

VTRIX TECHNOLOGY LIMITED

HDMI Matrix Serial communication protocol

Version	V1.0
Date	2014-5-12
Draft by	Farrell Tan

1 Serial communication protocol format:

Baud Rate: 9600

Data bits: 8

Parity: None

Stop bits: 1

Command head (2 byte)	Command index (1 byte)	Command length (1 byte)	Command body (CMD_LENGTH bytes)	Check-sum (1 byte)	Command tail (2 byte)
CMD_HEAD	CMD_INDEX	CMD_LENGTH	CMD_BODY	CMD_CHECKSUM	CMD_TAIL
{{					}}
0x7b 0x7b					0x7d 0x7d

Note: Check-sum is the low 8bits of the sum of CMD_HEAD,CMD_INDEX,CMD_LENGTH,CMD_BODY and CMD_TAI

The length of all the command is CMD_LENGTH+7;

Example: 7B 7B 01 02 01 01 F5 7D 7D

7b 7b: Command head

01: Command index (Change routing command)

02: Command length: the length of the command body

01 01: Command body

F5: Check-sum

7d 7d: Command tail

2 . Serial communication protocol list:

(0x01)Switching (0x01) :

Command head (2byte)	Command index (1byte)	Command length (1byte)	Command body (CMD_LENGTH byte)		Check-sum (1byte)	Command tail (2byte)
{{	0x01	0x02	Input	Outputs		}}
0x7b 0x7b	0x01	0x02				0x7d 0x7d

Note:

- (1) Every bit of the “Outputs” byte means whether to switch the input to this output port. 1: switch the input to the output port. 0: Do nothing
- (2) Bit 0~Bit7 of the “Outputs” byte represent HDMI output port 1~8;
- (3) The “input” byte represent the input port index, 0~7 represent HDMI input port 1~8

Example:

Switch the input 2 to output 1	Switch the input 4 to all the Output ports(Output port 1~8)
Command: 7B 7B 01 02 01 01 F5 7D 7D	Command: 7B 7B 01 02 03 FF F5 7D 7D
7b 7b: Command head 0: Command index 02: Command length 02 01: Command body F5: Check-sum 7d 7d: Command Tail	7b 7b: Command head 01: Command index 02: Command length 03 ff: Command body F5: Check-sum 7d 7d: Command Tail
Return: 7B 7B 01 02 01 01 F5 7D 7D	Return: 7B 7B 01 02 03 FF F5 7D 7D

After the devices received the command successfully, will send back the whole command back..

(0x02)Routing configuration save: Save the current routing configuration

Command head (2byte)	Command index (1byte)	Command length (1byte)	Command body (CMD_LENGTH byte)	Check-sum (1byte)	Command tail (2byte)
{{	0x02	0x01	Routing configuration Index		}}
0x7b 0x7b	0x02	0x01			0x7d 0x7d

Note :

(1) The device supports store 8 different routing configuration. From 0~7, represent Routing configuration index 1~8

Example:

Save the current routing configuration to index 1	Save the current routing configuration to index 8
Command: 7B 7B 02 01 00 F3 7D 7D	Command: 7B 7B 02 01 07 FA 7D 7D
7b 7b: Command head 02: Command index 01: Command length 00: Command body ,0x00 means Routing configuration index 1; (0~7 represent Routing configuration index 1~8) F3: Check-sum 7d 7d: Command tail	7b 7b: Command head 01: Command index 01: Command length 07: Command body ,0x07 means Routing configuration index 8; (0~7 represent Routing configuration index 1~8) FA: Check-sum 7d 7d: Command tail
Return: Don't return any command	Return: Don't return any command

(0x03)Recall the routing configuration that saved before (0x03): To set the current routing configuration the same as the routing configuration index xx that saved before

Command head (2byte)	Command index (1byte)	Command length (1byte)	Command body (CMD_LENGTH byte)	Check-sum (1byte)	Command tail (2byte)
{{	0x03	0x01	Routing configuration Index		}}
0x7b 0x7b	0x03	0x01			0x7d 0x7d

Note:

(1) The device support 8 different Routing configuration

Example:

Recall the routing configuration index 1	Recall the routing configuration index 8
Command: 7B 7B 03 01 00 F4 7D 7D	Command: 7B 7B 03 01 07 FB 7D 7D
7b 7b: Command head 03: Command index 01: Command length 00: Command body, 00: Means 1 routing configuration index 1 (0~7 represent routing configuration index 1~8) F4: Check-sum 7d 7d: Command tail	7b 7b: Command head 03: Command index 01: Command length 07: Command body, 07: Means 1 routing configuration index 8 (0~7 represent routing configuration index 1~8) FB: Check-sum 7d 7d: Command tail
Return: 7B 7B 11 04 00 01 02 03 0B 7D 7D (Please refer to command index 0x11)	Return: 7B 7B 11 04 00 01 02 03 0B 7D 7D (Please refer to command index 0x11)

(0x11) The routing configuration information (0x11)

Command head (2byte)	Command Index (1byte)	Command length (1byte)	Command body (CMD_LENGTH byte)					Check-sum (1byte)	Command tail (2byte)
{{	0x11		The input port index of the output 1	The input port index of the output 2	The input port index of the output 3	The input port index of the output 4		}}
0x7b 0x7b	0x11		0~7 means Input 1~8	0~7 means Input 1~8	0~7 means Input 1~8	0~7 means Input 1~8		0x7d 0x7d

Note:

(1) The Command length is determined by the HDMI device outputs port counter;

Example:

HDMI 4x4 Matrix: The current routing information is 1-1,2-2,3-3,4-4	HDMI 4x4 Matrix: The current routing information is 1-1,1-2,1-3,1-4
Command: 7B 7B 11 04 00 01 02 03 0B 7D 7D	Command: 7B 7B 11 04 00 00 00 00 05 7D 7D
7b 7b: Command head 11: Command index 04: Command length 00 01 02 03: Command body, Means input 1 to output 1, input 2 to output 2, input 3to output 3, input 4 to output 4, 0B: Check-sum 7d 7d: Command tail	7b 7b: Command head 11: Command index 04: Command length 00 00 00 00: Command body. Means input 1 to output 1, input 1 to output 2, input 1 to output 3, input 1 to output 4, 05: Check-sum 7d 7d: Command tail
Return: Don't return any command	Return: Don't return any command

(0x15)EDID Read Command (0x15): Read the EDID data of the device that connect to the HDMI output

Need to read 16 times, due to each time will return only 16 bytes EDID data.

Command head (2byte)	Command Index (1byte)	Command length (1byte)	Command body (CMD_LENGTH byte)		Check-sum (1byte)	Command tail (2byte)
{{	0x15	2	Output port index, 0~7 means port 1~8	The beginning of the EDID index to read from		}}
0x7b 0x7b	0x15	2				0x7d 0x7d

Note: After device received this command, will return 16 bytes EDID data, from the EDID data index that set by the command. If failed, then the device will return read failed command, please refer to command index 0x16.

Please make sure that the port which to read EDID data from, do have picture display well, otherwise, will failed;

Example: Read the EDID data from the device that connected to HDMI output 1

Receive (With respect to the HDMI device)	Send (With respect to the HDMI device)
7B 7B 15 02 00 00 07 7D 7D	7B 7B 15 12 00 00 00 FF FF FF FF FF FF 00 4D 77 01 00 01 00 00 00 D7 7D 7D
7B 7B 15 02 00 10 07 7D 7D	7B 7B 15 12 00 10 1C 16 01 03 80 3C 22 78 0A 0D C9 A0 57 47 98 27 90 7D 7D
7B 7B 15 02 00 20 07 7D 7D	7B 7B 15 12 00 20 12 48 4C BF EF 00 01 01 01 01 01 01 01 01 95 7D 7D
7B 7B 15 02 00 30 07 7D 7D	7B 7B 15 12 00 30 01 01 01 01 01 01 01 01 1D 00 72 51 D0 1E 20 6E 28 D2 7D 7D
7B 7B 15 02 00 40 07 7D 7D	7B 7B 15 12 00 40 55 00 C4 8E 21 00 00 1E 01 1D 80 18 71 1C 16 20 B6 7D 7D
7B 7B 15 02 00 50 07 7D 7D	7B 7B 15 12 00 50 58 2C 25 00 C4 8E 21 00 00 9E 00 00 00 FC 00 53 70 7D 7D
7B 7B 15 02 00 60 07 7D 7D	7B 7B 15 12 00 60 6B 79 77 6F 72 74 68 20 55 48 44 0A 00 00 00 FD 97 7D 7D
7B 7B 15 02 00 70 07 7D 7D	7B 7B 15 12 00 70 00 31 4C 0F 50 0E 00 0A 20 20 20 20 20 20 01 B1 ED 7D 7D
7B 7B 15 02 00 80 07 7D 7D	7B 7B 15 12 00 80 02 03 29 74 4B 84 10 1F 05 13 14 01 02 11 06 15 92 7D 7D
7B 7B 15 02 00 90 07 7D 7D	7B 7B 15 12 00 90 26 09 7F 03 11 7F 18 83 01 00 00 6D 03 0C 00 10 10 7D 7D

