LVP-9300 RS-232/RS-485 Protocol Specification

Revision: 1.0

2017/06/23

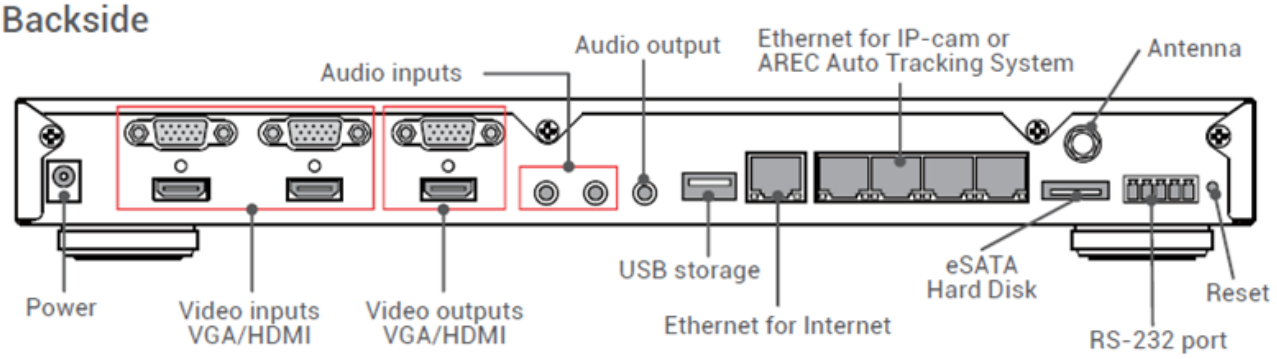
History

Version	Date	Comment
1.0	2017/06/23	1st release

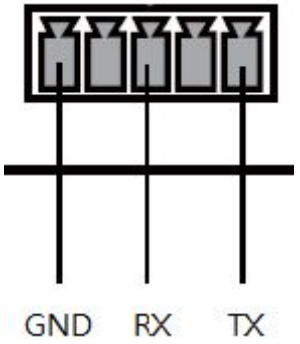
1 Interface

1.1 Hardware

■ Backside



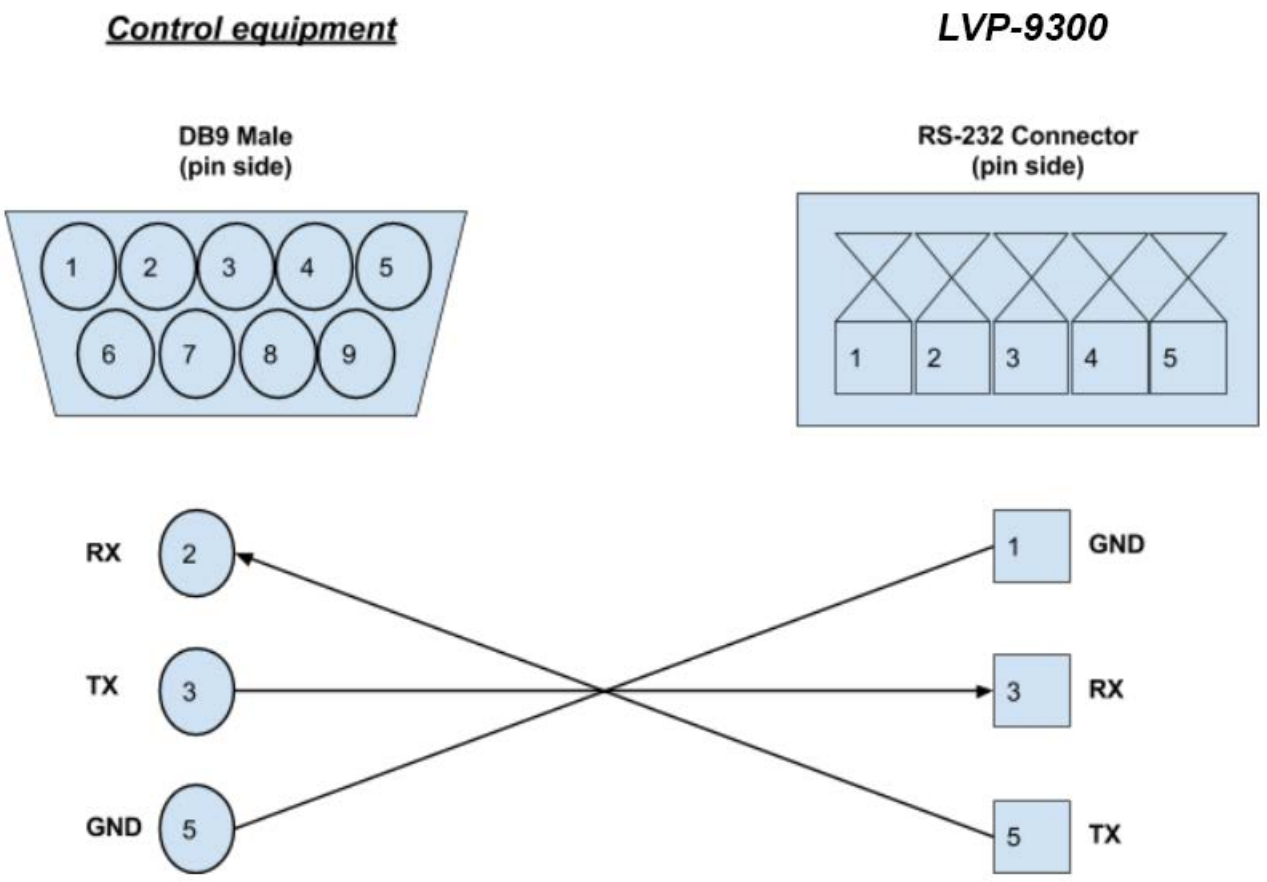
Connect the RS-232 cable to the RS-232 port of the LVP-9300.
The pin definition of the RS-232 port：



