	C2

Selected Input	COMMAND	Information Field (HEX)			
		1st	2nd	3rd	4th
	iPOD ◀ ◀ (IPOD-)	82	0B	4F	B0
	iPOD ▶ ▶ (IPOD+)	82	0B	4E	B1
	iPOD CCW (CLIK◀)	82	0B	0B	F4
	iPOD CW (CLIK▶)	82	0B	10	EF
	iPOD MENU	82	0B	81	7E
	iPOD SELECT	82	0B	9D	62
	iPOD ▶	82	0B	89	76
	PC ◀ ◀	82	0B	CC	33
	PC ▶	82	0B	CE	31
	PC ▶ ▶	82	0B	CD	32
	Z2:Volume + (cw)	82	0B	57	A8
	Z2:Volume – (ccw)	82	0B	56	A9
	Z2:OFF	82	0B	46	B9
	Z2:MUTE (toggle)	82	0B	55	AA
	Z2:HD select	82	0B	60	9F
	Z2:DVD select	82	0B	61	9E
	Z2:GAME select	82	0B	37	C8
	Z2:SAT select	82	0B	64	9B
	Z2:CABLE select	82	0B	63	9C
	Z2:DVR select	82	0B	65	9A
	Z2:CD select	82	0B	66	99
	Z2:DOCK select	82	0B	30	CF
	Z2:PC select	82	0B	4C	B3
	Z2:TUNER select	82	0B	6A	95
	Z2:AUX1 select	82	0B	6B	94
	Z2:AUX2 select	82	0B	4D	B2
	Main Mute ON	83	0B	01	x

Selected Input	COMMAND	Information Field (HEX)			
		1st	2nd	3rd	4th
	Main Mute OFF	83	0B	02	x
	Zone2 Mute ON	83	0B	03	x
	Zone2 Mute OFF	83	0B	04	x
	Auto EQ ON	83	0B	05	x
	Auto EQ OFF	83	0B	06	x
√	Tone ON	83	0B	07	x
√	Tone OFF	83	0B	08	x
√	Analog IN	83	0B	09	x
√	Digital IN	83	0B	0A	x
	2Line OSD time (toggle)	83	0B	0E	x
√	V-Process (toggle)	83	0B	0F	x
	EQ HF Shelf +dB	83	0B	10	x
	EQ HF Shelf -1dB	83	0B	11	x
	(Tuner RV-5 only) FM Band	83	0B	12	x
	(Tuner RV-5 only) AM Band	83	0B	13	x
	(Tuner RV-5 only) STEREO	83	0B	14	x
	(Tuner RV-5 only) MONO	83	0B	15	x
	(Tuner RV-5 only) Tune Auto	83	0B	16	x
	(Tuner RV-5 only) Tune Manual	83	0B	17	x

Direct Setting Command					
Selected Input	COMMAND	Information Field (HEX)			
		1st	2nd	3rd	4th
	2Line OSD time setting	84	02	0~6	x
	Note: 0~1:2-Line OSD Off, 2,3:2-Line OSD 3 Sec, 4~6:2-Line OSD Off time(sec). Note: Device cannot be in menu item to accept direct setting				
	VFD Bright Setting	84	03	0~2	x
	0:FULL 1:HALF 2:OFF Note: Device cannot be in menu item to accept direct setting				
√	V-Process Setting	84	04	0~2	x
	0:BYPASS 1:VIDEO CONV ON 2:FAROUDJA Note: Device cannot be in menu item to accept direct setting				
	Main Volume Setting	84	05	0~0x5A	x
	0(-80dB) ~ 0x5A(+10dB)				
	Zone2 Volume Setting	84	06	0~0x5A	x
	0(-80dB) ~ 0x5A(+10dB)				
√	Bass Level Setting	84	07	0~0x0C	x
	0(-6dB)~0x0C(+6dB) Note: Device cannot be in menu item to accept direct setting				
√	Treble Level Setting	84	08	0~0x0C	x
	0(-6dB)~0x0C(+6dB) Note: Bass/Treble are not global parameters so they apply only to input selected Note: Device cannot be in menu item to accept direct setting				
	EQ HF Shelf Level Setting	84	09	0~0x10	x
	0(-8dB)~0x10(+8dB) Note: Device cannot be in menu item to accept direct setting				
	(Tuner RV-5 only) FM Frequency Direct	84	0A	0x222E ~ 0x2A30	
	0000 x10kHz (ex 87.50Mhz :0x222E,100.00Mhz:0x2710, 108.00Mhz:0x2A30) Note: Device cannot be in menu item to accept direct setting				
	(Tuner RV-5 only) AM Frequency Direct	84	0B	0x208 ~ 0x6B8	
	0000 x1kHz (ex 520khz:0x0208, 1000khz:0x03e8, 1720khz:0x06B8) Note: Device cannot be in menu item to accept direct setting				
	(Tuner RV-5 only) Preset Direct Access	84	0C	0~0x1E	x
	0(Preset 1)~1E(Preset 30), 0 & 1 are same = 1 Note: Device cannot be in menu item to accept direct setting				

Direct Setting Command					
Selected Input	COMMAND	Information Field (HEX)			
		1st	2nd	3rd	4th
	FL Trim Level Setting	84	10	0~0x14	x
	0(-15dB)~0x14(+5dB) CE,FR,SR....SUB2 : same Note: Device cannot be in menu item to accept direct setting				
	CEN Trim Level Setting	84	11	0~0x14	x
	FR Trim Level Setting	84	12	0~0x14	x
	SR Trim Level Setting	84	13	0~0x14	x
	RR Trim Level Setting	84	14	0~0x14	x
	RL Trim Level Setting	84	15	0~0x14	x
	SL Trim Level Setting	84	16	0~0x14	x
	SUB1 Trim Level Setting	84	17	0~0x14	x
	SUB2 Trim Level Setting	84	18	0~0x14	x

