University of Diyala

Telecom Switching Systems

Lecture 7

4th Stage

Communication department / Engineering collage

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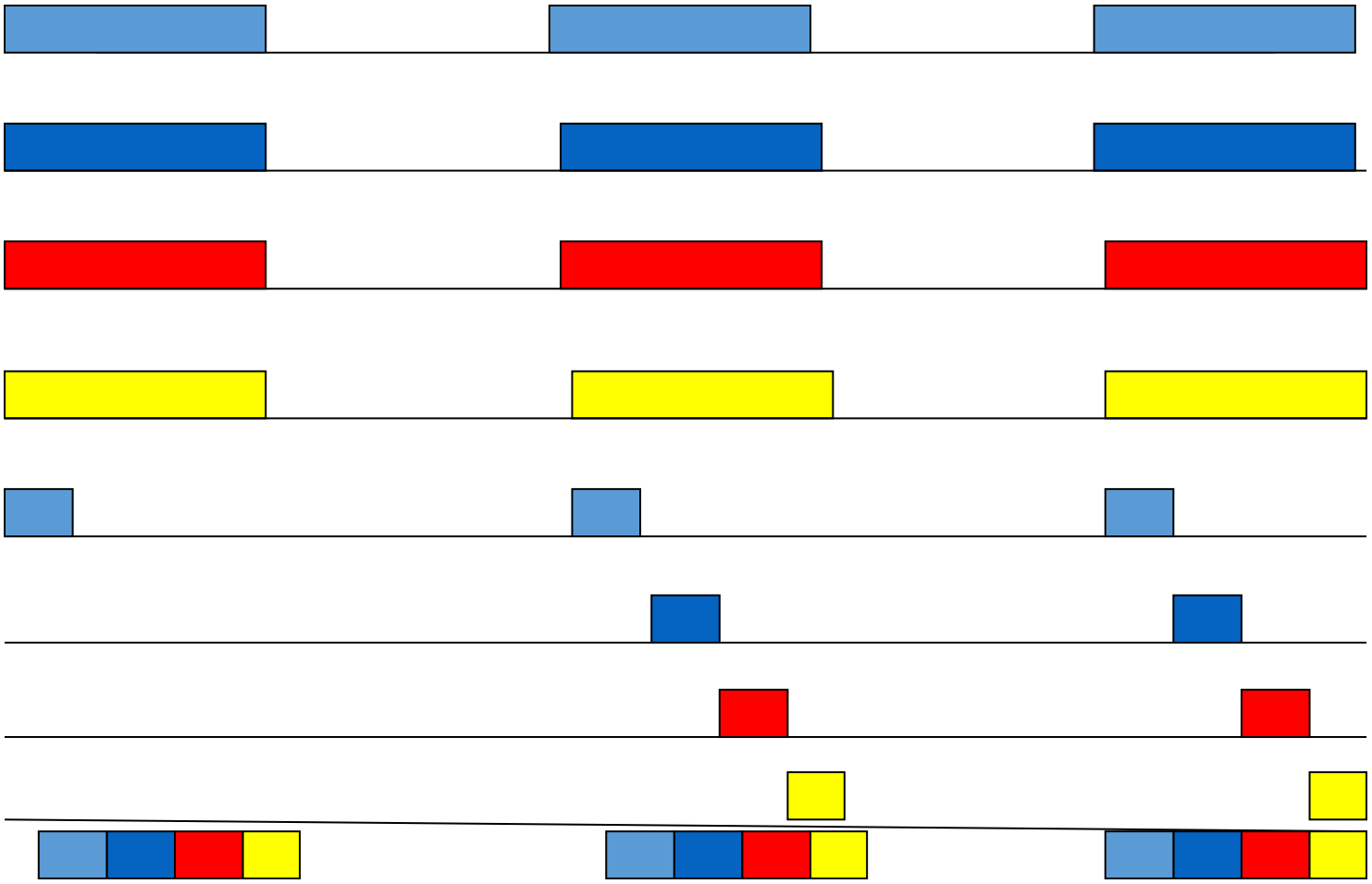
- In bit interleaving, one bit is taken from each tributary in turn. The frame length is the same as for primary multiplex, i.e. 125 µs, since this is determined by the basic channel-sampling rate of 8 kHz.
- When N inputs are combined, the digit rate of the higher-order frame is more than N times the digit rate of the input frames. This is because it is necessary to add extra “overhead" digits

