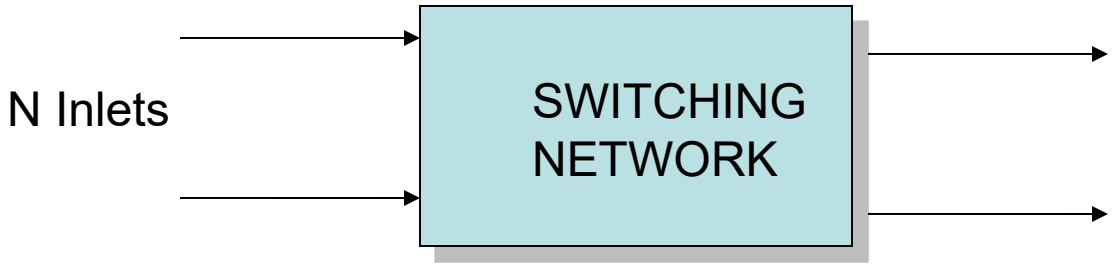
INTRODUCTION TO TELEPHONY

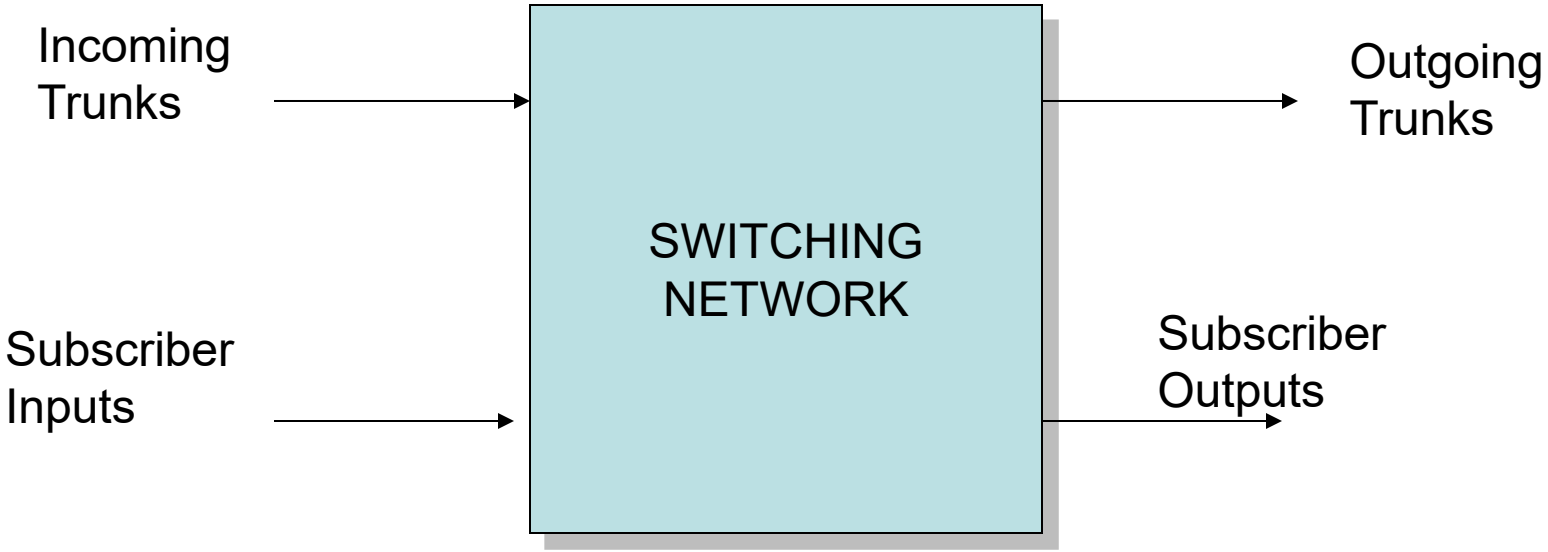
EEEN 462-ANALOGUE COMMUNICATION

Friday, November 14, 2025

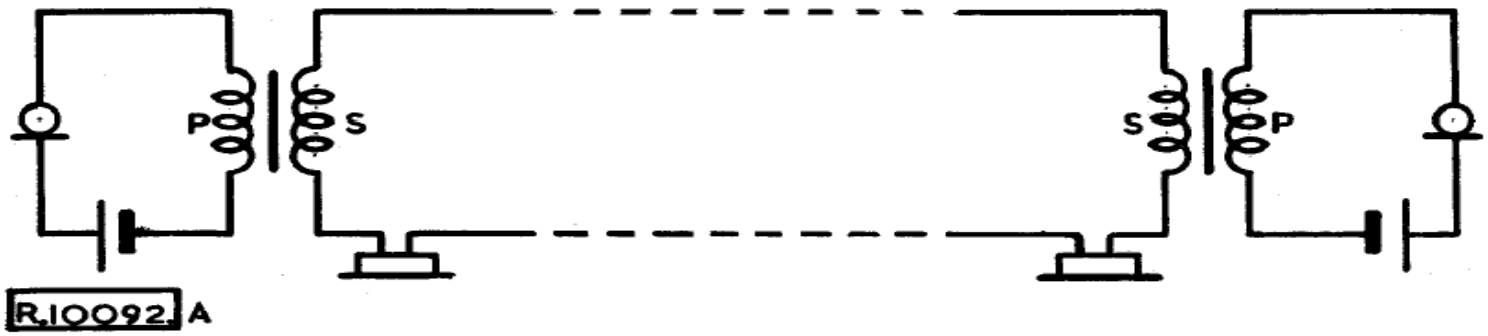
BASIC SWITCHING NETWORK

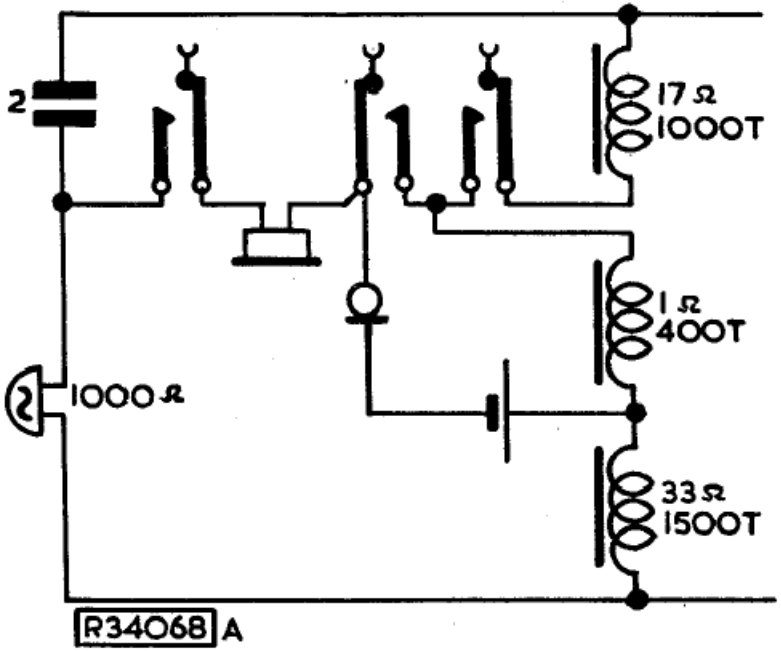