Status Request Command					
Selected Input	COMMAND	Information Field (HEX)			
		1st	2nd	3rd	4th
	Display Status Request	83	0B	80	x
	Ram Status Request	83	0B	81	x
	Flag Status Request	83	0B	82	x
	Display Status Auto ON	83	0B	90	x
	Display Status Auto OFF	83	0B	91	x
	Ram Status Auto ON	83	0B	92	x
	Ram Status Auto OFF	83	0B	93	x
	Flag Status Auto ON	83	0B	94	x
	Flag Status Auto OFF	83	0B	95	x

5 Status Data

AVR -> PC, Data length: 4 byte

5.1 Display Status

Data type: 3

Byte	Content	Code type
1-20	FL UPPER (20byte)	ASCII
21-40	FL Down (20byte)	ASCII

The RV-5/MV-5 includes two custom characters:

Code	Character Definition	Comment
0x13	Pause symbol	Displays when the Dock/iPod input is paused
0x13	Roman numeral “II”	Displays when the Dolby PLIIx listening mode is selected

The RV-5/MV-5 includes two custom characters that are defined as Dock/iPod pause symbol and Roman Numeral II in PLIIx displays in front panel and OSD. In data type 3 above these are both sent as control character 0x13. All of display status (data type: 3) data is ASCII, except when dock is selected stings from iPod are displayed, those are UTF-8 characters (U+0000 to U+00FF)

5.2 Ram Status

Data type: 4

Selected Input	Byte	Content	Code type
	1	Main Input	Hex
	2	Zone2 Input	Hex
	See table below with values returned that correspond to setting since they do not map to setting input values in other section above		
	Table: Values returned byte 1-2 “INPUT”	MAIN	ZONE2
	HD	0x06	0x01
	SAT	0x08	0x03
	CD	0x03	0x07
	TUNER	0x00	0x00
	DVD	0x07	0x02
	CABLE	0x09	0x04

	DOCK	0x0E	0x09
Selected Input	Byte	Content	Code type
	AUX1	0x0A	0x05
	GAME	0x0B	0x0E
	DVR	0x05	0x06
	PC	0x0F	0x0C
	AUX2	0x04	0x08
	OFF	0x20	0x20
	3	MAIN Volume	Hex
	4	Zone2 Volume	Hex
√	5	Bass Level	Hex
√	6	Treble Level	Hex
	7	EQ HF Shelf Level	Hex
	9	2Line OSD Time	Hex
		Note: Values returned are 1 off, 3-6 sec	
	10	Front VFD Brightness	Hex
√	11	V-Process Setting	Hex
	12	FL Trim Level Setting	Hex
	13	CEN Trim Level Setting	Hex
	14	FR Trim Level Setting	Hex
	15	SR Trim Level Setting	Hex
	16	RR Trim Level Setting	Hex
	17	RL Trim Level Setting	Hex
	18	SL Trim Level Setting	Hex
	19	SUB1 Trim Level Setting	Hex
	20	SUB2 Trim Level Setting	Hex

5.3 Flag Status

Data type: 5

Selected Input	Byte	Content	Code type
	1	Power ON/OFF (bit set=on)	Bit7
		Main Mute ON/OFF (bit set=on)	Bit6
		Zone2 Mute ON/ OFF (bit set=on)	Bit5
		Auto EQ ON/ OFF (bit set=on)	Bit4
√		Tone ON/ OFF (bit set=on)	Bit3
√		Analog/Digital (bit set=digital)	Bit2
		unused SPARE	Bit1
		(Tuner RV-5 only) FM/AM (bit set=FM)	Bit0
		2	(Tuner RV-5 only) ST/MONO (bit set=ST)
	(Tuner RV-5 only) AUTO/MAN (bit set=auto)		Bit6
	Display status transfer auto (bit set=on)		Bit5
	Ram status transfer auto (bit set=on)		Bit4
	Flag status transfer auto (bit set=on)		Bit3
	unused SPARE		Bit2
	unused SPARE		Bit1
	unused SPARE		Bit0

6 Examples

6.1 FM Frequency Direct Example

The specification states that:

COMMAND	Information Field (HEX)			
	1st	2nd	3rd	4th
FM Frequency Direct	84	0A	0x222E ~ 0x2A30	
0000 x10kHz (ex 87.50Mhz :0x222E,100.00Mhz:0x2710, 108.00Mhz:0x2A30)				

Here are some examples:

Start Code	Date Type	Length Data	Data				Result
0xFF	0x02	0x04	0x84	0x0A	0x28	0xAA	104.10
0xFF	0x02	0x04	0x84	0x0A	0x24	0xEA	94.50
0xFF	0x02	0x04	0x84	0x0A	0x23	0x5A	90.50

If the direct FM frequency is 104.10

1. Remove decimal from decimal number (10410)
2. Convert to decimal 10410 to HEX (0x28AA)
3. Send word as two bytes 0x28 0xAA in the last two bytes of 4 byte data

Others:
 94.50 > 9450 > 0x24EA 0x24 0xEA
 90.50 > 9050 > 0x235A 0x23 0x5A

6.2 Main Volume Setting Example

The specification states that:

COMMAND	Information Field (HEX)			
	1st	2nd	3rd	4th
Main Volume Setting	84	05	0~0x5A	
0(-80dB) ~ 0x5A(+10dB)				

Here are some examples:

Start Code	Date Type	Length Data	Data				Result
0xFF	0x02	0x03	0x84	0x05	0x00		-80dB
0xFF	0x02	0x03	0x84	0x05	0x22		-46dB
0xFF	0x02	0x03	0x84	0x05	0x5A		+10dB