7B 7B 15 02 00 A0 07 7D 7D	7B 7B 15 12 00 A0 00 B8 3C 2F 80 60 01 02 03 01 1D 00 BC 52 D0 1E DA 7D 7D
7B 7B 15 02 00 B0 07 7D 7D	7B 7B 15 12 00 B0 20 B8 28 55 40 C4 8E 21 00 00 1E 01 1D 80 D0 72 CD 7D 7D
7B 7B 15 02 00 C0 07 7D 7D	7B 7B 15 12 00 C0 1C 16 20 10 2C 25 80 C4 8E 21 00 00 9E 8C 0A D0 81 7D 7D
7B 7B 15 02 00 D0 07 7D 7D	7B 7B 15 12 00 D0 8A 20 E0 2D 10 10 3E 96 00 13 8E 21 00 00 18 8C F8 7D 7D
7B 7B 15 02 00 E0 07 7D 7D	7B 7B 15 12 00 E0 0A D0 90 20 40 31 20 0C 40 55 00 13 8E 21 00 00 75 7D 7D
7B 7B 15 02 00 F0 07 7D 7D	7B 7B 15 12 00 F0 18 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 22 41 7D 7D

(0x16)EDID Read failed return command (0x16):

Command head (2byte)	Command Index (1byte)	Command length (1byte)	Command body (CMD_LENGTH byte)		Check-sum (1byte)	Command tail (2byte)
{{	0x16	2	Output port 0~7 represent 1~8	The beginning of the EDID index to read from		}}
0x7b 0x7b	0x16	2				0x7d 0x7d

Example: Read from EDID data index 0x60 failed, the device will Return:7B 7B 16 02 00 60 68 7D 7D

(0x18)Write EDID (0x18):

Command head (2byte)	Command Index (1byte)	Command length (1byte)	Command body (CMD_LENGTH byte)			Check-sum (1byte)	Command tail (2byte)
{{	0x18	0x12	0~7 represent HDMI input 1~8	The beginning of the EDID index to write to	16 bytes data that to write		}}
0x7b 0x7b	0x18	0x12					0x7d 0x7d
Return	If write successes, will return the same command as that the device received						

Note: After device received this command, will write the 16 bytes EDID data, from the EDID data index that set by the command. If write successes, will return the same command as that the device received. Please make sure that the port which to write EDID data to be normal, otherwise, will fail;

Example:

Receive (With respect to the HDMI device)	Send (With respect to the HDMI device)
7B 7B 18 12 00 00 00 FF FF FF FF FF FF 00 4D 77 01 00 01 00 00 00 DA 7D 7D	7B 7B 18 12 00 00 00 FF FF FF FF FF FF 00 4D 77 01 00 01 00 00 00 DA 7D 7D
7B 7B 18 12 00 10 1C 16 01 03 80 3C 22 78 0A 0D C9 A0 57 47 98 27 93 7D 7D	7B 7B 18 12 00 10 1C 16 01 03 80 3C 22 78 0A 0D C9 A0 57 47 98 27 93 7D 7D
7B 7B 18 12 00 20 12 48 4C BF EF 00 01 01 01 01 01 01 01 01 01 01 98 7D 7D	7B 7B 18 12 00 20 12 48 4C BF EF 00 01 01 01 01 01 01 01 01 01 01 98 7D 7D
7B 7B 18 12 00 30 01 01 01 01 01 01 01 01 1D 00 72 51 D0 1E 20 6E 28 D5 7D 7D	7B 7B 18 12 00 30 01 01 01 01 01 01 01 01 1D 00 72 51 D0 1E 20 6E 28 D5 7D 7D
7B 7B 18 12 00 40 55 00 C4 8E 21 00 00 1E 01 1D 80 18 71 1C 16 20 B9 7D 7D	7B 7B 18 12 00 40 55 00 C4 8E 21 00 00 1E 01 1D 80 18 71 1C 16 20 B9 7D 7D
7B 7B 18 12 00 50 58 2C 25 00 C4 8E 21 00 00 9E 00 00 00 FC 00 53 73 7D 7D	7B 7B 18 12 00 50 58 2C 25 00 C4 8E 21 00 00 9E 00 00 00 FC 00 53 73 7D 7D
7B 7B 18 12 00 60 6B 79 77 6F 72 74 68 20 55 48 44 0A 00 00 00 FD 9A 7D 7D	7B 7B 18 12 00 60 6B 79 77 6F 72 74 68 20 55 48 44 0A 00 00 00 FD 9A 7D 7D
7B 7B 18 12 00 70 00 31 4C 0F 50 0E 00 0A 20 20 20 20 20 01 B1 F0 7D 7D	7B 7B 18 12 00 70 00 31 4C 0F 50 0E 00 0A 20 20 20 20 20 01 B1 F0 7D 7D
7B 7B 18 12 00 80 02 03 29 74 4B 84 10 1F 05 13 14 01 02 11 06 15 95 7D 7D	7B 7B 18 12 00 80 02 03 29 74 4B 84 10 1F 05 13 14 01 02 11 06 15 95 7D 7D
7B 7B 18 12 00 90 26 09 7F 03 11 7F 18 83 01 00 00 6D 03 0C 00 10 13 7D 7D	7B 7B 18 12 00 90 26 09 7F 03 11 7F 18 83 01 00 00 6D 03 0C 00 10 13 7D 7D
7B 7B 18 12 00 A0 00 B8 3C 2F 80 60 01 02 03 01 1D 00 BC 52 D0 1E DD 7D 7D	7B 7B 18 12 00 A0 00 B8 3C 2F 80 60 01 02 03 01 1D 00 BC 52 D0 1E DD 7D 7D