M=N : Symmetric Network



SIMPLE LOCAL BATTERY SYSTEM – OLD EXCHANGES





ELEMENTS OF A LOCAL BATTERY SYSTEM

Pair of Copper Wires

Contents:

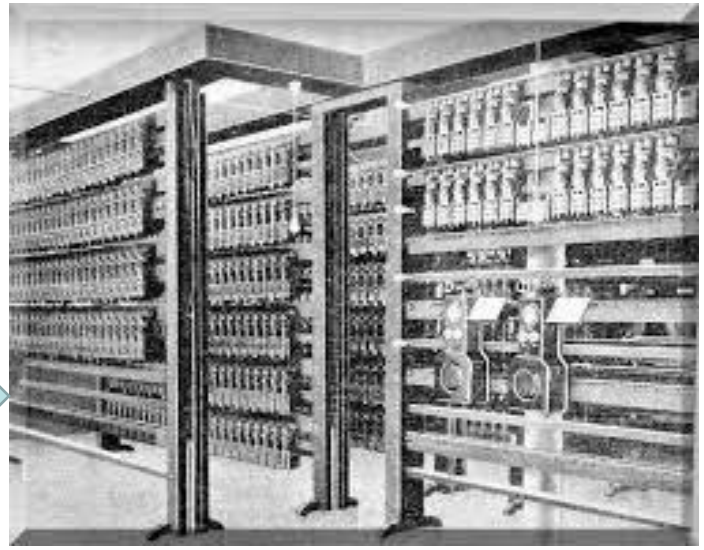
1, Ear Piece
2. Mouth Piece
3. Ringer/Bell
4. Magneto Generator

