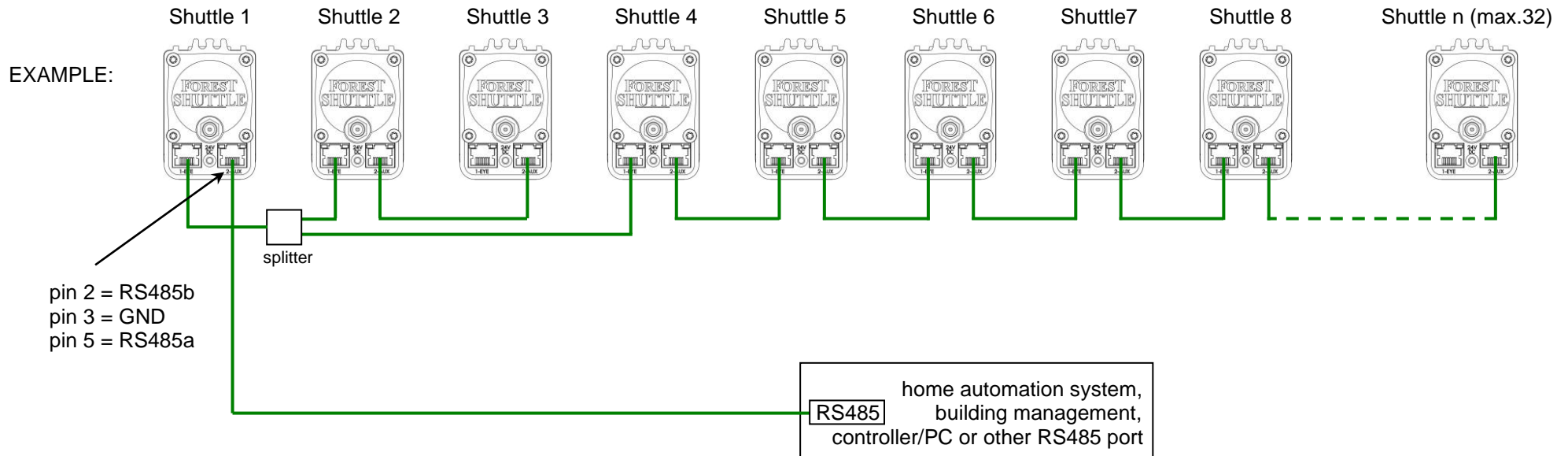IMPORTANT: standard port setting of the Shuttle motor is communication on RS232 mode. Set the Shuttle to RS485 mode by pressing the configuration button on bottom of the motor 29 (!) times. Each button press the LED on the ports will move on to the next LED. After 29 presses, confirm by pressing once more, keep pressed for 5 seconds. Unplug the power to the motor, wait 5 seconds and re-plug the power to the motor.

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 partly FX ports. Shuttles are connected together to form a FX bus. Serial commands at RS485 level can be send between the Shuttle motor and an outside Controller/PC. Shuttles are connected to each other in a bus- or daisy chain-network and to a control device. Star network also possible but limited.
Total physical bus wiring length can be up to 1200 meter (3936ft), with up to 32 Shuttles on a bus.

EXAMPLE:

splitter

pin 2 = RS485b
pin 3 = GND
pin 5 = RS485a

RS485 home automation system,
building management,
controller/PC or other RS485 port

All Shuttles have standard the address 'OWN'. This address can be changed to a unique address before connecting to the FX-bus. Commands are addressed directly to a Shuttle or, in some cases, globally to the entire bus. In order to get a response message from a Shuttle (position ect.) you need to send a request to a unique address. The addressed motor will then respond with a message onto the bus 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	#OWNASH1;	address changed of OWN to SH1
c	close	to Shuttle	0	none	#OWNc;	close device OWN(00%)
d	define a scene	to Shuttle	var.	scene *1, 00-99% or NS to not act on this scene	#OWNdA40;	define scene A to 50% of device OWN
		to Shuttle	1	- (minus sign) means clear all scenes	#OWNd-;	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 bz = busy, ro = read only, nc = not calibrated 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%
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
@	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, M receiver and FSS motor (no: 5232000000, 5232000001, 5232000003 and 7131000000)
◦ addressing ALL Shuttle motors: address 000
◦ address "OWN" on every single Shuttle can be re-addressed by means of the @-command
◦ when a request is request command is send towards the motor(s), <u>make sure the request is given to a unique motor address</u>. When a request is sent to an address 000, or multiple motors have the same address, there will be data collisions.

<u>Connections:</u>
◦ FX gateway is connected to PORT 2 of the first Shuttle. Port 2 serial communication: pin 2 = RS485b, pin 3 = GND, pin 5 = RS485a
◦ daisy-chain and/or star configuration is allowed.
◦ it's best when not all 8 pins of the RJ45 plugs are connected between Shuttle motors. Pin 2, pin 3 and pin 5 must be connected.

<u>Serial Connection parameters:</u>
◦ 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.