

Chapter 7

There should be a signalling method for two exchanges to communicate. Before that, signalling between the subscriber and the exchange should be analyzed.

There are two main features in signalling.

- I. Get the attention of the other
- II. Pass the message

To understand these features take the example of a situation you wanted to talk and pass a message to some other person. First you must get the attention of that person. To get the attention you call out his name. After verifying that he is listening you pass the message. While passing the message you want to know whether he is aware of what you are saying or in other words paying attention to your message (i.e. eye contact).

Same thing happens in telecommunication signalling. Every telephone is connected to the telephone network all the time. But when the subscriber does not need its service, the connection is disabled. In other words, the telephone exchange is sleeping relative to that appropriate telephone.

When the subscriber wants to take a call to another person, first he picks up the receiver. What happens when he picks up the receiver?

The telephone and the exchange are connected with two copper wires. One copper wire is connected to a relay and a negative battery while the other is earthed, making a loop. But the loop is open when the receiver is in its cradle. When the receiver is picked up, the loop gets completed and announces its need to the exchange. By picking up the receiver the subscriber wakes the exchange and gets its attention.

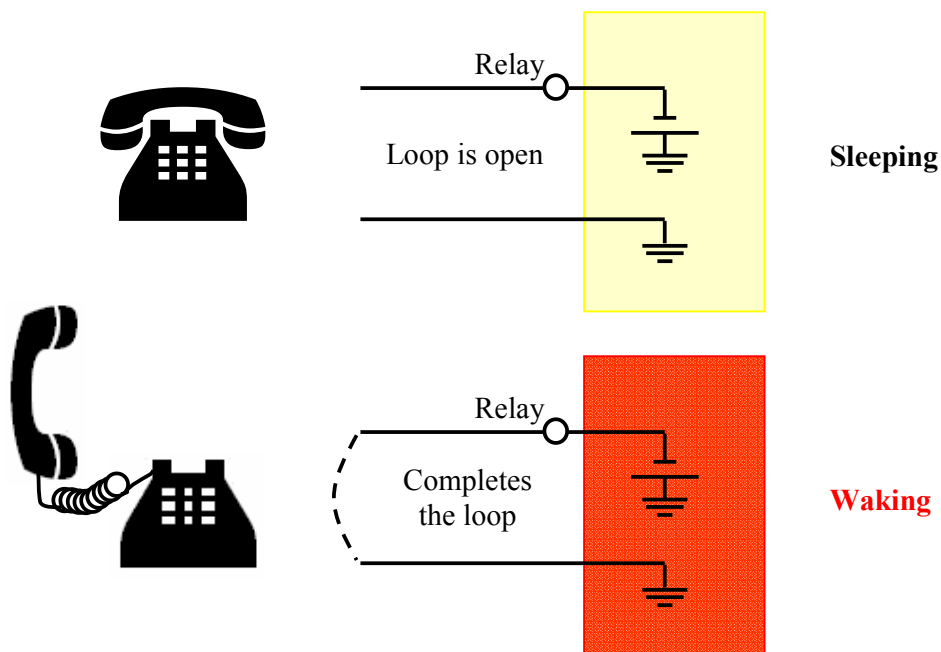


Figure 7.1

The same thing goes on for communication when signalling between two exchanges occurs. The exchange which wants to get connected to a subscriber from another exchange needs to its attention first. Switching takes place after that.

Two kinds of signals are introduced at this stage.

- I. Register signals
- II. Supervisory signals

Although our telephones are connected to the exchange, the exchange is inactive until the receiver is picked. By picking up the receiver the subscriber gets the attention of the exchange like in figure 7.1. Supervisory signals are used from this moment until the receiver is back on the cradle.

The exchange then wakes up and sends out a dial tone. Then dialling take place which is like calling the persons name in the example. Register signals are used for this purpose. Therefore register signals are always prior to voice. After getting connected the subscriber will be able to pass any message.

From picking up the receiver until the end of the connection, the exchange should be aware of this call which is like checking whether the receiver is paying attention in the example on previous page. Supervisory signals are used for this purpose. Hence supervisory signals are ON throughout the whole time until the connection is cut.

