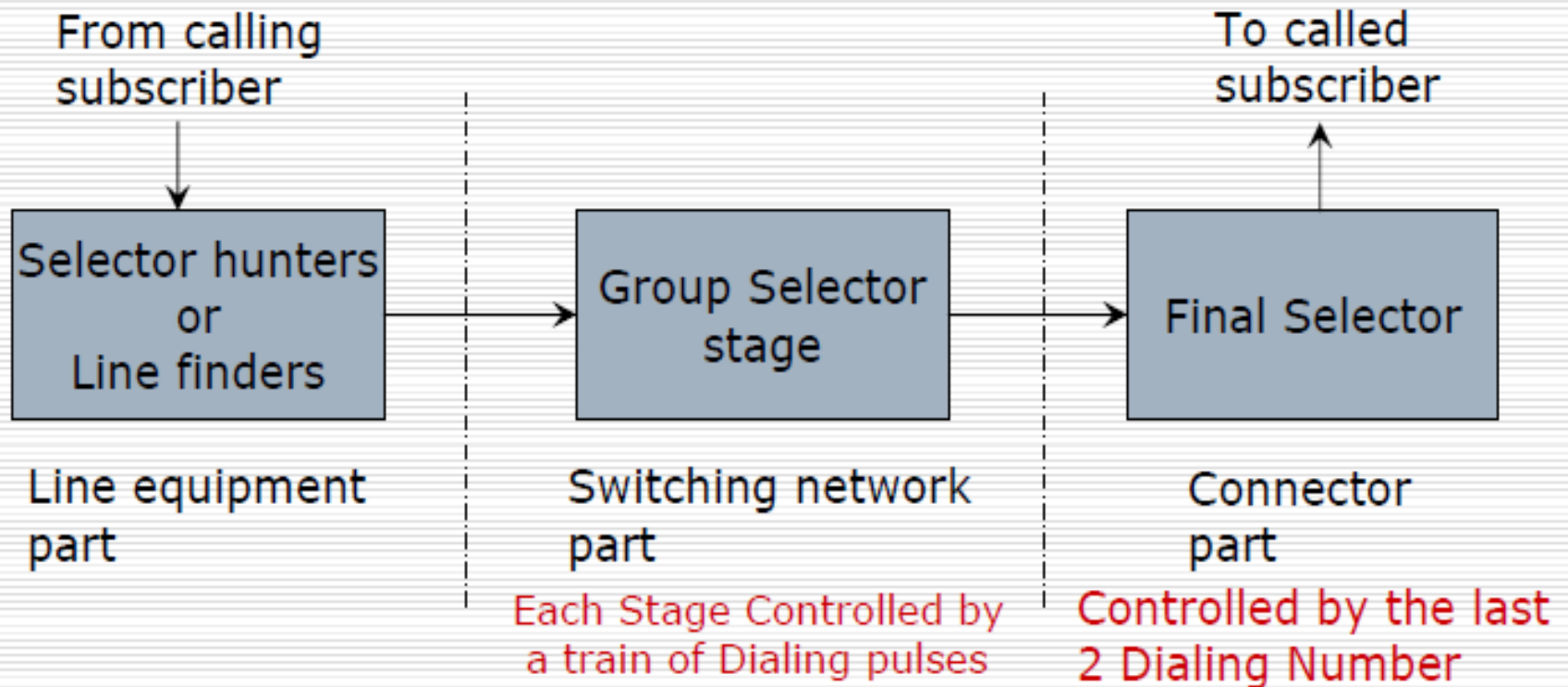


Step-by-step Switching

□ Configuration of a step-by-step switching system



Step-by-step switching system

- The Step-by-step switching system is a very popular and widely-used switching system, which may be constructed using Uni-selectors or two-motion selectors or the combination of both. The wiper present in this switching, steps forward by one contact and then moves forward according to the number of dialed pulses or according to the signaling conditions and hence the name, **step-by-step** switching is given.

