

High Density Bi-Polar 3 (HDB3)

Chapter 10

As this was introduced to suit for the transmission process, converting AMI codes to HDB3 is called trans-coding. Nature of voice is that it is 50% efficient. The repeater clock cannot be regenerated. Hence HDB3 coding technique is used. There are four rules for HDB3 coding.

- I. More than three consecutive zeros are not allowed to be present in the waveform. For the fourth '0' introduce a *Violation bit*.
- II. Violation bit has to be of the same polarity as the previous mark.
- III. Two consecutive violation bits has to be of opposite polarity.
- IV. If the number of marks between two consecutive violation bits is even the format should be **B00V** where B is a stuffing bit and of opposite polarity to the previous mark. If the number of marks is an odd number the format should be **000V**.

Some examples :-

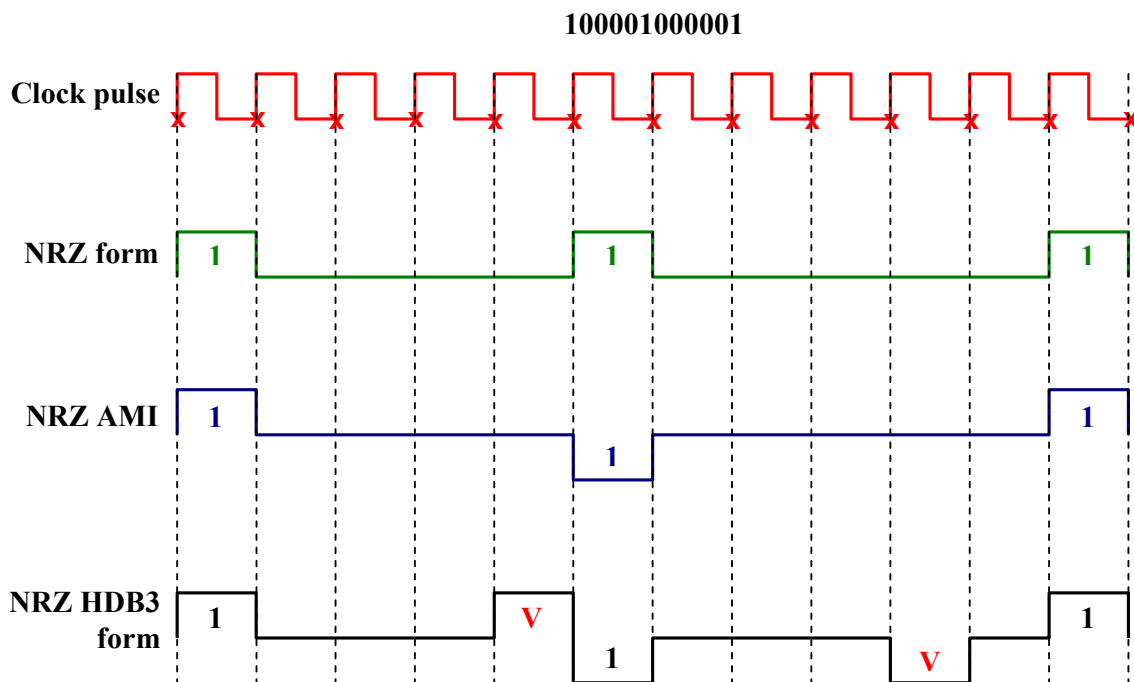


Figure 10.1

The receiving exchange will get $1^+0001^+1^-0001^-01^+$. Suppose that these coded values are sent from exchange A to exchange B. After coding the 1st mark it keeps its value in its memory. When B receives a 2nd consecutive positive mark, it immediately decides that a violation has taken place. Therefore B takes the second mark as a zero. When two more negative marks come, again B identifies them as another violation. The latter mark comes after 3 consecutive zeros. Therefore it cannot be a stuffing bit as only two zeros are followed after the stuffing bit. Then B decides that the latter mark should be a zero. Hence the final sample becomes 100001000001.

