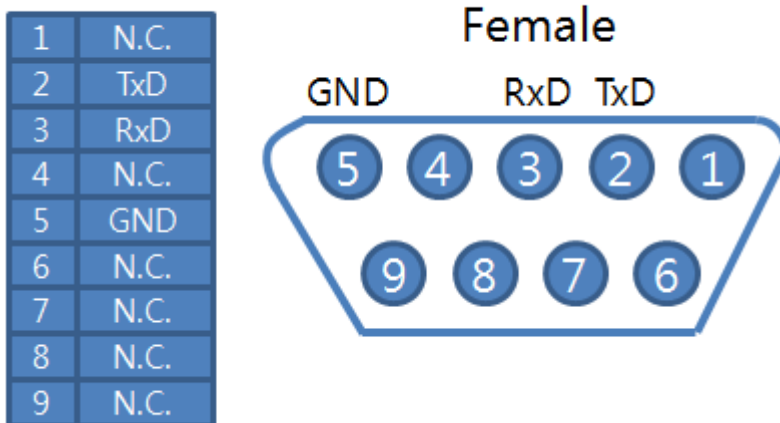


## 1. Introduction

This document represents simple UART protocol for controlling system operation using RS232C.

## 2. Communication Protocol

RS232C Pin Map



### *communication parameter*

baud rate : 38400

data : 8

parity : NONE

stop bit : 1

### *communication general spec*

- ID should show hexadecimal value of assigned ID.
- ID should be set on menu of the display
- If you want to control every mechanism connected with Serial Cable regardless of its ID, set ID to « 0x00 » and send commands. Then each SET will follow commands but it will not respond without ACK.
- Don't use 0x00, 0x8A(138) and 0xA9(168) for Set ID.

**Transmission format**

Start	Command	ID	Data	End
0xA9	0XX		0XX	0x8A

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- For example Power On & ID = 0x11

Start	Command	ID	Data	End
0xA9	0x11		0x01	0x8A

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Start	Command	ID	Data	End
0xA9	0x11	0x01	0x01	0x8A

- **Power Control**

- **Function**

RS232 Controller turns display power On/Off.

- **Get Power On/Off Status**

Start	Command	ID	Data	End
0xA9	0x11		0xAA	0x8A

- **Set Power On/Off**

Start	Command	ID	Data 1	End
0xA9	0x11		Power	0x8A

Power : Power code to be set on display.

0x1	Power On
0x0	Power Off

- **Ack**

Start	Ack/Nak	ID	r-CMD	Data	End
0xA9	'A'		0x11	Power	0x8A

'A' = 0x41

Power : Power code to be set on display.

0x1	Power On
0x0	Power Off

- **Nak**

Start	Ack/Nak	ID	r-CMD	Data 1	End
0xA9	'N'		0x11	ERR	0x8A

'N' = 0x4E

ERR :

1	Invalid Command
2	Invalid Data
0xFF	Etc

● **Panel Back Light Unit Control**

■ **Function**

RS232 Controller turns display panel BLU power On/Off.

■ **Get BLU Power On/Off Status**

Start	Command	ID	Data	End
0xA9	0x12		0xAA	0x8A

■ **Set BLU Power On/Off**

Start	Command	ID	Data 1	End
0xA9	0x12		BLU Power	0x8A

**BLU Power :** BLU Power code to be set on display.

0x1	Power On
0x0	Power Off

■ **Ack**

Start	Ack/Nak	ID	r-CMD	Data 1	End
0xA9	'A'		0x12	BLU Power	0x8A

'A' = 0x41

**Power :** Power code to be set on display.

0x1	Power On
0x0	Power Off

■ **Nak**

Start	Ack/Nak	ID	r-CMD	Data 1	End
0xA9	'N'		0x12	ERR	0x8A

'N' = 0x4E

**ERR :**

1	Invalid Command
2	Invalid Data
0xFF	Etc

● **Volume Control**

■ **Function**

Personal Computer changes volume of display

■ **Get Volume Status**

Start	Command	ID	Data	End
0xA9	0x13			0xAA

■ **Set Volume**

Start	Command	ID	Data 1	End
0xA9	0x13			Volume

Volume : Volume value code (0x0 (0) ~ 0x64 (100)) to be set on display.

■ **Ack**

Start	Ack/Nak	ID	r-CMD	Data	End
0xA9	'A'			0x13	Volume

'A' = 0x41

Volume : Same as above

■ **Nak**

Start	Ack/Nak	ID	r-CMD	Data 1	End
0xA9	'N'			0x13	ERR

'N' = 0x4E

ERR :

1	Invalid Command
2	Invalid Data
0xFF	Etc

● **Mute Control**

■ **Function**

RS232 Controller set mute On/Off.

