

CueStation Network Communications Protocol

Introduction

The ST-HUB CueStation Universal Network Hub is used to both power and control an array of digital CueStations (both 2-Wire and 5-Wire types) using either an RS-232 protocol or an Ethernet protocol.

This document describes the communications protocol for the Hub's functions, which includes receiving button press, hold and release events from the stations as well as sending button indicator messages back to the stations.

You should use this document to understand the low-level protocol for communicating with the button stations, which is useful for integrating digital CueStations with 3rd Party systems or custom applications.

If you are integrating CueStation button stations with our CueServer DMX processors, there is no need (other than idle curiosity) to read this document, because CueServer automatically communicates with CueStations without the user needing to know the communications protocol.

Hardware

RS-232

The serial port uses the following parameters for communication with the Host:

| Serial Parameter | Value |
|------------------|------------|
| Baud Rate | 38,400 bps |
| Data Bits | 8 |
| Parity | None |
| Stop Bits | 1 |

When the Hub senses a button event on a station, it will send a string via it's serial port to the Host. When the Host wants to change the state of a station's indicator, the Host should send a string back to the Hub.

The strings sent and received on the serial port contain one or more CueStation messages, each of which look similar to "<BD0104>". This is an example of a message that means that Button 4 on Station 1 was pressed down. Complete details about CueStation messages are given in the "Protocol" section of this document.

Ethernet

If the Hub is outfitted with the optional Ethernet option (ST-HUB-EN, ST-HUBD-EN), you can connect a standard CAT-5 type Ethernet cable to the Ethernet jack for communications with the Host device.

The Hub uses Multicast UDP packets to communicate to and from the Host. The parameters for Ethernet communications are below:

| Ethernet Parameter | Value |
|--------------------|---------------|
| Multicast Address | 239.255.204.3 |
| Port | 52737 |
| Protocol | UDP |

When the Hub senses a button event on a station, it will broadcast a packet to the Multicast group (which will be received by the Host). When the Host wants to change the state of a station's indicator, the Host should broadcast a packet to the Multicast group (which will be received by the Hub).

The packets each contain one or more CueStation messages, each of which look similar to "<BD0104>". This is an example of a message that means that Button 4 on Station 1 was pressed down. Complete details about CueStation messages are given in the "Protocol" section of this document.

RS-485 Port

The terminal block port marked "RS-485" is not used at this time. Do not connect anything to this port.

CueStation Messages

The messages passed between the CueStation Hub and the Host(s) are short ASCII-based strings. Each message begins with a less-than symbol (" $<$ "). The next two characters are a message code. Then each message has several parameters that follows. After the parameters, the message ends with a greater-than symbol (" $>$ "). The following illustration shows the basic structure of a CueStation message:

$<$ + 2-Character Message Code + Parameters + $>$

The same message strings are used for both RS-232 communication as well as via UDP packets. When more than one message is needed, several messages can be strung together in a single packet or serial transmission.

The CueStation Hub ignores any characters received that are not enclosed in $<$ angle-brackets $>$.

The following sections describe each message in detail.

Button Down Message

Message Format: $<BD\{station-number\}\{button-number\}\{hub-id\}>$

$\{station-number\}$ = The station number, expressed in hexadecimal digits, from 01 to 32 (corresponding to stations 1 through 50).

$\{button-number\}$ = The number of the button on the station, from 01 to 08.

$\{hub-id\}$ = Optional parameter. Hub transmits the ID as selected on hub address dip switches. Default is 0.

Description: The Button Down message is sent by the Hub to any connected Hosts whenever the Hub detects that a button is pressed on a station.

Example: $<BD010400>$

The message above would be sent from the Hub whenever Button #4 was pressed down on Station #1.

Button Up Message

Message Format: $<BU\{station-number\}\{button-number\}\{hub-id\}>$

$\{station-number\}$ = The station number, expressed in hexadecimal digits, from 01 to 32 (corresponding to stations 1 through 50).

$\{button-number\}$ = The number of the button on the station, from 01 to 08.

$\{hub-id\}$ = Optional parameter. Hub transmits the ID as selected on hub address dip switches. Default is 0.

Description: The Button Up message is sent by the Hub to any connected Hosts whenever the Hub detects that a button that had previously been pressed has now been released.

Example: <BU030700>

The message above would be sent from the Hub whenever Button #7 was released on Station #3.

Button Maintained Message

Message Format: <BM{station-number}{button-number}{hub-id}>

{station-number} = The station number, expressed in hexadecimal digits, from 01 to 32 (corresponding to stations 1 through 50).

{button-number} = The number of the button on the station, from 01 to 08.

{hub-id} = Optional parameter. Hub transmits the ID as selected on hub address dip switches. Default is 0.

Description: The Button Maintained message is sent by the Hub to any connected Hosts whenever the Hub detects that a button continues to be held down by the user for an extended period of time. After a button has been pressed and held down for one full second, a Button Maintained message is sent. The Button Maintained message continues to be sent once-a-second until the user releases the button. The Button Down and Button Up messages are always sent before and after a group of Button Maintained messages.

Example: <BM1C0300>

The message above would be sent from the Hub whenever Button #3 was held down for more than one second on Station #28 (1C in hexadecimal).

Indicator Set Message

Message Format: <IS{indicator-value}{station-number}{indicator-number}{hub-id}>

{indicator-value} = The value to set the indicator to, expressed in hexadecimal digits, from 00 to FF. See the description below for details.

{station-number} = The station number, expressed in hexadecimal digits, from 01 to 32 (corresponding to stations 1 through 50).

{indicator-number} = The number of the indicator on the station, from 01 to 08.

{hub-id} = Optional parameter. Only hub with matching hub-id will respond to this message. If 0 is sent as hub-id, then all hubs will respond to this message.

Description: The Indicator Set message is from a Host to the Hub to set the value of an LED indicator on a station. The indicator's value determines its color, intensity and flashing pattern. Depending on model, some stations do not have the ability to remotely set the color of the LED indicator, in this case the color portion of the value is ignored. See the section below that describes LED Indicator Values for specifics on how to choose an indicator value.

Example: <ISFF0A0200>

The message above would be sent from a Host to a Hub to set the value of LED indicator #2 on station #10 (0A in hexadecimal) to 255 (FF in hexadecimal).



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