RS-232 / IP Communication Protocol

The HXL-88 RS-232 communication protocol uses a fixed length with 5 bytes of data as defined below. The default baud rate is 9600 bps, no parity bit, 8 data bits, and 1 stop bit. The IP communication uses Telnet default. Use IP address or hostname with port 23 to connect to device. The commands and responses are the same for RS-232 and IP.

Host Request

A standard command is composed of the following 5 bytes:

Device + Command + Index + Value + CRC

Byte 1: Device Byte (DB)
Byte 2: Request Byte (RB)
Byte 3: Index Byte (IB)
Byte 4: Value Byte (VB)
Byte 5: CRC Byte (CB)

*Note: Host must send CRC code following the last byte.

Device Byte (DB)

Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
DB	0	0	1	0	0	0	0	0

Device ID: Device ID should be set to 0x20.

Request Byte (RB)

Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
RB	0	0	Request Type (000000-111111)					

Request Type: Please refer to **"Table – Host Request List"**.

Table – Host Request List

Request	Description	Index	Value	ACK
Switch Tools				
0x01	Switch Video Output Channel	Output	Input	A

0x03	Store Video Preset	0	Preset Slot	A
0x05	Recall Video Preset	0	Preset Slot	A
0x07	Request Video Output Channel	Output	0	B
Plug Detect				
0x09	Request Input Plug Status	Input	0	B
0x0B	Request Output Plug Status	Output	0	B
EDID				
0x20	Select Input EDID Type	0	EDID	A

Index Byte (IB)

Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
IB	Index							

Index: Please refer to **"Table – Host Request List"** and **"Table – Command Index List"**.

Table – Command Index List

Index	Description
Output	The output that will be selected. (1-8)
Input	The input that will be selected. (1-8)

Value Byte (VB)

Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
IB	Value							

Value: Please refer to **"Table – Host Request List"** and **"Table – Command Value List"**.

Table – Command Value List

Value	Description
Input	The input that will be connected. (1 – 8)

Preset Slot	Select the preset slot (1 through 8).
EDID	Select Output EDID or custom EDID file to set to all inputs. Use 1-8 for output EDID 1-8 and 9 for custom EDID file.

CRC Byte (CB)

Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
IB	CRC (cyclic redundancy check)							

CRC: Host must send CRC code following last byte.

Table – CRC Table

	00	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**0A**	**0B**	**0C**	**0D**	**0E**	**0F**
00	00	5E	BC	E2	61	3F	DD	83	C2	9C	7E	20	A3	FD	1F	41
10	9D	C3	21	7F	FC	A2	40	1E	5F	01	E3	BD	3E	60	82	DC
20	23	7D	9F	C1	42	1C	FE	A0	E1	BF	5D	03	80	DE	3C	62
30	BE	E0	02	5C	DF	81	63	3D	7C	22	C0	9E	1D	43	A1	FF
40	46	18	FA	A4	27	79	9B	C5	84	DA	38	66	E5	BB	59	07
50	DB	85	67	39	BA	E4	06	58	19	47	A5	FB	78	26	C4	9A
60	65	3B	D9	87	04	5A	B8	E6	A7	F9	1B	45	C6	98	7A	24
70	F8	A6	44	1A	99	C7	25	7B	3A	64	86	D8	5B	05	E7	B9
80	8C	D2	30	6E	ED	B3	51	0F	4E	10	F2	AC	2F	71	93	CD
90	11	4F	AD	F3	70	2E	CC	92	D3	8D	6F	31	B2	EC	0E	50
A0	AF	F1	13	4D	CE	90	72	2C	6D	33	D1	8F	0C	52	B0	EE
B0	32	6C	8E	D0	53	0D	EF	B1	F0	AE	4C	12	91	CF	2D	73
C0	CA	94	76	28	AB	F5	17	49	08	56	B4	EA	69	37	D5	8B
D0	57	09	EB	B5	36	68	8A	D4	95	CB	29	77	F4	AA	48	16
E9	E9	B7	55	0B	88	D6	34	6A	2B	75	97	C9	4A	14	F6	A8
F0	74	2A	C8	96	15	4B	A9	F7	B6	E8	0A	54	D7	89	6B	35

Example: Switch output 6 to input 3.

Byte 1 (DB) is 0x20: Device ID = 0x20

Byte 2 (RB) is 0x01: Switch Video Output Channel = 0x01
Byte 3 (IB) is 0x06: Output 6 = 0x06
Byte 4 (VB) is 0x03: Input 3 = 0x03
Byte 5 (CB) is 0x93: CRC code from Byte 1 to Byte 4.

CRC Calculation

CRC 0 = 0 (initial value)
CRC 1 = CRC_TABLE[CRC 0 ^ **Byte 1**] = CRC_TABLE[0x00 ^ 0x20] = 0x23
CRC 2 = CRC_TABLE[CRC 1 ^ **Byte 2**] = CRC_TABLE[0x23 ^ 0x01] = 0x0F
CRC 3 = CRC_TABLE[CRC 2 ^ **Byte 3**] = CRC_TABLE[0x9F ^ 0x06] = 0x8D
CRC 4 = CRC_TABLE[CRC 3 ^ Byte 4] = CRC_TABLE[0x8D ^ 0x03] = 0x93

Device ACK Packet

When the device receives supported commands from the host, it will respond with the following ACK types:

Table – ACK Type List

ACK Type	Byte 1	Byte 2	Byte 3	Byte 4	Last Byte
A	AB				CB
B	AB	LB	Index 1	Value 1	CB

ACK Type A (2 Bytes)

Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
AB	ACC	0	0	Device ID (0x20)				
CB	CRC							

ACC: The devices acknowledge status. Accept or Reject.

1: Command is accepted (ACK).

2: Command is rejected (NAK).

Device ID: The HXL-88's ID is 0x20.

CB: Device always sends the CRC byte following the last byte.

ACK Type B (2 Bytes)

Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
AB	ACC	0	0	Device ID (0x20)				
LB	Length for the total data bytes (Index+Value)							
IB	Index							
VB	Value							
CB	CRC							

ACC: The devices acknowledge status. Accept or Reject.

1: Command is accepted (ACK).

2: Command is rejected (NAK).

Device ID: The HXL-44's ID is 0x20.

LB: LB value is equal to the total data bytes (Index+Value), not including the CRC byte.

IB & VB: IB/VB often is the input or output port number depending on the command. Please see table below.

CB: Device always sends the CRC byte following the last byte.

IB/VB: Command Response

Command	Description	Index	Value
0x07	Request Video Output Channel	Output	Input
0x09	Request Video Input Plug Status	Input	0: Unplugged 1: Plugged in
0x0B	Request Video Output Plug Status	Output	