■ **Get Mute On/Off Status**

Start	Command	ID	Data	End
0xA9	0x14			0xAA

■ **Set Mute On/Off**

Start	Command	ID	Data	End
0xA9	0x14			Mute

Mute : Mute code to be set on display

1	Mute ON
0	Mute OFF

■ **Ack**

Start	Ack/Nak	ID	r-CMD	Data1	End
0xA9	'A'			0x14	Mute

'A' = 0x41

Mute : Same as above

■ **Nak**

Start	Ack/Nak	ID	r-CMD	Data	End
0xA9	'N'			0x14	ERR

'N' = 0x4E

ERR :

1	Invalid Command
2	Invalid Data
0xFF	Etc

● **Input Source Control**

■ **Function**

RS232 Controller changes input source of display.

■ **Get Input Source Status**

Start	Command	ID	Data	End
0xA9	0x15		0xAA	0x8A

■ **Set Input Source**

Start	Command	ID	Data	End
0xA9	0x15		Input	0x8A

**Input :** Input source code to be set on display.

Data	Input
TV	0x00
AV1	0x01
S-Video 1	0x02
Component 1	0x03
VGA	0x04
HDMI /MHL	0x05
HDMI / ARC	0x06
HDMI /EZ-Box	0x07
Display Port	0x08
OPS	0x09
HDMI 2.0	0x0A
USB	0x0B
Android	0x0C

■ **Ack**

Start	Ack/Nak	ID	r-CMD	Data	End
0xA9	'A'		0x15	Input	0x8A

'A' = 0x41

**Input :** Same as above

**Nak**

Start	Ack/Nak	ID	r-CMD	Data	End
0xA9	'N'		0x15	ERR	0x8A

'N' = 0x4E

**ERR :**

1	Invalid Command
2	Invalid Data
0xFF	Etc

- **Remote Key**

- **Function**

- Command for same thing with remote controller.

- **Command remote key**

Start	Command	ID	Data	End
0xA9	0x16		Key Code	0x8A

Key Code : Remote key code as Annex B.

- **Ack**

Start	Ack/Nak	ID	r-CMD	Data	End
0xA9	'A'		0x16	Key Code	0x8A

Key Code : Same as annex B.

- **Nak**

Start	Ack/Nak	ID	r-CMD	Data	End
0xA9	'N'		0x16	ERR	0x8A

'N' = 0x4E

ERR :

1	Invalid Command
2	Invalid Data
0xFF	Etc



● **Key Lock**

■ **Function**

RS232 Controller set Key Lock On/Off.

■ **Get Key Lock On/Off Status**

Start	Command	ID	Data	End
0xA9	0x17		0xAA	0x8A

■ **Set Key Lock On/Off**

Start	Command	ID	Data	End
0xA9	0x17		Lock	0x8A

**Lock : Key Lock code to be set on display**

1	Key Lock ON
0	Key Lock OFF

■ **Ack**

Start	Ack/Nak	ID	r-CMD	Data1	End
0xA9	'A'		0x17	Lock	0x8A

'A' = 0x41

Lock : Same as above

■ **Nak**

Start	Ack/Nak	ID	r-CMD	Data	End
0xA9	'N'		0x17	ERR	0x8A

'N' = 0x4E

**ERR :**

1	Invalid Command
2	Invalid Data
0xFF	Etc

## ● V2.0 Commands

No.	Command Type	Command	Value Range
1	Power control	0x11	
2	BLU Power Control	0x12	0x0 ~ 0x1
3	Volume control	0x13	0x0 ~ 0x64
4	Mute control	0x14	0x0 ~ 0x1
5	Input control	0x15	Input source
6	Remote control	0x16	Remote Key value

Key Name	Key Code	Description
RC_POWER	0xD7	Power
RC_VOL_UP	0x83	Volume Up
RC_VOL_DN	0x86	Volume Down
RC_BLU	0x8D	BLU On/Off
RC_FREEZE	0xB8	Picture Freeze
RC_MUTE	0xDF	Audio Mute
RC_IPTD	0x8C	Android
RC_OPS	0xBA	OPS
RC_DP	0xB9	Display Port
RC_HDMI1	0xCA	Discrete Input HDMI1
RC_HDMI2	0xC9	Discrete Input HDMI2
RC_HDMI3	0xC8	Discrete Input HDMI3
RC_EZ_BOX	0xB1	Discrete Input EZ-BOX
RC_VGA	0xCB	Discrete Input VGA
RC_4PIP	0x90	4 PIP