

RS 232 protocol for CTOUCH[®] Runner, CTOUCH Leddura, CTOUCH Leddura xt, CTOUCH Laser and CTOUCH Laser air





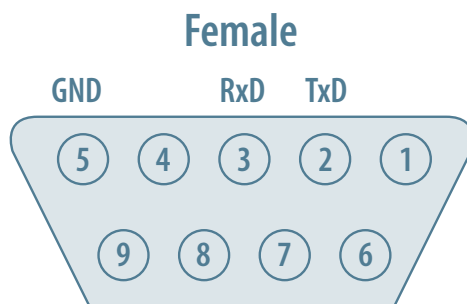
Introduction

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

Communication Protocol

RS232C Pin Map

- 1 N.C.
- 2 TxD
- 3 RxD
- 4 N.C.
- 5 GND
- 6 N.C.
- 7 N.C.
- 8 N.C.
- 9 N.C.



communication parameter only Laser air:

baud : 115200
 data : 8
 parity : NONE
 stop bit : 1

communication parameter all other models with firmware version 2.99 or higher:

baud : 9600
 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	0xXX		0xXX	0x8A

For example Power on & ID = 0x11

Start	Custom Code 1	ID	Data	End
0xA9	0x11		0x01	0x8A

Start	Command	ID	Key Code	End
0xA9	0x11		0xD7	0x8A

Command Detailed Explanation

- 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	0x8A

■ Set Volume

Start	Command	ID	Data 1	End
0xA9	0x13		Volume	0x8A

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	0x8A

A=0x41

Volume: Same as above

■ Nak

Start	Ack/Nak	ID	r-CMD	Data 1	End
0xA9	N		0x13	ERR	0x8A

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	0x8A

■ Set Mute ON/OFF

Start	Command	ID	Data	End
0xA9	0x14		Mute	0x8A

Mute: Mute code to be set on display

1	Mute ON
0	Mute OFF

■ Ack

Start	Ack/Nak	ID	r-CMD	Data	End
0xA9	A		0x14	Mute	0x8A

A=0x41

Mute: Same as above

■ Nak

Start	Ack/Nak	ID	r-CMD	Data 1	End
0xA9	N		0x14	ERR	0x8A

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 1	0x05
HDMI 2	0x06
HDMI 3	0x07
DISPLAY PORT	0x08
INSIDE PC	0x09
UHD	0x0A
USB	0x0B

■ Ack

Start	Ack/Nak	ID	r-CMD	Data 1	End
0xA9	A		0x15	Input	0x8A

A=0x41

Input: Same as above

■ Nak

Start	Ack/Nak	ID	r-CMD	Data 1	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

■ Ack

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

A=0x41

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	Data	End
0xA9	A		0x17	Mute	0x8A

A=0x41

Lock: Same as above

■ Nak

Start	Ack/Nak	ID	r-CMD	Data 1	End
0xA9	N		0x17	ERR	0x8A

N=0x4E

ERR:

1	Invalid Command
2	Invalid Data
0xFF	Etc

Annex A

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

Annex B

Key Name	Key Code	Description
RC_POWER	0xD7	Power
RC_NUM0	0xD9	Number 0
RC_NUM1	0x95	Number 1
RC_NUM2	0x99	Number 2
RC_NUM3	0x9D	Number 3
RC_NUM4	0xD6	Number 4
RC_NUM5	0xDA	Number 5
RC_NUM6	0xDE	Number 6
RC_NUM7	0x96	Number 7
RC_NUM8	0x9A	Number 8
RC_NUM9	0x9E	Number 9
RC_CH_DELIMITER	0xD5	Delimiter
RC_CH_PRE	0xDD	Previous Channel
RC_MENU	0x84	Menu
RC_EXIT	0xD4	Exit
RC_CURSOR_UP	0x92	Cursor Up
RC_CURSOR_DOWN	0xD8	Cursor Down
RC_CURSOR_RIGHT	0x9F	Cursor Right
RC_CURSOR_LEFT	0x97	Cursor Left
RC_ENTER	0x9B	Enter
RC_COLOR_RED	0xB2	Color Red
RC_COLOR_GREEN	0xB3	Color Green
RC_COLOR_YELLOW	0xB4	Color Yellow
RC_COLOR_BLUE	0xB5	Color Blue
RC_GUIDE	0xDB	Program Guide
RC_MUTE	0xDF	Audio Mute
RC_VOL_UP	0x83	Volume Up
RC_VOL_DN	0x86	Volume Down
RC_CH_UP	0x80	Channel Up
RC_CH_DN	0x8E	Channel Down
RC_MTS	0xC1	MTS
RC_CH_FAV	0xDC	Favorite Channel
RC_CH_ADD_DEL	0xCD	Channel Add/Delete
RC_ARC	0x81	Screen Size
RC_PSM	0xC3	Picture Mode
RC_SSM	0xC2	Sound Mode
RC_SLEEP	0xCE	Sleep Timer
RC_3D	0xB6	3D Mode
RC_INFO	0xB7	Program Information
RC_STILL	0xB8	Picture Freeze
RC_TV_VIDEO	0xC0	Input
RC_USB	0xBB	Discrete input USB
RC_TVRF	0xC7	Discrete Input RF
RC_AV1	0xC6	Discrete Input AV1
RC_YBCR1	0xC4	Discrete Input Component1
RC_RGB1	0xCB	Discrete Input RGB1
RC_HDMI1	0xCA	Discrete Input HDMI1
RC_HDMI2	0xC9	Discrete Input HDMI2
RC_HDMI3	0xC8	Discrete Input HDMI3
RC_HDMI4	0xB1	Discrete Input HDMI3
RC_DP	0xB9	Display Port
RC_OPS	0xBA	OPS
RC_VOL_MUTE_ON	0x60	Discrete Volume Mute On
RC_VOL_MUTE_OFF	0x61	Discrete Volume Mute On