CENTRAL BATTERY SYSTEMS

Power Room

- Rectifiers
- Generator
- Battery Banks

Copper Bus-bars



Telephone Exchange Room

Pair of Copper Wires

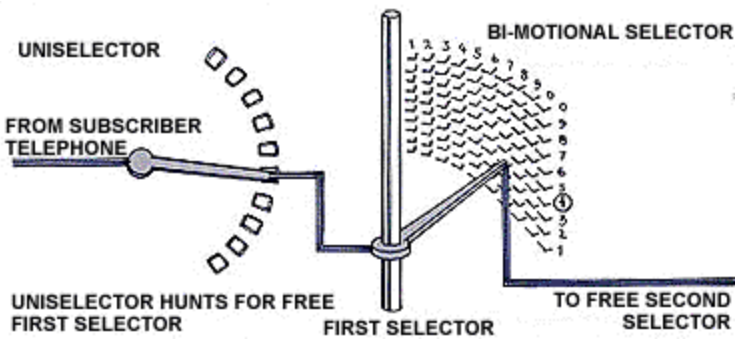
Dial Telephone

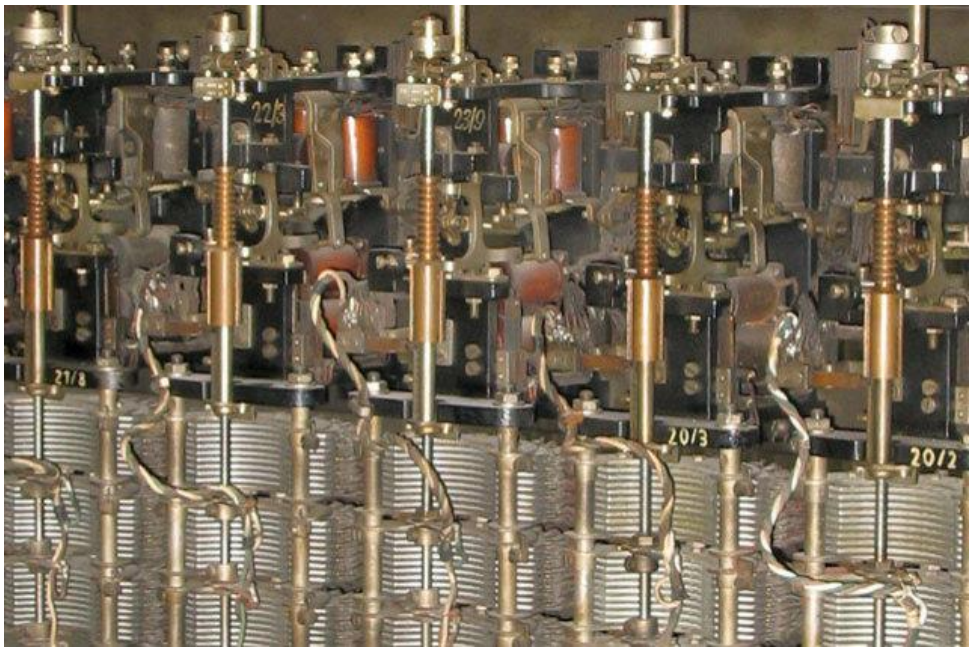
STROWGER SWITCH

Rotary dialing [edit]

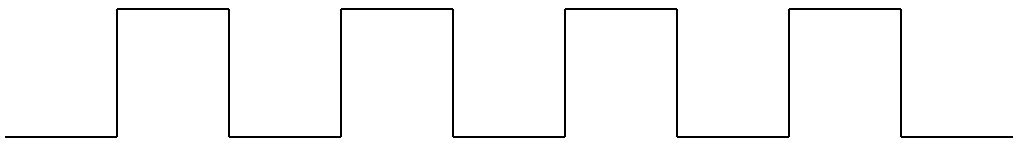
Main article: Strowger switch

Convinced that it should be subscribers, rather than the operator, who chose who was called - anecdotally, Strowger's undertaking business was losing clients to a competitor whose telephone-operator wife was intercepting and redirecting everyone who called Strowger - he first conceived his invention in 1888, and patented the automatic telephone exchange in 1891. It is reported that he initially constructed a model of his invention from a round collar box and some straight pins.





PULSE DAILING



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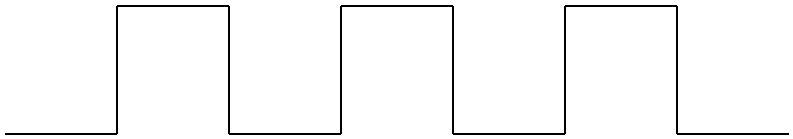

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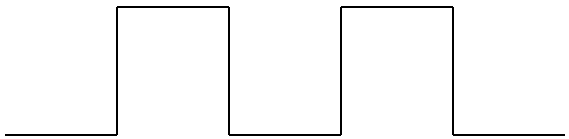