Interleaving

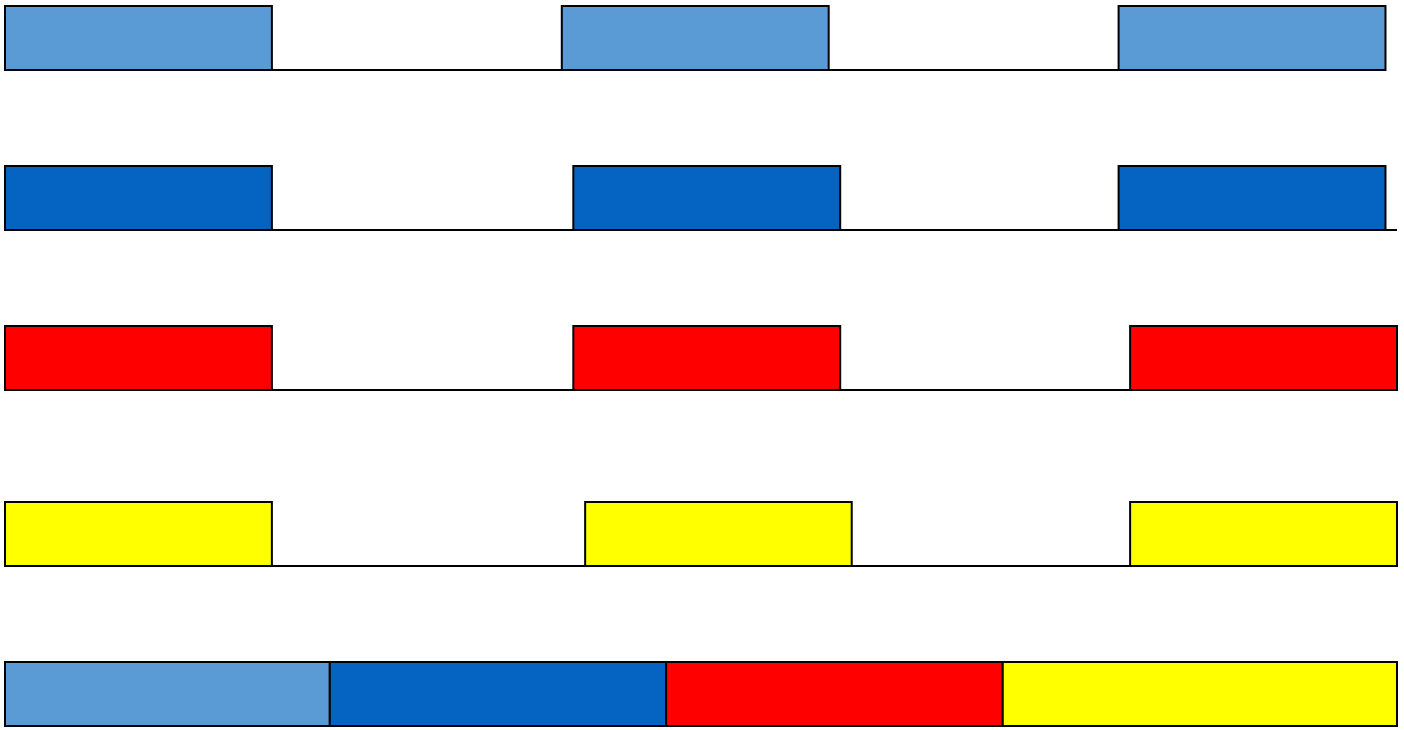
- Byte interleaving sets some restraints on the frame structure of the tributaries and require great amount of memory capacity.

- Bit interleaving is much simpler because it is independent of frame structure and also requires less memory capacity.

BIT INTERLEAVING



BYTE INTERLEAVING



PDH advantages and limitation

PDH advantages include:

- Equipment small enough for use in street cabinets
- Good for point-to-point connections

PDH Limitation:

They used expensive modulators and demodulators as well as filters for each voice channel and so a more cost-effective type of exchange equipment was needed to meet commercial needs

The synchronous digital hierarchy SDH

Increasing demand for network bandwidth virtually dictated the use of synchronous optical technologies that were both standardised and scalable, and led to the development of:

- *Synchronous* Optical Network (SONET) in North America
- Synchronous Digital Hierarchy (SDH) in Europe and the rest of the world.