GND：Ground
RX：Receive Data
TX：Transmit Data

1.2 Connection

Connect the GND, RX, TX pins of the RS-232 port with external control equipment. The LVP-9300 will be controlled by RS-232 protocol. For example, use the standard 9 pin DB9 serial cable as follows：



1.3 Configuration

- Baud rate ：9600
- Data length：8
- Parity：none
- Stop bit：1
- Flow control：none

2 Protocol

2.1 Format

Name	Header	Extended Header	Length	Address	Action	Command	Parameters	Checksum	End
Byte count	1	1	1	1	1	2	n	1	1

- ***Header***
  0x55
  Protocol header.
- ***Extended header***
  0xff
  reserved for future use.
- ***Length***
  Length is a byte counter from **address to checksum** field.
  Example:

Name	Header	Extended Header	Length	Address	Action	Command	Parameters	Checksum	End
Hex	0x55	0xff	0x06	0x01	0x73	0x4c 0x4f	0x01	0x16	0x0d

Counter = address 1 byte+action 1 byte+command 2 bytes+parameter 1 byte+checksum 1 byte

Total length = 6 bytes

- ***Address***
  Identification of device. Range is 0x01 ~ 0xff.(0 is reserved)
  *Address in LVP-9300 v2.5.9.x don't care
- ***Action***
  Get: 0x67
  "Query" operation for the LVP-9300.
  Set: 0x73
  "Set" operation for the LVP-9300.
  ACK: 0x06

When the LVP-9300 receives the protocol data correctly and executes the correspond command successfully. It replaces the action field with ACK in the received protocol format and return to remote controller.

NAK: 0x15

When the LVP-9300 receives the protocol data correctly but there are something wrong while the LVP-9300 executes the correspond command.It replaces the action field with NAK in the received protocol format and return to remote controller.

In addition, when the LVP-9300 receives the invalid protocol data(ie. the protocol data that the LVP-9300 can not understand). It returns a NAK code only.

- ***Command***
  Two bytes. Please refer to 2.1.2 Command Set and Parameters for more information.

- ***Parameters***
  Please refer to 2.1.2 Command Set and Parameters for more information.
- ***Checksum***
  Checksum is a byte sum.Add the data that from **length to parameters** field as unsigned binary numbers, discarding any overflow bits.
  Example:

Name	Header	Extended Header	Length	Address	Action	Command	Parameters	Checksum	End
Hex	0x55	0xff	0x06	0x01	0x73	0x4c 0x4f	0x01	0x16	0x0d

  Sum = 0x06+0x01+0x73+0x4c+0x4f+0x01 = 0x116
  Discarding overflow bits. Checksum = 0x16
- ***End***
  0x0d
  Protocol end code

2.2 Command Set and Parameters

“Set” Action Command List

Command	ASCII	Hex	Description
Power	PW	0x50 0x57	Power control
Record	RC	0x52 0x43	Record
Pause record	PS	0x50 0x53	Pause record
Stop record	SP	0x53 0x50	Stop record
Bookmark	BM	0x42 0x4d	Insert bookmark
Layout	LO	0x4c 0x4f	Layout control
Background	BG	0x42 0x47	Background control
Overlay	OL	0x4f 0x4c	Overlay control
Display	DP	0x44 0x50	Display control
Theme	TE	0x54 0x45	Theme control
Audio Volume	AV	0x41 0x56	Audio volume control
Audio Mute	AM	0x41 0x4d	Audio mute control
Audio Type	AT	0x41 0x54	Audio type control