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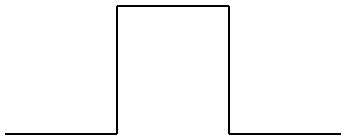
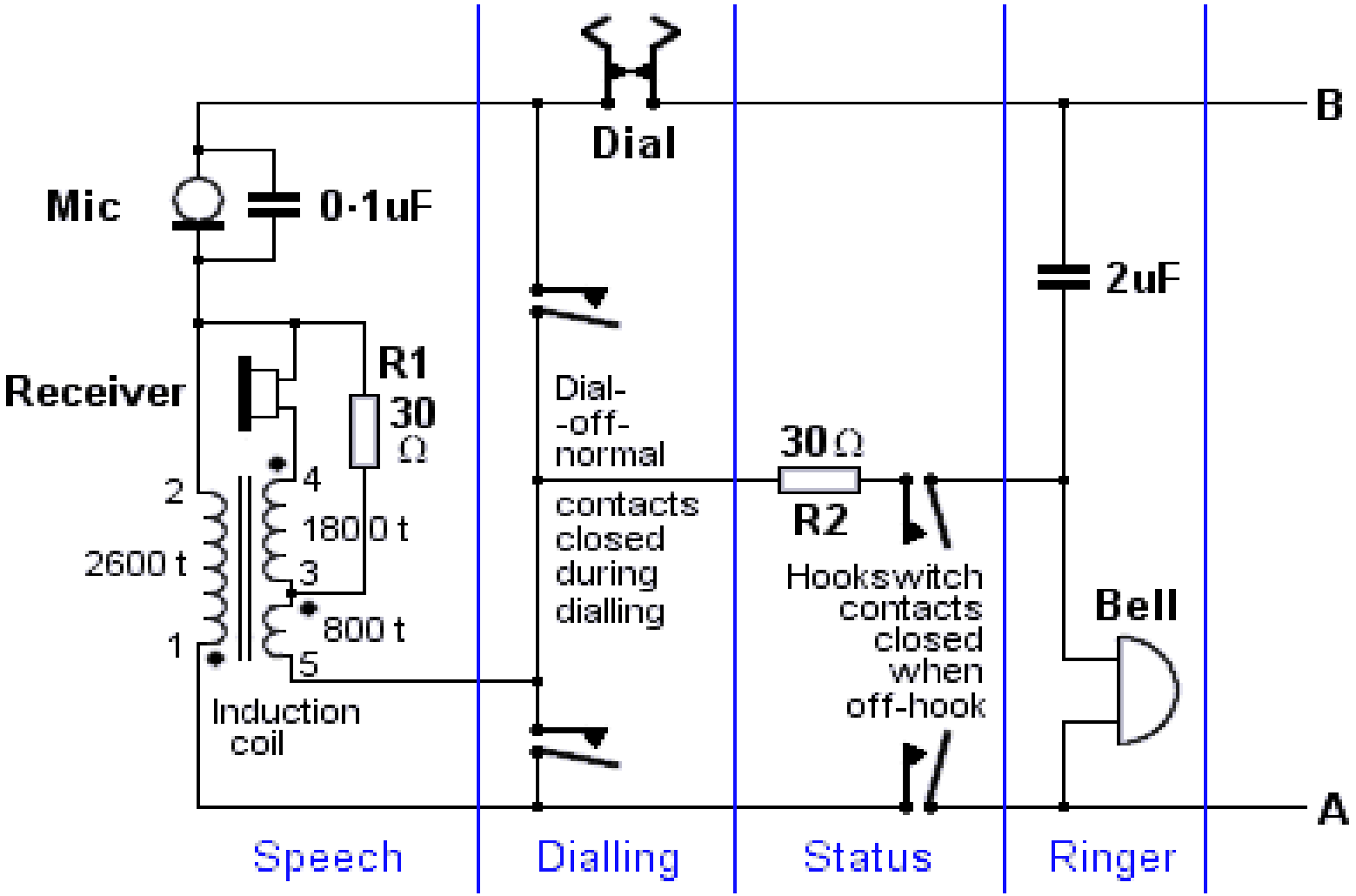
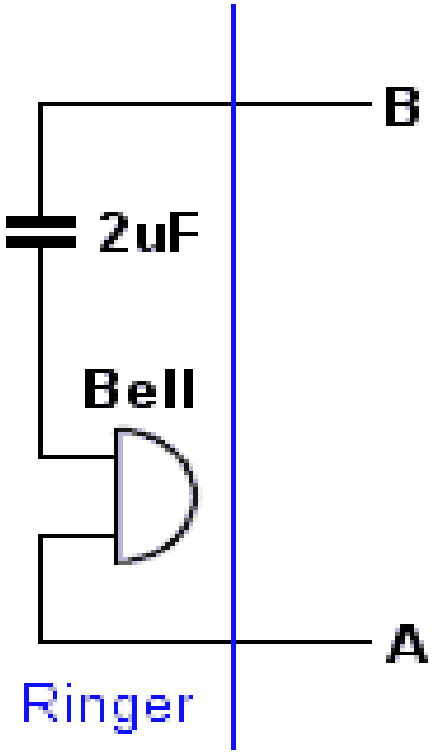


