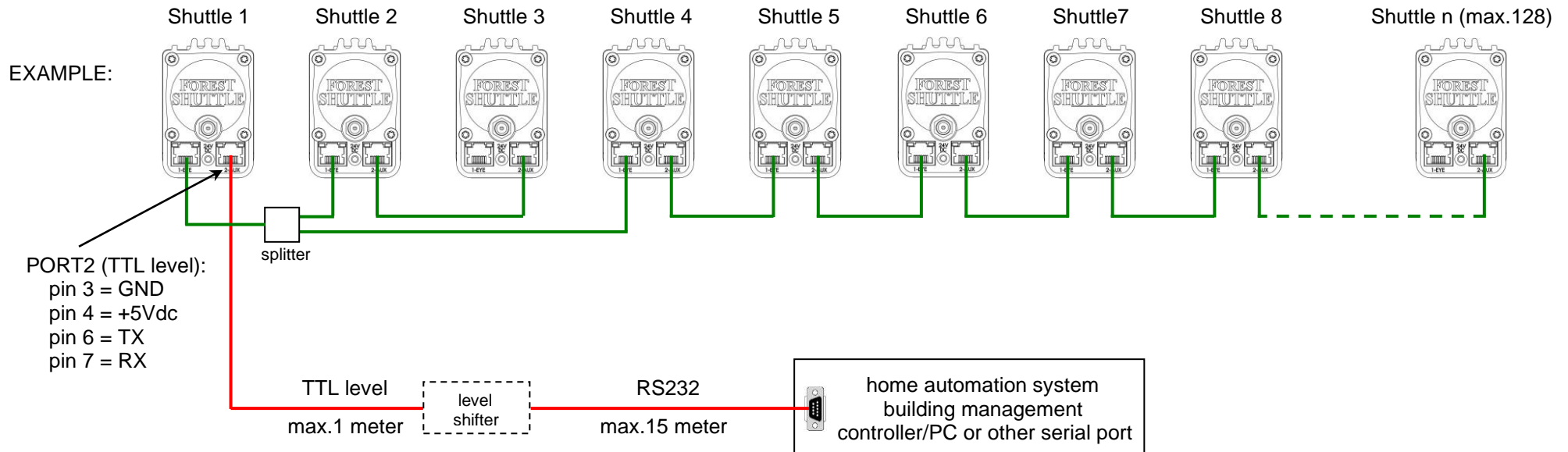


The Forest Shuttle **S, L or M receiver** can be controlled by FX bus (Forest eXtension bus). The 2 ports on the bottom of the Shuttle are FX ports. Shuttles are connected together to form a FX bus. Serial commands at TTL level can be send between the Shuttle motor and an outside Controller/PC. In case of a RS232 serial port, a level shifter is needed to connect the FX bus to interface with an outside Controller/PC utilizing an RS-232 serial communication link. Shuttles are connected to each other in a bus- or daisy chain-network and one Shuttle to a control device. Star network also possible but limited. Total physical bus wiring length can be up to 500 meter (1640ft), with up to 128 Shuttles on a bus. The FX gateway receives its power from a Shuttle and must be within 1 meter (3.3ft). of that Shuttle. Distance between FX gateway and serial communication port is maximum 15 meter (49ft).



All Shuttles have the address 'OWN' and can be changed before connecting to the FX-bus. Commands are addressed directly to a Shuttle or, in some cases, globally to the entire bus. In many cases, a Shuttle responds to a command by placing a response FX message onto the bus that is picked up by the FX gateway and transmitted over the Serial Communications uplink to the Home Automation system / Controller / PC.

ASCII strings are used to form FX messages. Downlink refers to messages from a Controller / PC to a Shuttle, while Uplink messages flow from an Shuttle to a Controller/PC. An FX message always begins with '#'. There will always be an address (3 ASCII characters) and a command (1 ASCII character). In some cases a data field will contain a variable number of characters or even no data. A question mark ("?) in the data field signifies a request. For downlink messages, the "end character" can be either ';' or <CR> (both are treated the same).

Many different commands and messages are possible, see table on next page.

Table of commands/messages:

| command character and description | command/message direction   | number of characters and description | example   | explanation  |                               |   |
|-----------------------------------|-----------------------------|--------------------------------------|-----------|--|-------------------------------|---|
| A                                 | acknowledge address change  | from Shuttle                         | 0 none    | #SH1AOWN;  | address changed of OWN to SH1 |   |
| c                                 | close                       | to Shuttle                           | 0 none    | #OWNc;   | close device OWN (00%)        |   |
| d                                 | define a scene              | to Shuttle<br>to Shuttle             | var.<br>1 | scene *1, 00-99% or NS to not act on this scene<br>- (minus sign) means clear all scenes                                       | #OWNdA40;<br>#OWNd-;          | define scene A to 40% of device OWN<br>clear all scenes of device OWN |
| d                                 | request scene setting       | to Shuttle                           | 2         | scene *1, question mark  | #OWNdA?                       | request scene A of device OWN   |
| d                                 | report scene setting        | from Shuttle                         | 3         | scene *1, 00-99% or NS if not in scene   | #OWNdA50;                     | scene A of device OWN defined at 50%                                  |
| E                                 | an error occurred           | from Shuttle                         | 2         | 2 characters describing error<br>bz = busy, ro = read only, nc = not calibrated<br>ml = message lost either uplink or downlink | #OWNEbz;                      | error: device OWN is busy   |
| g                                 | execute scene               | to Shuttle                           | 1         | scene *1   | #OWNgA;                       | device OWN move to scene A  |
| i                                 | indentify using green LED 1 | to Shuttle                           | 0         | none   | #OWNi;                        | led on device OWN blinks for 20 sec.                                  |
| m                                 | move to position            | to Shuttle                           | 2         | 2 digits from 00 to 99 = destination position in % *2  | #OWNm40;                      | device OWN move to 40%  |
| N                                 | assign a name               | to Shuttle                           | var.      | 1-16 characters (name cannot be "?", "!" or ";")   | #OWNNshuttle1;                | name device OWN "shuttle1"  |
| N                                 | request the name            | to Shuttle                           | 1         | question mark  | #OWNN?                        | request name of device OWN  |
| N                                 | report name                 | from Shuttle                         | var.      | 1 - 16 characters  | #OWNNshuttle1;                | report: name device OWN is "shuttle1"                                 |
| o                                 | open                        | to Shuttle                           | 0         | none   | #OWNo;                        | open device OWN (to 99%)  |
| p                                 | reset Shuttle               | to Shuttle                           | 2         | 2 characters, RD = "FX" default, R* = total reset *3   | #OWNpRD;                      | reset device OWN to "FX" default                                      |
| r                                 | request current position    | to Shuttle                           | 1         | question mark  | #OWNr?                        | request position of device OWN  |
| r                                 | report current position     | from Shuttle                         | 2         | 2 digits from 00 to 99 = current position in % *2  | #OWNr40;                      | device OWN at 40%   |
| s                                 | stop                        | to Shuttle                           | 0         | none   | #OWNs;                        | stop device OWN   |
| v                                 | request version             | to Shuttle                           | 1         | question mark  | #OWNv?                        | request version number of OWN   |
| v                                 | report version              | from Shuttle                         | 3         | 3 characters   | #OWNvT11;                     | version number of OWN is T11  |
| <                                 | moving from xx%             | from Shuttle                         | 2         | 2 digits from 00 to 99 = position now *2   | #OWN>99;                      | device OWN is moving from 99% in dir. 1                               |
| >                                 | moving from xx%             | from Shuttle                         | 2         | 2 digits from 00 to 99 = position now *2   | #OWN<00;                      | device OWN is moving from 00% in dir. 2                               |
| @                                 | re-address                  | to Shuttle                           | 3         | 3 characters (0-9 or A-Z)  | #OWN@SH1;                     | re-address OWN to SH1   |
| ~                                 | randomize your address      | to Shuttle                           | 0         | none   | #OWN~;                        | randomize address of OWN  |

\*1 means scene number 0 to 9, A to Z, a to z

\*2 00 means at reference position (close position), 99 means at limit away from reference (open position), limits must be set before these messages happen.

\*3 see reset table on next page

"0" = zero, except for "o" (lower case "o")

### Reset table:

| setting                     | "FX" default, e.g. !OWNpRD; | total reset, e.g. !OWNpR*;    |
|-----------------------------|-----------------------------|-------------------------------|
| limits and current position | not changed                 | cleared                       |
| touch impulse options       | not changed                 | enabled with easy sensitivity |
| open/close direction        | set to original             | set to original               |
| master or slave setting     | not                         | not                           |
| Z-wave positions            | not changed                 | not changed                   |
| FX scenes                   | cleared                     | cleared                       |
| FX address                  | not changed                 | not changed                   |

### Notes:

- The FX-bus is only for the Shuttle S, L and M receiver (no: 5232000000, 5232000001 and 5232000003)
- addressing ALL Shuttle motors: address 000
- address "OWN" on every single Shuttle can be re-addressed by means of the @-command

### Connections:

- FX gateway is connected to PORT 2 of the first Shuttle. Port 2 serial communication: pin 3 = GND, pin 6 = TX, pin 7 = RX
- The cable between Shuttle motors can be UTP/FTP or flat cable. Daisy-chain and/or star configuration is allowed.

### Serial Connection parameters:

- 9600 baud 8N1 (8 data bits, no parity, 1 stop bit). No sync characters. Case matters everywhere.
- Extended ASCII characters (0x80-0xFF) NOT allowed anywhere.
- Flow control: X-on / X-off.