The synchronous digital hierarchy (SDH):

Networks are becoming fully digital, operating synchronously, using high-capacity optical-fiber transmission systems and time-division switching. It is advantageous for the multiplexers used in these networks to be compatible with the switches used at the network nodes, i.e. they should be synchronous rather plesiochronous

WHY SDH?

- High Transmission Rates
- Simplified Add & Drop Function
- High Availability and Capacity Matching
- Reliability
- Future Proof Platform for New Services
- Interconnection

The basic SDH signal, called the synchronous transport module at level 1

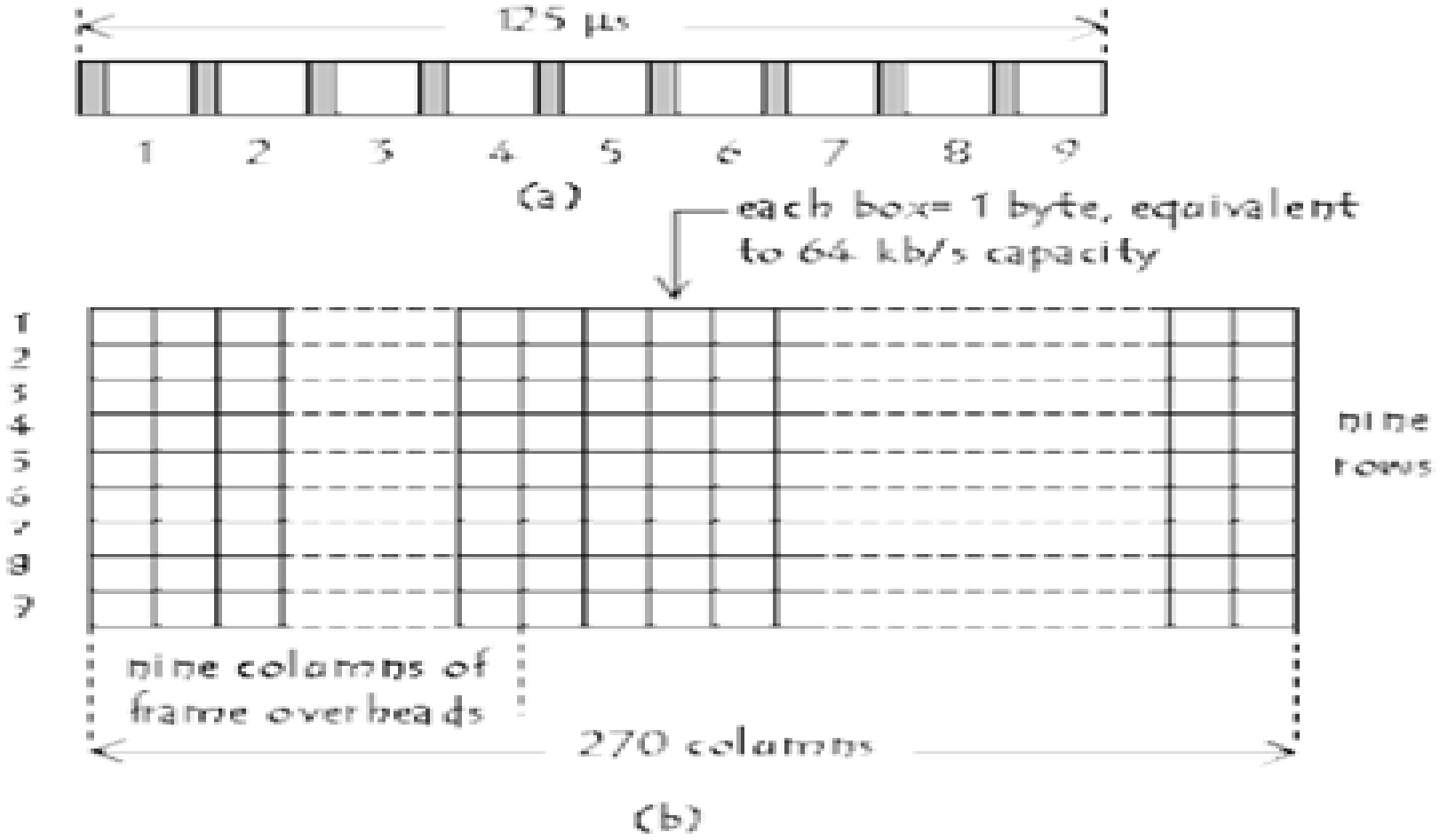


Fig. – SDH: frame stracture of STM-1
(a) On line frame stracture
(b) Frame stracture shown in rows and colamns