1

PULSE TONE TELEPHONE CIRCUIT

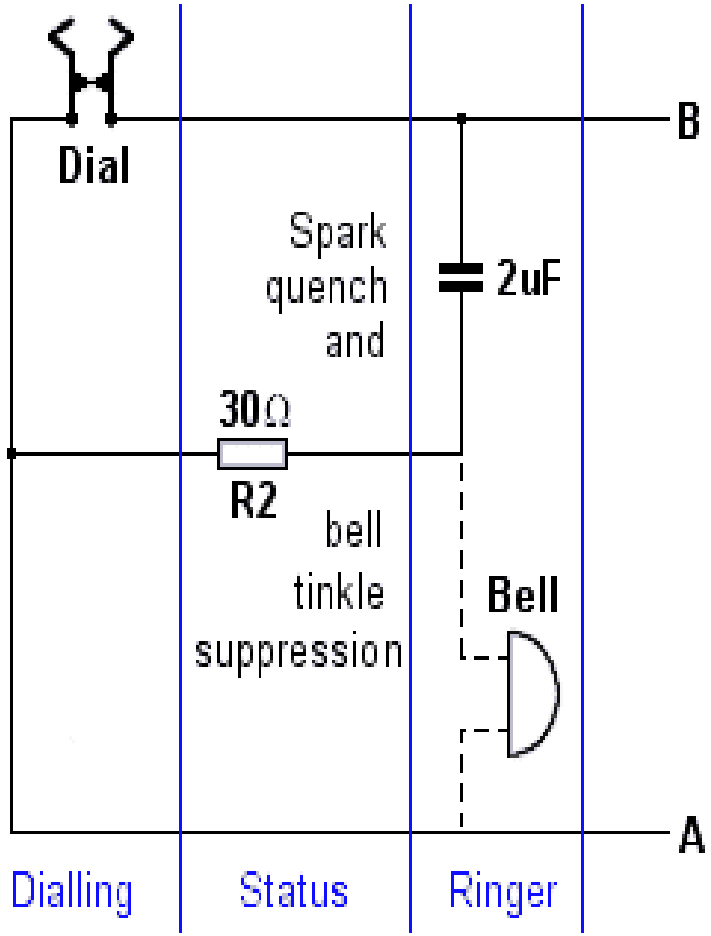


RINGER



1. When the telephone is on-hook the hook-switch contacts are open, and only the bell is connected across the line.
2. The 2μF capacitor blocks dc
3. Exchange sends 75v (rms) at 17 Hz to the line to ring the bell.

