# Home Box Duo RS485 Interface

## Summary

Home Box Duo RS485 interface used for the local integration of the 3$^{rd}$ party system, and one Home Box Duo control up to 30 motors. The 3$^{rd}$ party system could freely control all of the one-way and bi-directional devices via Bridge via RS485.

Please kindly notice that RS485 interface only provide Bridge&device discover and control commands. The device configuration process must be completed by Connector APP or the local integration configuration APP.

The recommended interval between two commands > 100 ms.

The setup sequence
1. Configure Bridge by BREL HOME app or the local integration configuration APP
2. Establish the Server-Client RS485 connection.
3. Discover Bridge (Server must get Bridge address before use)
4. Discover Device (Server must get device address before use)

Nouns

Server: The 3rd party control unit, which could control Bridge via RS485

Client: Home Box Duo

Bridge: Home Box Duo

Motor: BREL motor

Device: BREL motor

One way motor: 'UP/STOP/DOWN.'

Bi-directional motor: 'UP/STOP/DOWN' + Percentage control + Position feedback

## Connection Parameters:

Baud Rate: 9600 bps

Parity: N

Data Bits: 8

Stop Bits: 1
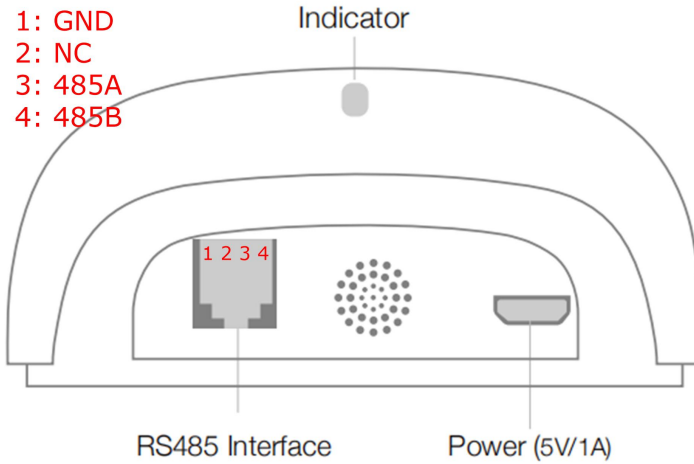
## Bridge firmware required:

Firmware 0.6.6 or above.

Please update your previous Bridge by using the BREL HOME app.

'Setting' ---> 'Location' ---> 'All Bridges' ---> 'Firmware Setting'

## Wiring

Data cable: RJ9

1: GND
2: NC
3: 485A
4: 485B

Indicator

1 2 3 4

RS485 Interface    Power (5V/1A)

## Message Frame:

Bridge control

| Start Character | Address | Command | Data | End Character |
|---|---|---|---|---|
| ! | 3 Byte ASCII | 1 Byte ASCII | (Optional) | ; |

Motor control

| Start Character | Bridge Address | Delimiter Character | Motor Address | Command | Data | End Character |
|---|---|---|---|---|---|---|
| ! | 3 Byte ASCII | D | 3 Byte ASCII | 1 Byte ASCII | (Optional) | ; |

0-9, broadcast address 000 for the query, range 001- 999

no- numerical ASCII

"?" for inquiry of the motor status

## Message details

## 1, Bridge address query, Bridge reboot, and DEVICE 'Status update'(1) query & set

| Command Keyword | Keyword Remark | Example massage Server(Downlink) | Example message Client(Uplink) | Command Remark |
|---|---|---|---|---|
| V | Bridge address query | !000V?; | !123V0.4.9; | Bridge address: 123 Bridge firmware version: 0.4.9 |

| | | | | |
|---|---|---|---|---|
| **G** | Bridge address edit | !123**G**456; | !123**G**456; | Update Bridge address from 123 to 456 |
| **R** | Reboot Bridge | !123**R**; | !123**R**; | Reboot Bridge |
| **C** | 'Status update mode' query | !123**C**?; | !111**C**0;<br>!123**C**1; | C0: Non-auto update mode<br>C1: Auto update mode |
| | 'Status update mode' set | !123**C**0;<br>!123**C**1; | !111**C**0;<br>!111**C**1; | C0: Set to non-auto update<br>C1: Set to auto update |

(1): Bridge will upload bi-directional motor's position to the 3rd party system via RS485 when motor stop running if the DEVICE 'Status update' mode is enabled.

The server needs to query the Bridge address before use. If multiple Bridges used on the system, please install and query sequentially; otherwise all the Bridges will acknowledge query command at the same time.

Example messages

    Server:  !000**V**?;       // Address 000 for query

    Client:  !123V0.4.9;    // Bridge address: 123, Bridge firmware version: 0.4.9

```
[send]      [15:17:59 419]   !000V?;
[receive]   [15:17:59 621]   !123V0.4.9;
```

## 2, Motor address query

| Command Keyword | Keyword Remark | Example massage Server(Downlink) | Example message Client(Uplink) | Command Remark |
|---|---|---|---|---|
| **D** | Motor address query | !111**D**000v?; | !111**D123**vD10;<br>!111**D124**vD10;<br>!111**DFFFv000**; | Bridge report its device list<br>Device: D123 and D124 |

The server needs to query motor address before use. The bridge will report its motor device list. Take care of that there are two kinds of motor type, one-way motor and bi-directional motor.

