

CLAIMS

1. A system arrangement for use in an automobile for low latency and fail-safe command propagation allowing a targeted actuation of each of a plurality of client devices (CD) in real-time, comprising:
 - an initiator device (I) arranged to generate and initiate commands;
 - a series of branch devices (BD) communicatively coupled to the initiator device (I) via an Initiator Side Port (ISP), the series of branch devices (BD) being communicatively connected using a transmission medium;
 - the plurality of client devices (CD) being segmented into a plurality of serial branches each of at least two client devices (CD) along a branch type data line each branch being connected to respectively one branch device (BD), characterized in that each branch device (BD) directly provides commands generated and initiated by the initiator device (I) to respectively a first client device (CD) using a Client Side Port (CSP) of respectively one branch being connected with the branch device (BD) according to a configured mode (M0, M1, M2, ... , M6), wherein the command is further propagated to the at least one further client device (CD) via the Client Side Port (CSP) of the respective branch device (BD), the mode being configured as a function of the generated command and/ or by a number of received link attention events.
2. The system according to claim 1, characterized in that the mode is configured at least between pairwise communication ports of each branch device (BD), the communication ports comprising an Initiator Side Port (ISP), a Client Side Port (CSP) and/ or an Extension Side Port (ESP).
3. The system according to claim 1 or 2, characterized in that received link attention events are formed by at least one decoded Frame Synchronization event, at least one command, at least one downstream frame, at least one upstream frame, at least one received message, at least one executed command and/ or at least one instruction.
4. The system according to any one of the preceding claims, characterized in that the number of received link attention events is specified by the generated command or a predefined threshold.

5. The system according to any one of the preceding claims, characterized in that each generated command comprises Frame Synchronization data arranged to indicate a frame start.
- 5 6. The system according to any one of the preceding claims, characterized in that a mode specifies switching, routing, parsing and/ or transmission of packages between pairwise ports (ISP, CSP, ESP).
- 10 7. The system according to any one of the preceding claims, characterized in that each branch device (BD) is operated according to a protocol, which is implemented by the initiator device (I) specifying rules according to which each branch device (BD) is operated in one state out of a number of states, the number of states comprising: a state directly after power up, where no address is assigned to the branch device (BD); a state where only an initializing command is accepted; a state in which a
15 unique network address is assigned to the branch device (BD); a state where all network relevant operations of the branch device (BD) are operational; a state in which the branch device (BD) performs network relevant operations and performs device specific functions; a state where the branch device (BD) has no assigned network address and is bidirectionally transparent for frames arriving at Initiator Side Port (ISP), being forwarded to Extension Side Port (ESP) and Client Side Port (CSP),
20 or Extension Side Port (ESP) being forwarded to Initiator Side Port (ISP) and Client Side Port (CSP).
- 25 8. The system according to any one of the preceding claims, characterized in that at least one branch device (BD) is operated in a state in which the branch device (BD) performs network relevant operations and performs device specific functions, the branch device (BD) performing switching or routing operations on pairwise ports (ISP, CSP, ESP) according to the configured mode, the mode comprising: a mode where all incoming packages are forwarded; a mode where packages are only forwarded in
30 case of an address match where the command provides an address of at least one branch device (BD); a mode where the connected client devices (CD) are read out; a mode where the connected client devices (CD) are instructed; a mode where incoming commands are first parsed; a mode where incoming commands are directly passed on; and/ or a mode where an incoming command is adapted as a function of
35 a branch device (BD) address.

9. The system according to any one of the preceding claims, characterized in that the client devices are implemented by light emitting diodes and/ or sensors and are address per branch by the respective branch device (BD) which forwards commands from the initiator device (I).

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10. The system according to any one of the preceding claims, characterized in that in case of a loss of voltage, a loss of current, an undefined behavior of the branch device (BD) an incoming port (ISP, ESP) passes incoming packages through to an outgoing port (ESP, ISP) without further processing, parsing, routing or switching steps.

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11. The system according to any one of the preceding claims, characterized in that the branch type data line is arranged on a printed circuit board and/ or connects printed circuit boards.

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12. The system according to any one of the preceding claims, characterized in that the transmission medium comprises respectively one Unshielded Twisted Pair Cable in between pairwise branch devices or one single Unshielded Twisted Pair Cable along which all branch devices are arranged.

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13. A method for use in an automobile for low latency and fail-safe command propagation allowing a targeted actuation of each of a plurality of client devices in real-time, comprising:

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- operating (100) an initiator device (I) arranged to generate and initiate commands;
- operating (101) a series of branch devices (BD) communicatively coupled to the initiator device (I) via an Initiator Side Port (ISP), the series of branch devices (BD) being communicatively connected using a transmission medium;

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- operating (102) the plurality of client devices (CD) being segmented into a plurality of serial branches each of at least two client devices (CD) along a branch type data line each branch being connected to respectively one branch device (BD), characterized in that each branch device (BD) directly provides (103) commands generated and initiated by the initiator device (I) to respectively a first client device (CD) using a Client Side Port (CSP) of respectively one branch being connected with the branch device (BD) according to a configured mode (M0, M1, M2, ... , M6),

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wherein the command is further propagated (104) to the at least one further client device (CD) via the Client Side Port (CSP) of the respective branch device (BD), the

mode being configured (105) as a function of the generated command and/ or by a number of received link attention events.

- 5 14. A computer program product comprising instructions to cause the arrangement of any one of claims 1 to 12 to execute the steps of the method of claim 13.
15. A computer-readable medium having stored thereon the computer program of claim 14.