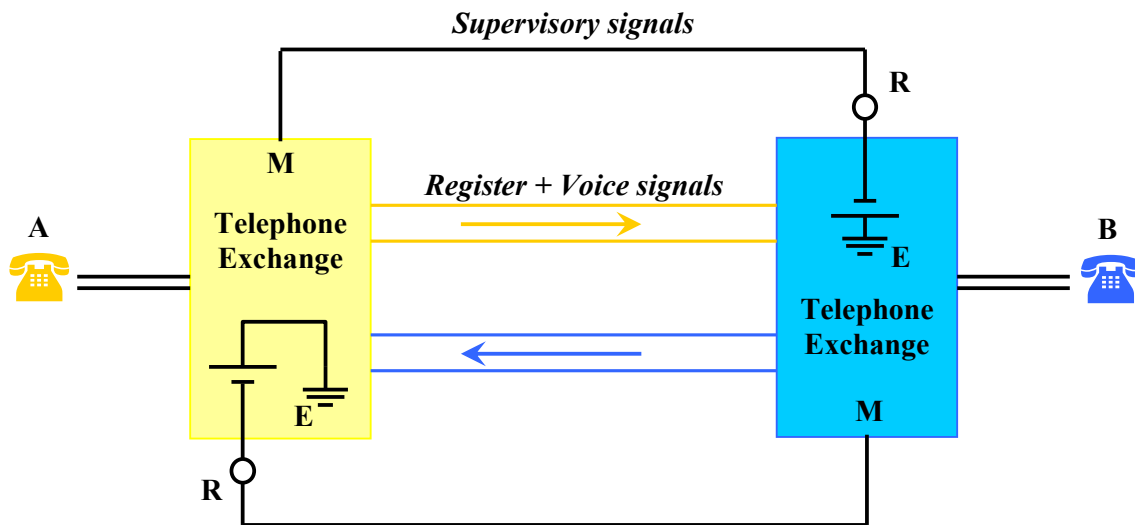


Figure 7.2

As can be seen in figure 7.2 register signals can be sent using the voice path as register signals are always prior to voice. But supervisory signals are present even with the voice. Hence there should be another way to send supervisory signals. Another wire was set up for this purpose. Altogether there are 6 wires connecting any two exchanges. This is shown in figure 7.2.

The register signals are sent by the time slot the telephone channel allocates. But as supervisory signals are ON all the time, they cannot be transmitted using the same time slot. Another timeslot should be used.

Hence TS16 of every frame is used to send supervisory signals.

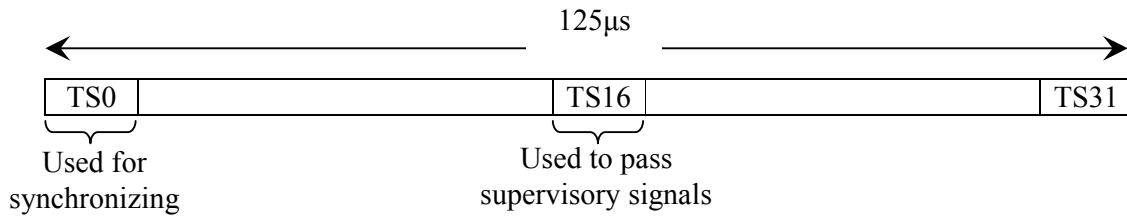


Figure 7.3

Like every timeslot, TS16 is composed of 8 bits. The CCITT recommended that only the supervisory signals of two channels should be sent from a TS16. Therefore 4 bits of TS16 is used for one channel and the other 4 for another. Hence information of only two channels could be sent through TS16 in a single frame.

Out of 30 subscribers only the information of two can be sent along within the same frame. This was a problem. To avoid this problem engineers came up with a multi-frame concept where a multi-frame consists of 16 frames numbered 0-15.

TS16 of frame 0 is used for multi-frame synchronizing. The first half of TS16 in frame 1 is used to pass the information of channel 1 while the other half is for channel 17. Likewise TS16 of the last frame (frame 15) contains information on channel 15 and 31. This procedure is shown below.

