

Chapter 3

3.1 Interleaving Methods

In digital transmission a voice sample is converted to 8 binary bits. These bits will be sent in 3.9us to the other end through the transmission media if the multiplexing used is CEPT (Committee of European Post and Telecom). Is it necessary to send these 8 bits in serial in 3.9us. Other wise if we use 8 media in 488ns the sample information will be received at the other end. The latter method is not used due to the following reasons.

1. Instead of one transmission media 8 transmission media to be used. Hence cost is high.
2. Even 8 transmission medias deployed it will not have similar characteristics for the buts in transmission. Leading the receiver to deploy additional techniques to synchronize the bits for a word. **Here a word means a sample information of 8 bits.**

Hence in the basic PCM of 2.048 Mbps always 8 bits pertaining to sample information is sent serially. Since there are 32 Time Slots (30 channels are multiplexed in the CEPT system) . All the bits pertaining to a sample are serially interleaved and sent in one transmission media. But when a multiplexing is carried out in the higher order the basic information to the higher order multiplexer is a bit pertaining to a primary tributary of 488ns and not 8 bits pertaining to a sample. Two interleaving methods can be adopted. They are as follows

1. Bit Interleaving- As explained earlier four bits of 4 primary tributaries are multiplexed together as one time slot on the higher tributary. This is shown as follows.

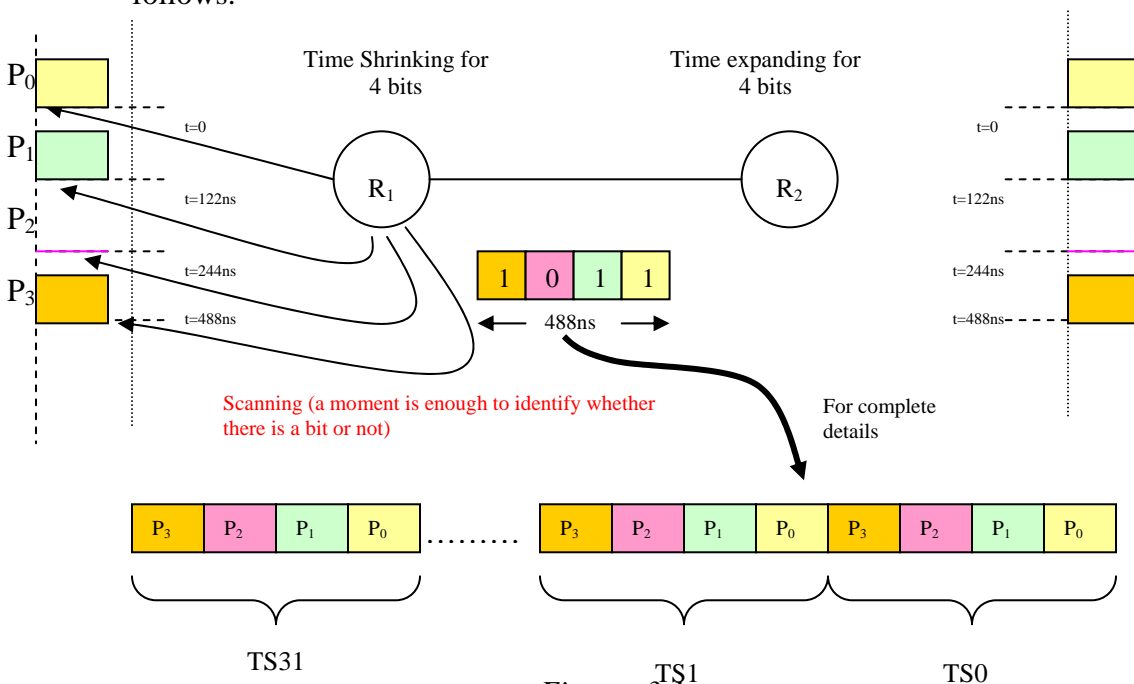


Figure: 3.1

2. Word (Byte) Interleaving- In this method the scanning of each bit is similar to above while transmission on the higher order PCM, all these scanned primary information for a particular Time Slot of Primary tributary will be stored and sent serially in the higher order PCM as one time slot but not in 3.9us. In the case of 8.448 Mbps this time slot will carry 8 bits in  $117 \times 8 = 936\text{ns}$ .

In the practical situation Bit Interleaving deployed due to treatment of practical primary PCMs non alignment of clocks and will be discussed in detail. While the word Interleaving is deployed in circuit switching systems where all the primary PCMs to the switching network is synchronized. It should be bear in the mind for Synchronous Digital Hierarchy word interleaving is used and is further discussed under SHD section.