Power

	ASCII	Hex	Description
Command code	PW	0x50 0x57	
Parameter 1	0 1	0x30 0x31	Power off Power on(NOT supported. Hardware limitation)

Record

	ASCII	Hex	Description
Command code	RC	0x52 0x43	Start record process
Parameter			

Pause

	ASCII	Hex	Description
Command code	PS	0x50 0x53	Pause record process
Parameter			

Stop

	ASCII	Hex	Description
Command code	SP	0x53 0x50	Stop record process
Parameter			

Bookmark

	ASCII	Hex	Description
Command code	BM	0x42 0x4d	Insert bookmark
Parameter			

Layout

	ASCII	Hex	Description
Command code	LO	0x4c 0x4f	Set layout ID
Parameter 1		0x01~0xff	Layout ID

Background

	ASCII	Hex	Description
Command code	BG	0x42 0x47	Set background ID
Parameter 1		0x00~0xff	Background ID 0x00: Background off

Overlay

	ASCII	Hex	Description
Command code	OL	0x4f 0x4c	Set overlay ID
Parameter 1		0x00~0xff	Overlay ID 0x00: Overlay off

Display

	ASCII	Hex	Description
Command code	DP	0x44 0x50	Set display ID
Parameter 1		0x01~0xff	Display ID

Theme

	ASCII	Hex	Description
Command code	TE	0x54 0x45	Set theme ID
Parameter 1		0x01~0xff	Theme ID

Audio Volume

	ASCII	Hex	Description
Command code	AV	0x41 0x56	Set audio volume
Parameter 1	I O	0x49 0x4f	Set input volume Set output volume
Parameter 2	1 2 3	0x31 0x32 0x33	Input: Audio input 1; Output: Line out Input: Audio input 2; Output: HDMI out Input: Bluetooth microphone; Output: None
Parameter 3		0x00~0x7d 0x00~0x0f	Audio volume(0~125) Bluetooth microphone volume(0~15)

Audio Mute

	ASCII	Hex	Description
Command code	AM	0x41 0x4d	Set audio mute/unmute
Parameter 1	I O	0x49 0x4f	Set input mute/unmute Set output mute/unmute
Parameter 2	1 2 3	0x31 0x32 0x33	Input: Audio input 1; Output: Line out Input: Audio input 2; Output: HDMI out Input: Bluetooth microphone; Output: None
Parameter 3	0 1	0x30 0x31	Audio unmute Audio mute

Audio Input Type

	ASCII	Hex	Description
Command code	AT	0x41 0x54	Set audio input type
Parameter 1	1 2	0x31 0x32	Audio input 1 Audio input 2
Parameter 2	1 2 3 4 5	0x31 0x32 0x33 0x34 0x35	Line in Mic in HDMI HDMI+Line in HDMI+Mic in

Example :

1. Record start

Remote controller send to LVP-9300

Name	Header	Extended Header	Length	Address	Action	Command	Parameters	Checksum	End
Hex	0x55	0xff	0x05	0x01	0x73	0x52 0x43		0x0e	0x0d

LVP-9300 response to Remote controller
Success:

Name	Header	Extended Header	Length	Address	Action	Command	Parameters	Checksum	End
Hex	0x55	0xff	0x05	0x01	0x06	0x52 0x43		0xa1	0x0d

Failed:

Name	Header	Extended Header	Length	Address	Action	Command	Parameters	Checksum	End
Hex	0x55	0xff	0x05	0x01	0x15	0x52 0x43		0xb0	0x0d

2. Set layout ID 1

Remote controller send to LVP-9300

Name	Header	Extended Header	Length	Address	Action	Command	Parameters	Checksum	End
Hex	0x55	0xff	0x06	0x01	0x73	0x4c 0x4f	0x01	0x16	0x0d

LVP-9300 response to Remote controller
Success:

Name	Header	Extended Header	Length	Address	Action	Command	Parameters	Checksum	End
Hex	0x55	0xff	0x06	0x01	0x06	0x4c 0x4f	0x01	0xa9	0x0d

Failed:

Name	Header	Extended Header	Length	Address	Action	Command	Parameters	Checksum	End
Hex	0x55	0xff	0x06	0x01	0x15	0x4c 0x4f	0x01	0xb8	0x0d