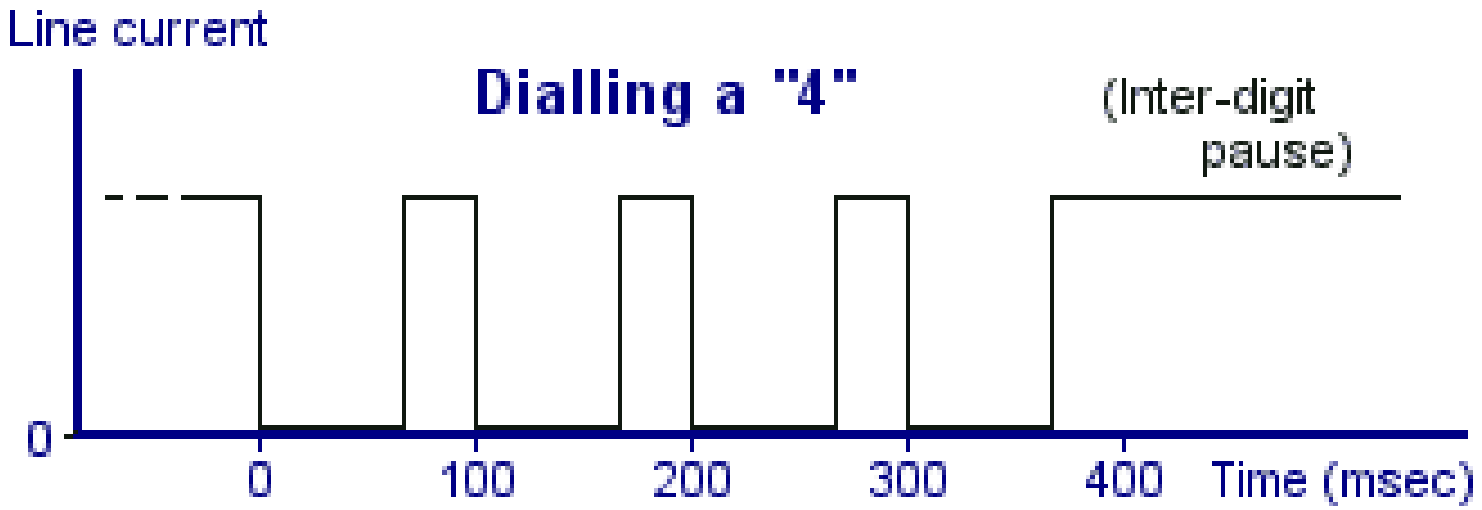
DIALING



1. The rotary dial transmits number to the exchange as a sequence of pulses by repeatedly making and breaking the line.
2. The series RC network connected across the impulse contacts modifies the pulse shape, prevents arcing at the contacts and also mutes the bell.

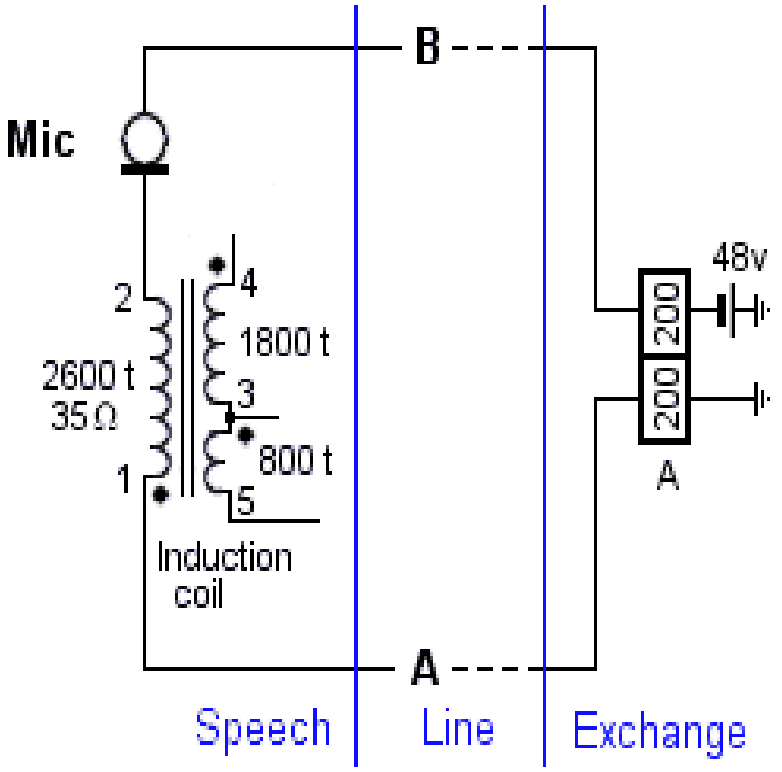
PULSE TIMING DIAGRAM

1. The dial is supposed to deliver 10 pulses per second (but the exchange equipment was designed to accept anything between 7 and 12 pulses/sec) at a make/break ratio of 1:2.



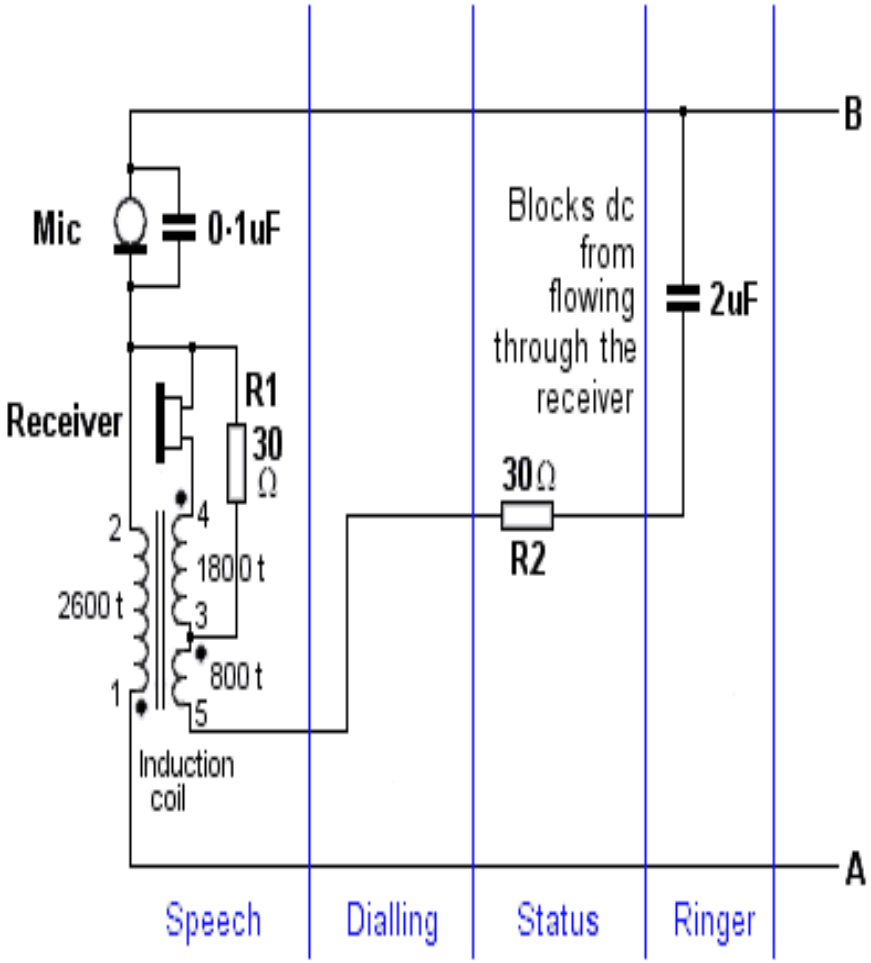
2. The actual value of line current flowing would depend on the length of the line back to the exchange and the state of the exchange battery(35 to 140 mA).

