"1"s and "0"s. This bit stream **110** may originate from, for example, but not limited to, a computing device such as a personal computer, server, or computer-readable data storage device, and/or from a telephonic or other communications device. The incoming bit stream **110** is converted into TFB blocks **130** by an encoder **120**, which will be described in more detail hereinafter with respect to **FIG. 1B**. The TFB blocks **130** are transformed into TFB packets **150** by modulating the block waveform with e.g. the central frequency of the channel to be used for transmission of this group of bits by a modulator **140**. Additional to or instead of modulation processing may be added to compensate, either fully or in part, for the effect of the transmission medium. In an alternative embodiment TFB blocks **130** may also be transformed into TFB packets **150** without applying additional signal processing to the blocks **130**. Subsequently, a waveform **170** corresponding to the TFB packet **150** is generated by a waveform generator **160** and physically realized on the transmission medium. The waveform generator **160** will be described in more detail hereinbelow with respect to **FIG. 1C**.

[0070] **FIG. 1B** is a block diagram representing an illustrative implementation of the encoder **120** of the transmitter **100** shown in **FIG. 1A**. The incoming bit stream **110** may be buffered in a receiving mechanism **121** before being encoded. The incoming bits are grouped in groups **122** of length M. An error correction mechanism **123** may add N-M bits for error correction, thus obtaining a group **124** of length N containing M bits of data and N-M error correction bits. Group length N corresponds to the number of TFB functions used for encoding and on the number of bits mapped onto a single TFB function. Both M and N may be determined dynamically, possibly per block. The error correction mechanism may be arranged to receive information on the quality of the transmission and/or the transmission medium on an input **129** to optimize the error correction algorithm depending on effects of the transmission and/or the transmission medium. In case there are insufficient data in the input sequence to fill a block **130**, padding bits may be added to the group **122** or **124**. In a weighing mechanism **125**, for each bit in the group **124** a weighing factor is determined, which is to reflect the value of the bit ("0" or "1"). As an example, the weighing factor is −1 if the bit value is 0, and +1 if the bit value is 1. The weighing mechanism may be arranged to receive information on the quality of the transmission and/or the transmission medium on an input **131** for optimizing the weight generation, given the conditions of the transmission and/or the transmission medium. The weighing factors are by no means limited to the example given above and can be chosen freely to suit the application or system needs. A mapping mechanism **127** maps the N bits of the group **124** of bits onto N TFB functions, generated by a signal generation mechanism **128**. The signal generation mechanism **128** may be arranged to receive information on the quality of the transmission and/or the transmission medium for optimizing the TFB functions, given the conditions of the transmission and/or the transmission medium Preferably the TFB functions are digital representations of TFB functions. It is, however, also possible to use analog, physical representations of the TFB functions. This mapping is achieved by multiplying a first function from a selected set of TFB functions with a first weighing factor, a second function with a second weighing factor and so on until all N functions have been multiplied with a weighing factor. Preferably, the first function is multiplied by a weighing factor corresponding to the first bit of the group **124**, the second function with a weighing factor corresponding to the second bit of the group **124** and so on. Subsequently, the mapping mechanism **125** adds all N thus weighted functions to form a TFB block **130**.

[0071] If n bits are to be mapped onto each TFB function, and there are N_T TFB functions to be used, the bits are grouped in groups of $N=n \times N_T$ bits (incoming bits plus error correction bits). In the weighing mechanism **125**, for each set of n bits in the group **124** a weighing factor is determined, which is to reflect the value of the set of bits. The mapping mechanism **127** maps the N bits of the group **124** of bits onto N_T TFB functions, generated by the signal generation mechanism **128**. This mapping is, again, achieved by multiplying the first function from the selected set of TFB functions with the first weighing factor, the second function with the second weighing factor and so on until all N_T functions have been multiplied with a weighing factor. Preferably, the first function is multiplied by a weighing factor corresponding to the first set of n bits of the group **124**, the second function with a weighing factor corresponding to the second set of n bits of the group **124** and so on. Subsequently, the mapping mechanism **125** adds all N_T thus weighted functions to form a TFB block **130**.

[0072] **FIG. 1C** is a block diagram representing an illustrative implementation of the waveform generator **160** of the transmitter **100** shown in **FIG. 1A**. A sampler **162** is used to determine a digital representation **164** of the waveform of the packet **150** as generated by the modulator **140**. A Digital-to-Analog (D/A) converter **166** converts the digital waveform **164** into an analog waveform. A transmission mechanism **168**, finally, puts the analog TFB waveform **170** on the transmission medium.

[0073] In the embodiment depicted by **FIGS. 1A, 1B** and **1C** the incoming bits **110** are digitally mapped on digital representations of the N TFB functions, the sum of which (block **130**) is digitally determined and modulated before being converted to an analog waveform **170** which is put on the transmission medium. The invention is by no means limited to this embodiment. Alternative embodiments, wherein the incoming bit stream **110** is converted to an analog signal at a different point within the system all fall within the scope of the invention. Examples are multiplying N analog TFB functions with analog equivalents of the weighing factors or converting the N digitally weighed functions to analog waveforms prior to adding the separate waveforms to form a block. Further, the invention could be embodied electronically, in firmware, in software, in hardware or in various combinations thereof.

[0074] **FIG. 2A** is a block diagram setting forth an illustrative implementation of a receiver **200** of the system according to the present invention equipped to decode an incoming TFB waveform **210** into one or more streams of binary data **280**. A front end **220** of the receiver **200** receives waveforms **210** from the transmission medium. As described hereinafter in more detail with respect to **FIG. 2A** the front end **220** converts the received waveform **210** to a sampled packet **230**. A decoder **240** decomposes the packet **230** into a group **260** of bits as described below with respect to **FIG. 2C**. Finally, the bit groups **260** are restored to a bit stream **280** by a bit stream generator **270** as described in more detail hereinbelow with respect to **FIG. 2D**.