IEEE P802.15 Wireless Personal Area Networks

Project	IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)
Title	**Convolutional Coding Scheme**
Date Submitted	[21 January 2010]
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Re:	Draft text contribution for 15.4g
Abstract	A convolutional coding scheme for 4g SUN FSK PHY.
Purpose	Draft text contribution
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Description of the proposed convolutional coding scheme with interleaving

Because definition of some convolutional coding scheme parameters can be sometime confusing, we would like proposing a common definition for the convolutional coding parameters, as follows:

- n = number of output bits,
- k = number of input bits,
- m = number of memory registers,
- r = code rate (= k/n),
- L = constraint length = m+1.

In this context, we propose the following parameters for the convolutional coding scheme:

1) r = 1/2 ,
2) m = 3,
3) n = 2,
4) k = 1,
5) L = 4.

We propose the following *connection vectors*:

g_0 = {1, 1, 1, 1} and g_1 = {1, 0, 1, 1}.

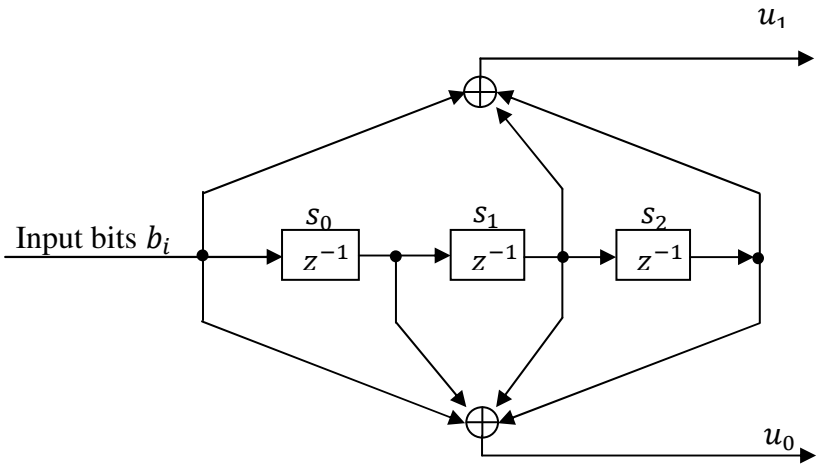


Figure 1: A possible implementation of the Convolutional Encoder

We propose the following interleaving scheme:

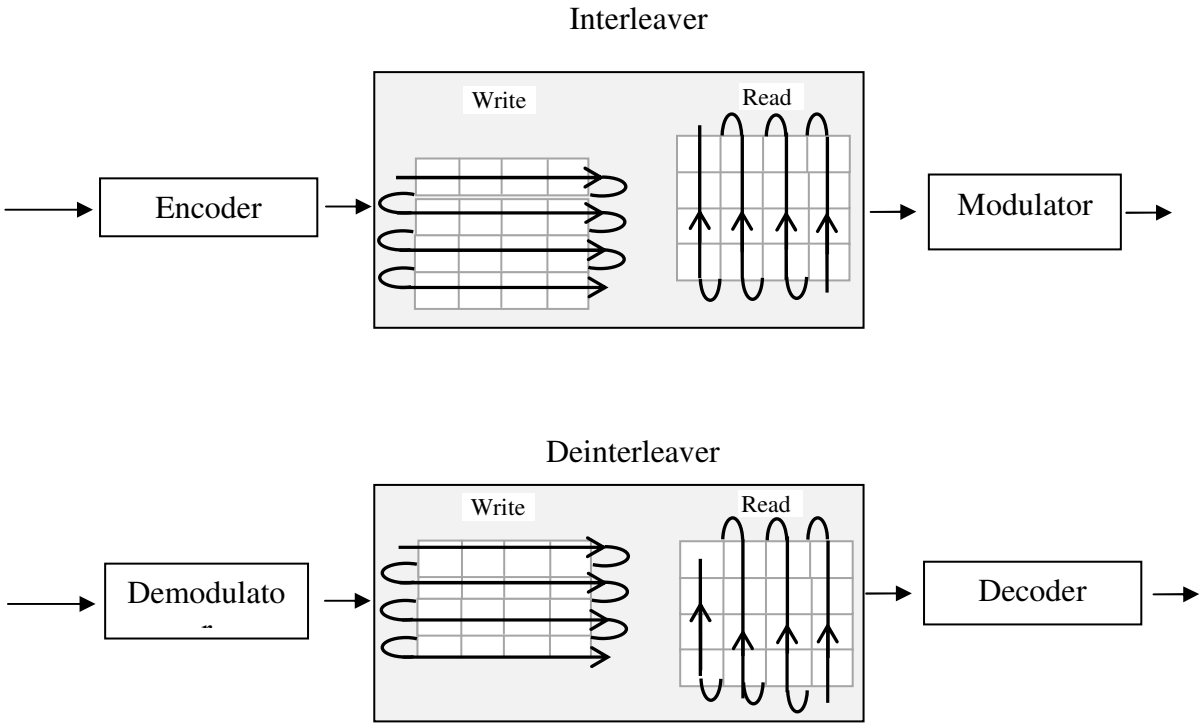
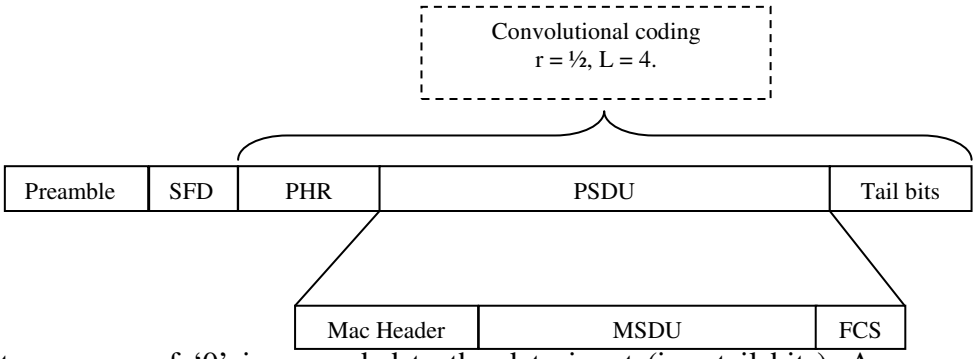


Figure 2: Functional representation of FEC and Interleaving

The interleaving scheme is depicted in Figure 2. Interleaving write/read buffers can be represented as 4x4 matrices, where each cell of the matrix has a size of 2 bits (i.e., one encoded output symbol).



A 3-bit sequence of '0' is appended to the data input (i.e., tail bits). As a consequence, it is necessary to fill up the interleaver buffer with some additional (non zero) stuffing bits for the last block of data so that a full interleaver block may be transmitted.