

ABSTRACT

A transmitter includes an encoder configured to divide a first number of binary input bits of an input data signal into a first bit group and a second bit group, generate a first intermediate bit group and a second intermediate bit group by manipulating the first bit group and the second bit group differently based on a value of the first bit group, and generate a first symbol group and a second symbol group by encoding the first intermediate bit group and the second intermediate bit group, each of the first symbol group and the second symbol group including a plurality of symbols, and each of the plurality of symbols having three different voltage levels. The transmitter includes a driver configured to generate an output data signal by concatenating the first symbol group and the second symbol group.

FIG. 1