100001100001

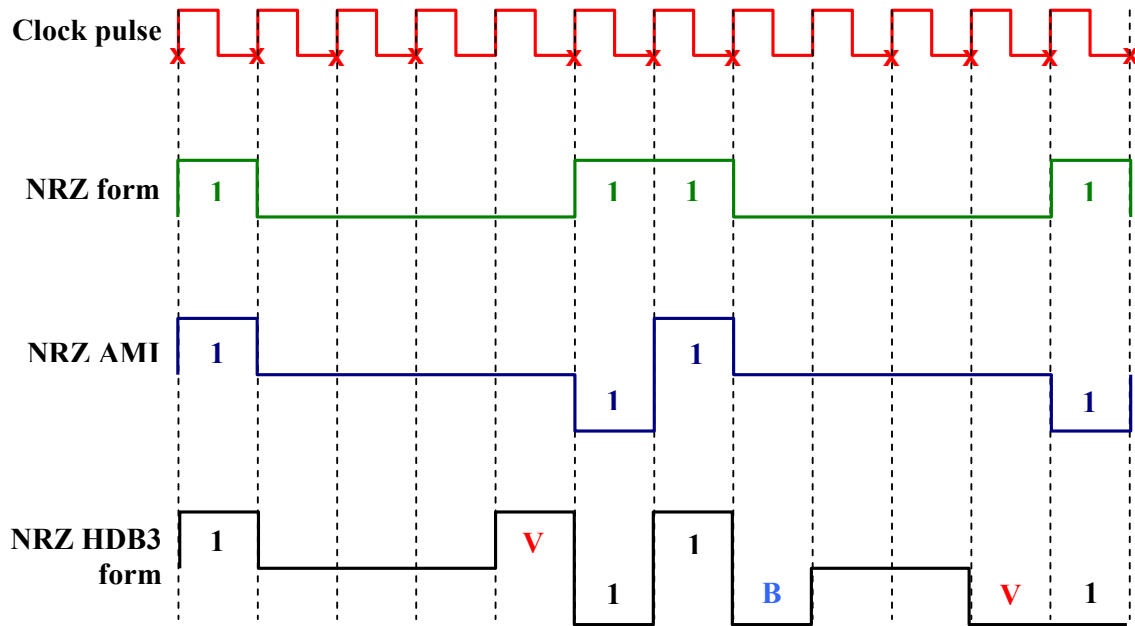


Figure 10.2

100001000001

Assuming that the previous bit was a positive mark this series of zeros will be coded according to HDB3 rules as follows.

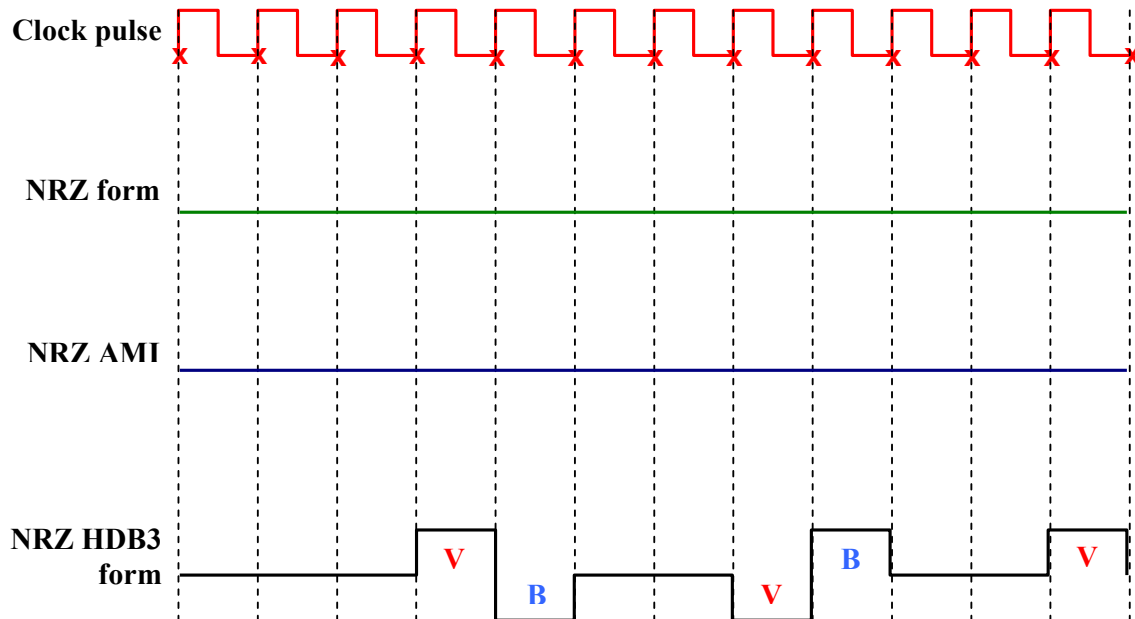


Figure 10.3