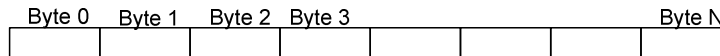


## OVERALL ARCHITECTURE

It will be possible to control the brick either through the USB communication channel or through the Bluetooth® communication channel, which both uses the LEGO® MINDSTORMS® NXT Communication protocol.

For further details and explanation on the USB and Bluetooth® communication channels, please refer to LEGO® MINDSTORMS® NXT Communication protocol document.

The figure below shows the general telegram architecture:



**Figure 1: General protocol architecture**

**Byte 0:** Telegram type, as dictated by main LEGO® MINDSTORMS® NXT Communication protocol specification. Note that for the purposes of this document, only “direct command telegrams” and “reply telegrams” are important – “system commands” are specified and handled at the main LEGO® MINDSTORMS® NXT Communication protocol document.

- 0x00: Direct command telegram, response required
- 0x01: System command telegram, response required
- 0x02: Reply telegram
- 0x80: Direct command telegram, no response
- 0x81: System command telegram, no response

**Byte 1 – N:** the command itself or a reply, depending on telegram type

## MAXIMUM COMMAND LENGTH

Currently, total direct command telegram size is limited to 64 bytes, including the telegram type byte as listed above. As specified in the LEGO® MINDSTORMS® NXT Communication protocol document, Bluetooth® packets have an additional two bytes for size tacked onto the front, but these are not included in this limit.

## BLUETOOTH® MESSAGES

As explained above all Bluetooth® messages needs to have two bytes in front of the messages itself which indicates how many bytes the message includes. The length of the packages is counted without the two length bytes.

The figure below shows a Bluetooth® message:



**Figure 2: Bluetooth® protocol packages**

## OPTIONAL RESPONSES

The LEGO® MINDSTORMS® NXT Communication protocol specification states that any incoming protocol telegram may be marked with the 0x80 mask on its telegram type byte to indicate that no response is expected. Direct commands is a primary use case for this functionality, as requiring a response on all telegrams could lead up to approximately 60 ms latency. Of course, this concept doesn't hold for all commands – for example, attempting to “GetInputValues” without requiring a response would just be wasting time.