"Get" Action Command List

Command	ASCII	Hex	Description
State	ST	0x53 0x54	System state
Layout	LO	0x4c 0x4f	Layout control
Background	BG	0x42 0x47	Background control
Overlay	OL	0x4f 0x4c	Overlay control
Display	DP	0x44 0x50	Display control
Theme	TE	0x54 0x45	Theme control
Audio Volume	AU	0x41 0x55	Audio volume control
Audio Mute	AM	0x41 0x4d	Audio mute control
Audio Type	AT	0x41 0x54	Audio type control

State

	ASCII	Hex	Description
Command code	ST	0x53 0x54	Get system state
Response Parameter 1	0 1 2 3 4 5	0x30 0x31 0x32 0x33 0x34 0x35	Uninitialize Ready Stopped Streaming Paused Waiting

Layout

	ASCII	Hex	Description
Command code	LO	0x4c 0x4f	Get layout ID
Response Parameter 1		0x01~0xff	Layout ID

Background

	ASCII	Hex	Description
Command code	BG	0x42 0x47	Get background ID
Response Parameter 1		0x00~0xff	Background ID 0x00: Background off

Overlay

	ASCII	Hex	Description
Command code	OL	0x4f 0x4c	Get overlay ID
Response Parameter 1		0x00~0xff	Overlay ID 0x00: Overlay off

Display

	ASCII	Hex	Description
Command code	DP	0x44 0x50	Get display ID
Response Parameter 1		0x01~0xff	Display ID

Theme

	ASCII	Hex	Description
Command code	TE	0x54 0x45	Get theme ID
Response Parameter 1		0x01~0xff	Theme ID

Audio Volume

	ASCII	Hex	Description
Command code	AV	0x41 0x56	Set audio volume
Command/Response Parameter 1	I O	0x49 0x4f	Set input volume Set output volume
Command/Response Parameter 2	1 2 3	0x31 0x32 0x33	Input: Audio input 1; Output: Line out Input: Audio input 2; Output: HDMI out Input: Bluetooth microphone; Output: None
Response Parameter 3		0x00~0x7d 0x00~0x0f	Audio volume(0~125) Bluetooth microphone volume(0~15)

Audio Mute

	ASCII	Hex	Description
Command code	AM	0x41 0x4d	Set audio mute/unmute
Command/Response Parameter 1	I O	0x49 0x4f	Set input mute/unmute Set output mute/unmute
Command/Response Parameter 2	1 2 3	0x31 0x32 0x33	Input: Audio input 1; Output: Line out Input: Audio input 2; Output: HDMI out Input: Bluetooth microphone; Output: None
Response Parameter 3	0 1	0x30 0x31	Audio unmute Audio mute

Audio Input Type

	ASCII	Hex	Description
Command code	AT	0x41 0x54	Set audio input type
Command/Response Parameter 1	1 2	0x31 0x32	Audio input 1 Audio input 2
Response Parameter 2	1 2 3 4 5	0x31 0x32 0x33 0x34 0x35	Line in Mic in HDMI HDMI+Line in HDMI+Mic in

Example：

1. Get system state of LVP-9300

Remote controller send to LVP-9300

Name	Header	Extended Header	Length	Address	Action	Command	Parameters	Checksum	End
Hex	0x55	0xff	0x05	0x01	0x67	0x53 0x54		0x14	0x0d

LVP-9300 response to Remote controller
Success: system state = Ready

Name	Header	Extended Header	Length	Address	Action	Command	Parameters	Checksum	End
Hex	0x55	0xff	0x06	0x01	0x06	0x53 0x54	0x31	0xe5	0x0d

Failed:

Name	Header	Extended Header	Length	Address	Action	Command	Parameters	Checksum	End
Hex	0x55	0xff	0x05	0x01	0x15	0x53 0x54		0xc2	0x0d

2. Get layout ID of LVP-9300

Remote controller send to LVP-9300

Name	Header	Extended Header	Length	Address	Action	Command	Parameters	Checksum	End
Hex	0x55	0xff	0x05	0x01	0x67	0x4c 0x4f		0x08	0x0d

LVP-9300 response to Remote controller
Success: ID = 1

Name	Header	Extended Header	Length	Address	Action	Command	Parameters	Checksum	End
Hex	0x55	0xff	0x06	0x01	0x06	0x4c 0x4f	0x01	0xa9	0x0d

Failed:

Name	Header	Extended Header	Length	Address	Action	Command	Parameters	Checksum	End
Hex	0x55	0xff	0x05	0x01	0x15	0x4c 0x4f		0xb6	0x0d

3 Note

1. Commands are not accepted during LVP-9300 boot-up.