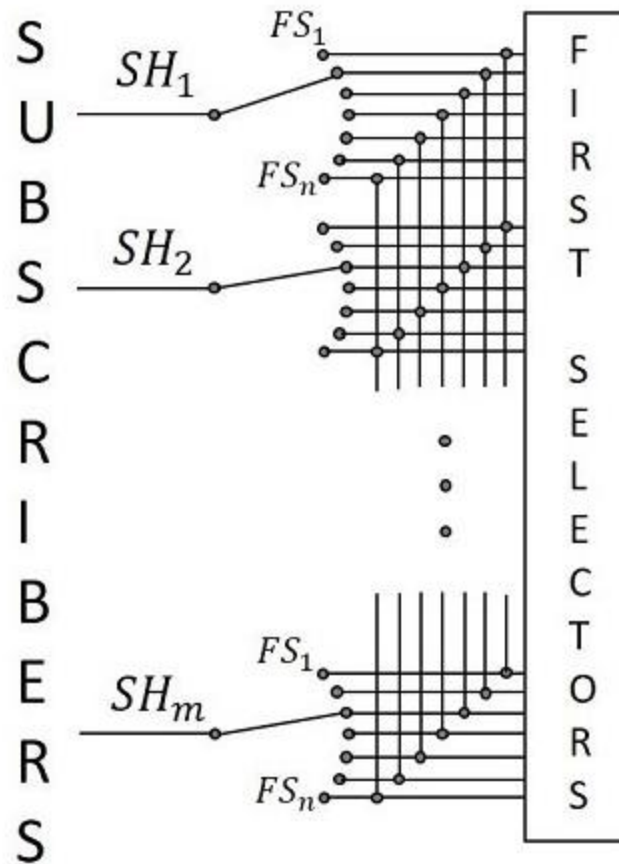
Selector Hunters

- As soon as the calling subscriber gets ready to dial the number, by lifting the handset from the telephone, a dial tone is heard otherwise, the number is not accepted. But to get that dial tone, the line has to be established when the handset is lifted up. The **Selector Hunter** circuit, establishes the line to make a call as immediately as the calling subscriber lifts up the handset to make a call.

Selector Hunters

- When a calling subscriber lifts the handset to make a call, the selector hunter activates the interrupter mechanism, which steps up the wiper until a free first group selector is found at the outlet. One of the bank contacts of the selector hunter, at this point, senses whether the first group selector is free or busy. Once a free first selector is sensed, the interrupter is disabled and the connection is established, where the first selector sends out a dialer tone to the calling subscriber.

Selector Hunters



Group Selector Stages

- The Group Selector stage has the main switching network. The calling subscriber dials the number after hearing the dial tone. The first number when dialed activates the first selector. To be more precise, the group selector consists of certain selector stages. We used to have 5 numbers as an identification number, for the land connection. Hence, there were three selector stages present.

Group Selector Stages

- When the subscriber starts dialing, the dial tone produced till then, cuts off and the pulse train is received according to the number dialed. The wiper assembly of the first selector then moves vertically upward, according to the number dialed. The wipers then move in the horizontal plane across the contacts until they come across a contact to which a free second group selector is connected.

Final Selector

- The last two digits are processed by the final selector. This selector moves vertically according to the fourth digit dialed and then it moves horizontally according to the last digit, as there are no further digits to connect it to some other connector. The last digit dialed, establishes electrical connection to the called subscriber.

Design Parameters

□ Design parameters

- Number of subscriber lines, N
- Total number of switching elements, S
- Cost of the switching system, C

$$C = S \times C_s + C_c + C_{ch}$$

- C_s – cost per switching element
 - C_c – cost of the common control subsystem
 - C_{ch} – cost of the common hardware
 - Switching capacity, SC
-

□ Traffic handling capacity, TC

$$TC = 2(SC)/N$$

$TC = \text{switching capacity} / \text{theoretical maximum Load}$

□ Equipment utilization factor, EUF

$$EUF = (\text{number of SE in operation}) / (\text{total number of SE})$$

SE stands for Switching Element

□ Number of switching stages, K

□ Average switching time per stage, T_{st}

□ Call setup time, $T_s = KT_{st} + T_0$

□ Cost capacity index, $CCI = SC / (C/N)$

T_0 is the time required for functions other than switching. T_0 is a significant quantity in common control systems where control functions are separated from switching functions. In stroger (direct control system), T_0 may be ignored.

$$\text{CCI} = \text{switching capacity/cost per subscriber line} = \text{SC}/(\text{C}/\text{N}) = \text{N}(\text{SC})/\text{C}$$

❖ The higher the value of CCI, the better is the design