7B 7B 18 12 00 B0 20 B8 28 55 40 C4 8E 21 00 00 1E 01 1D 80 D0 72 D0 7D 7D	7B 7B 18 12 00 B0 20 B8 28 55 40 C4 8E 21 00 00 1E 01 1D 80 D0 72 D0 7D 7D
7B 7B 18 12 00 C0 1C 16 20 10 2C 25 80 C4 8E 21 00 00 9E 8C 0A D0 84 7D 7D	7B 7B 18 12 00 C0 1C 16 20 10 2C 25 80 C4 8E 21 00 00 9E 8C 0A D0 84 7D 7D
7B 7B 18 12 00 D0 8A 20 E0 2D 10 10 3E 96 00 13 8E 21 00 00 18 8C FB 7D 7D	7B 7B 18 12 00 D0 8A 20 E0 2D 10 10 3E 96 00 13 8E 21 00 00 18 8C FB 7D 7D
7B 7B 18 12 00 E0 0A D0 90 20 40 31 20 0C 40 55 00 13 8E 21 00 00 78 7D 7D	7B 7B 18 12 00 E0 0A D0 90 20 40 31 20 0C 40 55 00 13 8E 21 00 00 78 7D 7D
7B 7B 18 12 00 F0 18 00 00 00 00 00 00 00 00 00 00 00 00 00 22 44 7D 7D	7B 7B 18 12 00 F0 18 00 00 00 00 00 00 00 00 00 00 00 00 00 22 44 7D 7D

(0xAA) Restore to factory default setting:

Command head (2byte)	Command Index (1byte)	Command length (1byte)	Command body (CMD_LENGTH byte)	Check-sum (1byte)	Command tail (2byte)
{{	0xAA	0x02	0x01	0x01	}}
0x7b 0x7b	0xAA	0x02	0x01	0x01	0x7d 0x7d

After the device received this command, will restore to the factory default setting, and will return the routing configuration information by command 0x11

(0x13) IP Configuration: (0x13) (If the HDMI device has ETHERNET control function)

Auto obtains IP address: 7B 7B 13 01 01 05 7D 7D

Command head (2byte)	Command Index (1byte)	Command length (1byte)	Command body (CMD_LENGTH byte)	Check-sum (1byte)	Command tail (2byte)
{{	0x13	0x01	0x01	0x05	}}
0x7b 0x7b	0x13	0x01	0x01	0x05	0x7d 0x7d

Manual set the IP address:

Command head (2byte)	Command Index (1byte)	Command length (1byte)	Command body (CMD_LENGTH byte)	Check-sum (1byte)	Command tail (2byte)
{{	0x13	0x05			}}
0x7b 0x7b	0x13	0x05			0x7d 0x7d

Example: Set the IP to 192.168.1.1:

7B 7B 13 05 00 C0 A8 01 01 72 7D 7D

7B 7B: Command head

13: Command index

05: Command length

00: Manual

C0 A8 01 01: The Hex of 192.168.1.1

72: check-sum

7d 7d: Command tail