Claims

1. A wireless network comprising a plurality of nodes including plural routers and plural end devices, which nodes each include a wireless interface for wireless communication, the nodes of the network being arranged to communicate in accordance a network protocol, in accordance with which:

the routers transmit beacons in respective timeslots within a periodic beaconing interval, passively scan for messages, and, in response to receiving a message, transmit an acknowledgement of the received message; and

when an end device has a message that is pending transmission, the end device (a) passively scans for beacons transmitted from any router; and (b) in response to receiving a beacon, transmits the message, and passively scans for an acknowledgement, the end device repeating steps (a) and (b) if no acknowledgement is received.

2. A wireless network according to claim 1, wherein, in accordance with the network protocol, the routers passively scan for messages in the respective timeslot of their own beacon, and the end device transmits the message in the timeslot of the received beacon.

3. A wireless network according to claim 2, wherein, in accordance with the network protocol, the routers transmit an acknowledgement of the received message in the timeslot of their own beacon, and the end device passively scans for an acknowledgement in the timeslot of the received beacon.

4. A wireless network according to any one of the preceding claims, wherein the routers include a coordinator and plural gateway routers, wherein, in accordance with the network protocol, the gateway routers transmit messages they receive to the coordinator.

5. A wireless network according to any one of the preceding claims, wherein, in accordance with the network protocol:

the coordinator transmits a beacon in an initial timeslot;

each gateway router passively scans for a beacon transmitted from another router, and transmits a beacon in its respective timeslot only in response to receiving a beacon with a predetermined period prior thereto.

6. A wireless network according to claim 5, wherein, in accordance with the network protocol, in response to a determination that radio silence is required, the coordinator is arranged not to transmit a beacon in the initial timeslot, whereby the gateway routers are caused also not to transmit beacons.

7. A wireless network according to any one of claims 4 to 6, wherein, in accordance with the network protocol, the routers have a tree-shaped communication topology comprising a first layer of gateway routers that are each associated to the coordinator and optionally one or more further layers of gateway routers that are each associated to a gateway router in a lower layer.

8. A wireless network according to claim 7, wherein, in accordance with the network protocol, the gateway routers transmit messages they receive to the router to which they are associated.

9. A wireless network according to claim 7, wherein, in accordance with the network protocol, when a gateway router has a message that is pending transmission, the gateway router, in response to receiving a beacon from the router to which it is associated, transmits the message in the timeslot of the received beacon, and passively scans for an acknowledgement, the gateway router repeating that transmission if no acknowledgement is received.

10. A wireless network according to any one of claims 7 to 9, wherein each gateway router passively scans for a beacon transmitted from the router to which it is associated, and transmits a beacon in its respective timeslot only in response to receiving a beacon from the router to which it is associated within a predetermined period prior thereto.

11. A wireless network according to any one of the preceding claims, wherein, in response to a determination that radio silence is required, the routers are arranged not to transmit beacons.

12. A wireless network according to any one of the preceding claims, wherein the end devices do not passively scan for beacons except when they have a message that is pending transmission, and optionally also at predetermined times for reception of a downstream message.

13. A wireless network according to any one of the preceding claims, wherein the end devices each include a sensor unit for sensing the rotational position of a respective rotatable element, and are arranged to generate messages indicating the sensed rotational position.

14. A wireless network according to claim 13, wherein the end devices are each mounted on the respective rotatable element.

15. A method of communication between nodes of a wireless network, including plural routers and plural end devices, which nodes each include a wireless interface for wireless communication, the method comprising:

the routers transmitting beacons in respective timeslots within a periodic beaconing interval, passively scanning for messages and, in response to receiving a message, transmitting an acknowledgement of the message; and

when an end device has a message that is pending transmission, the end device (a) passively scanning for beacons transmitted from any router; and (b) in response to receiving a beacon, transmitting the message, and passively scanning for an acknowledgement, the end device repeating steps (a) and (b) if no acknowledgement is received.

16. An end device for use as a node in a wireless network further comprising plural routers, the end device including a wireless interface for wireless communication with the routers, wherein the end device is arranged, when it has a message that is pending transmission, (a) to passively scan for beacons transmitted from any router in respective timeslots within a periodic beaconing interval; and (b) in response to receiving a beacon, to transmit the message, and to passively scan for an acknowledgement, the end device being arranged to repeat steps (a) and (b) if no acknowledgement is received.