    Example messages

    Server:  !123**D**000v?;    // Address 000 for query

    Client:  !123**D123**vD10;    // Motor type: One way motor, motor address **D123**, firmware version:D10

              !123**D124**vD10;  // Motor type: Two way DC tubular motor, motor address **D124**, firmware version:D10

              !123**DFFF**v000;  // End of the message. DFFF is the end of message flag, it is not a real device.

## 3, Motor control

The example Bridge address is 123, the example motor address is D001

| Command Keyword | Keyword Remark | Example massage Server(Downlink) | Example message Client(Uplink) | Command Remark |
|---|---|---|---|---|
| **o** | UP/Open | **!123D001o;** | **!123D001o;** | Motor receives Open message |
| | | | **!123D001Enl;** | No response, Motor is offline |
| **s** | Stop | **!123D001s;** | **!123D001s;** | Motor receives Stop message |
| | | | **!123D001Enl;** | No response, Motor is offline |
| **c** | DOWN/Close | **!123D001c;** | **!123D001c;** | Motor receives Close message |
| | | | **!123D001Enl;** | No response, Motor is offline |
| **m** | Lift percentage control | **!123D001m080;** | **!123D001m080;** | Motor receives 'run to 80%' message. |
| | | | **!123D001Enc;** | Motor does not set limit position |
| | | | **!123D001Enl;** | No response, Motor is offline |
| | | | **!123D001r080b 180;** | Motor upload its position(80%,180°) when it stops. |
| **b** | Tilt/rotate control | **!123D001b070;** | **!123D001b070;** | Motor receives 'run to 70%' message. |
| | | | **!123D001Enl;** | No response, Motor is offline |
| | | | **!123D001Enc;** | Motor does not set limit position |
| | | | **!123D001r023b 070;** | Motor upload its position(23%,70°) when it stops. |
| **m+b** | Lift+tilt control | **!123D001m050b15 0;** | **!123D001m050 b150;** | Motor receives 'run to 50%150°' message. |
| | | | **!123D001Enc;** | Motor does not set limit position |
| | | | **!123D001Enl;** | No response, Motor is offline |
| | | | **!123D001r050b** | Motor reports its |

| | | | | |
|---|---|---|---|---|
| | | | 150; | position(50%,150°) when it stops. |
| **BJE24TD BJE24TR** | Lift+tilt control | **!123D001td050bu050;** | **!123D001td050 bu050;** | Motor receives 'top-down run to 50%,bottom-up run to 50%' message. |
| | | | **!123D001Enc;** | Motor does not set limit position |
| | | | **!123D001Enl;** | No response, Motor is offline |
| | | | **!123D001rtd050 bu050;** | Motor reports its position(top-down 50%, bottom-up 50%). |
| **p** | Motor voltage query | **!123D001pVc?;** | **!123D001pVc01 054;** | Current voltage is 10.54V |
| | | | **!123D001Enl;** | No response, Motor is offline |
| **N** | Alias setting | **!111D001NDM25LE/ S;** | **!111D001NDM25 LE/S;** | Set alias for device (Alias <16 Characters) |
| **N** | Alias query | **!111D001N?;** | **!111D001NDM25 LE/S;** | Alias query |
| **E** | Error | **!123D001o;** **!123D001c;** **!123D001s;** **!123D001m080;** **...** | **!123D001Eee;** | **E**(error)**ee**(error code) **ee** = bz (Motor is busy)   = df (Reach the added device amount limits)   = np (device is not existing)   = nc (no position limits)   = mh (Master hall sensor error)   = sh (Slave hall sensor error)   = or (upper obstacle)   = cr (lower obstacle)   = pl (Low supply power)   = ph (High supply power)   = nl (Device offline)   = ec (Undefined error) |

**Notes:**

   **E(Error)** is the device information feedback from Bridge when the Server makes controls.

**ee** is the detail error code. Please kindly take care 'One-way' device has no feedback capability, so only the code np is available for 'One-way' device.

bz : Device is busy and can not execute Bridge commands, Bridge could send commands later.

df : Max. Paring device amounts reached, totally 30 devices can be paired to Bridge. If the Server wants to pair the 31st Device, Bridge will feedback code df. This code is not used for Control4 sever.

np : Device is not existing. If the Device is not existing, Bridge returns np after Server makes any controls.

nc : Device does have position limits. When Server use the percentage control commands (**m**,**b**,**m+b**),

mh, sh : Hall sensor error

or, cr : Device obstacles in the running. Not All Devices have obstacles function; it's based on Device type.

pl, ph : Device power supply status indicator. Not All Devices have obstacles function; it's based on Device type.

nl : Device is offline, which means no feedback/ACK/NACK from Device side, and Bridge returns nl to Server

ec : Undefined error.