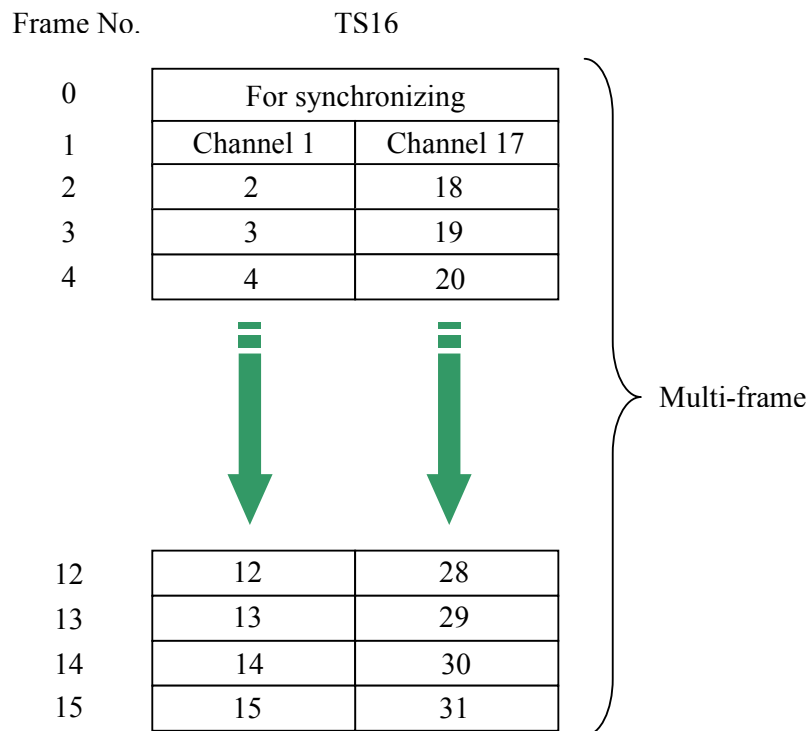


Figure 7.4

This method of sending information of all the 30 subscribers using a multi-frame is called Channel Associated Signalling (CAS).

Diagram of a frame

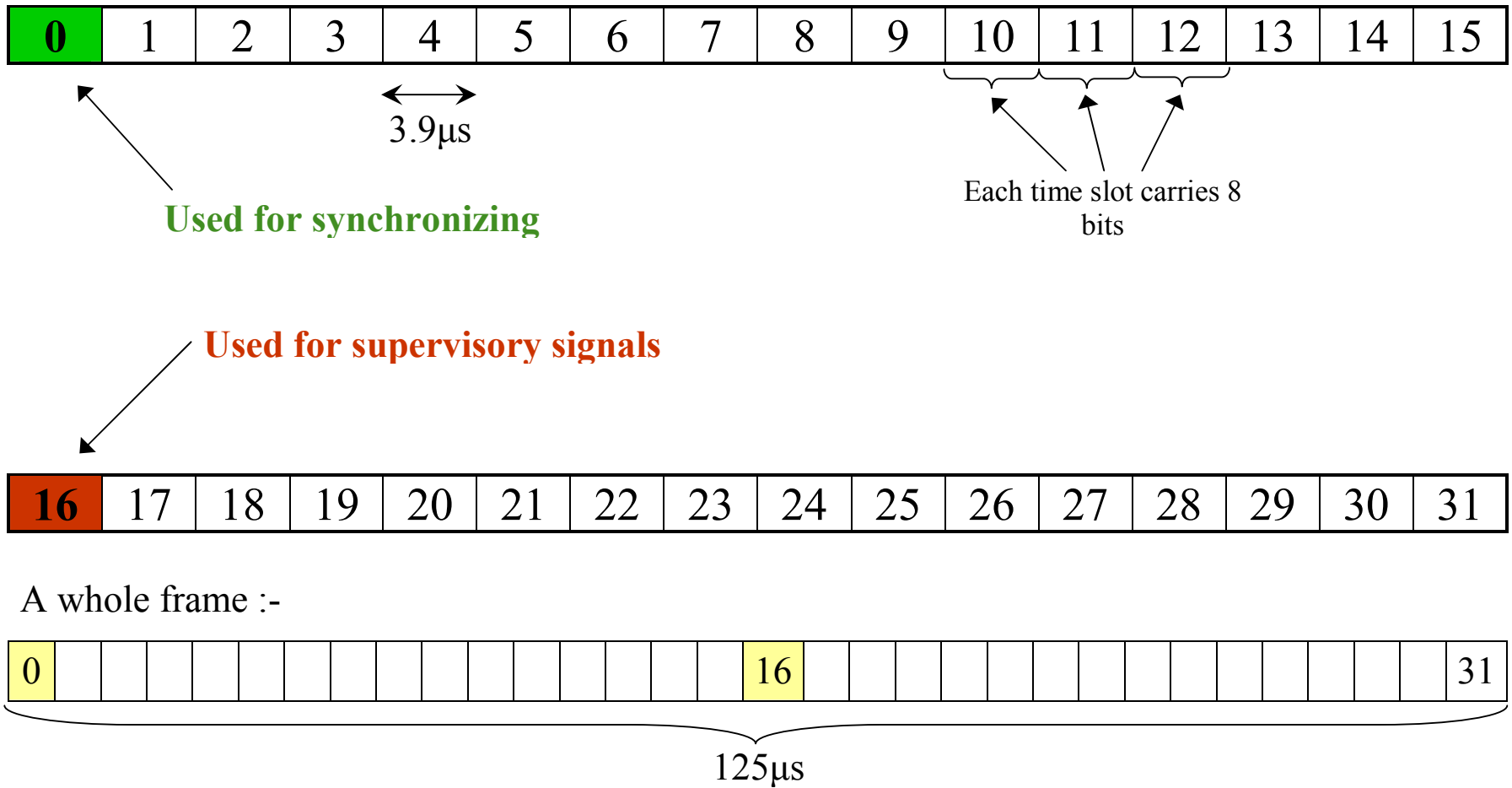


Figure 7.5