HOLDING CIRCUIT



1. When the user picks up the handset, current begins to flow in the line. The 'A' relay at the exchange operates.
2. When the call ends, relay is released.

THE SPEECH CIRCUIT



Functions:

1. Move all the signal power generated in the microphone out to the line.
2. Move all the signal power delivered by the line into the receiver.
3. Prevent any power being generated by the microphone from reaching the receiver.

STEP BY STEP SWITCH

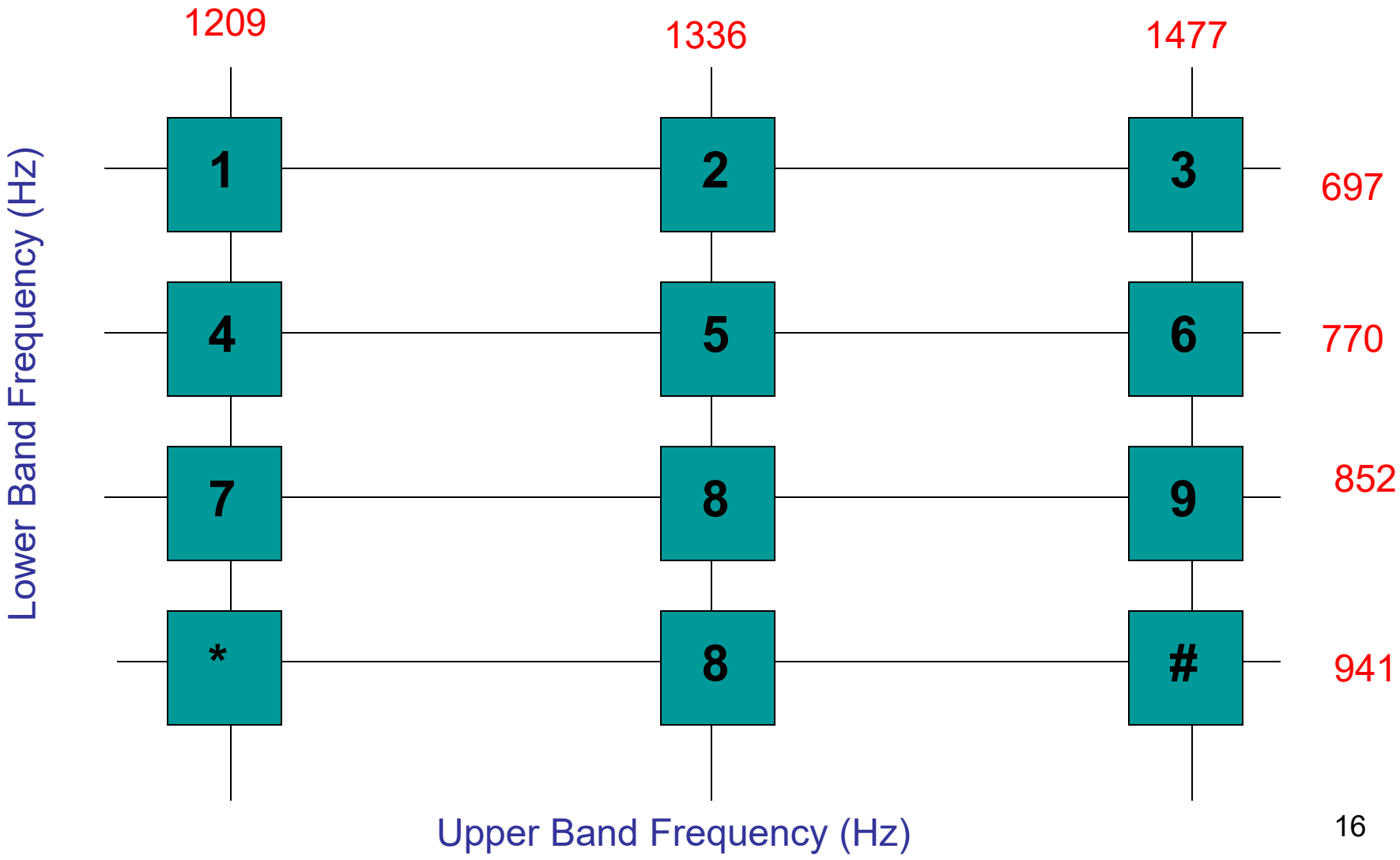
- Watch on UTube

DIAL/TOUCH-TONE PHONE

Dial-Pulse Phone

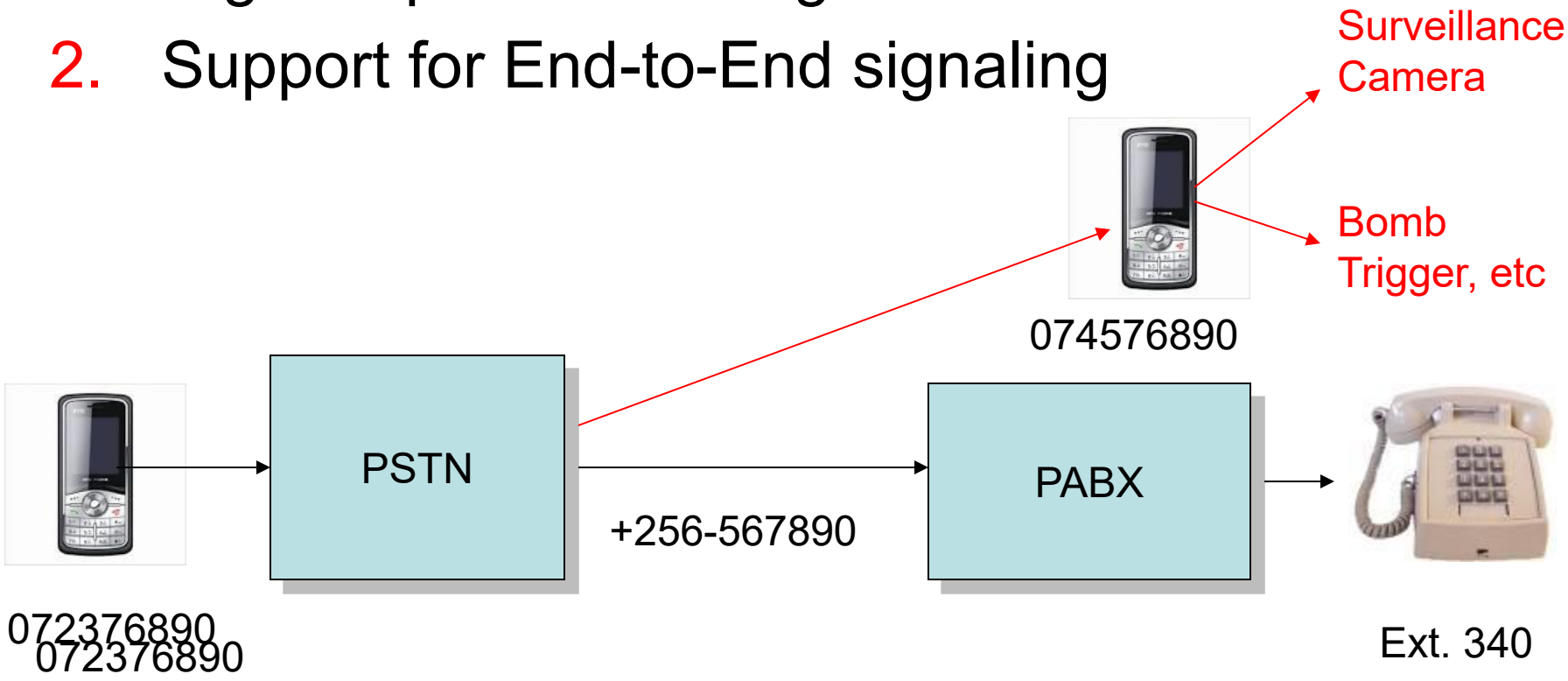
Touch Tone Phone

TOUCH TONE/MF TELEPHONE



ADVANTAGES OF TOUCH-TONE

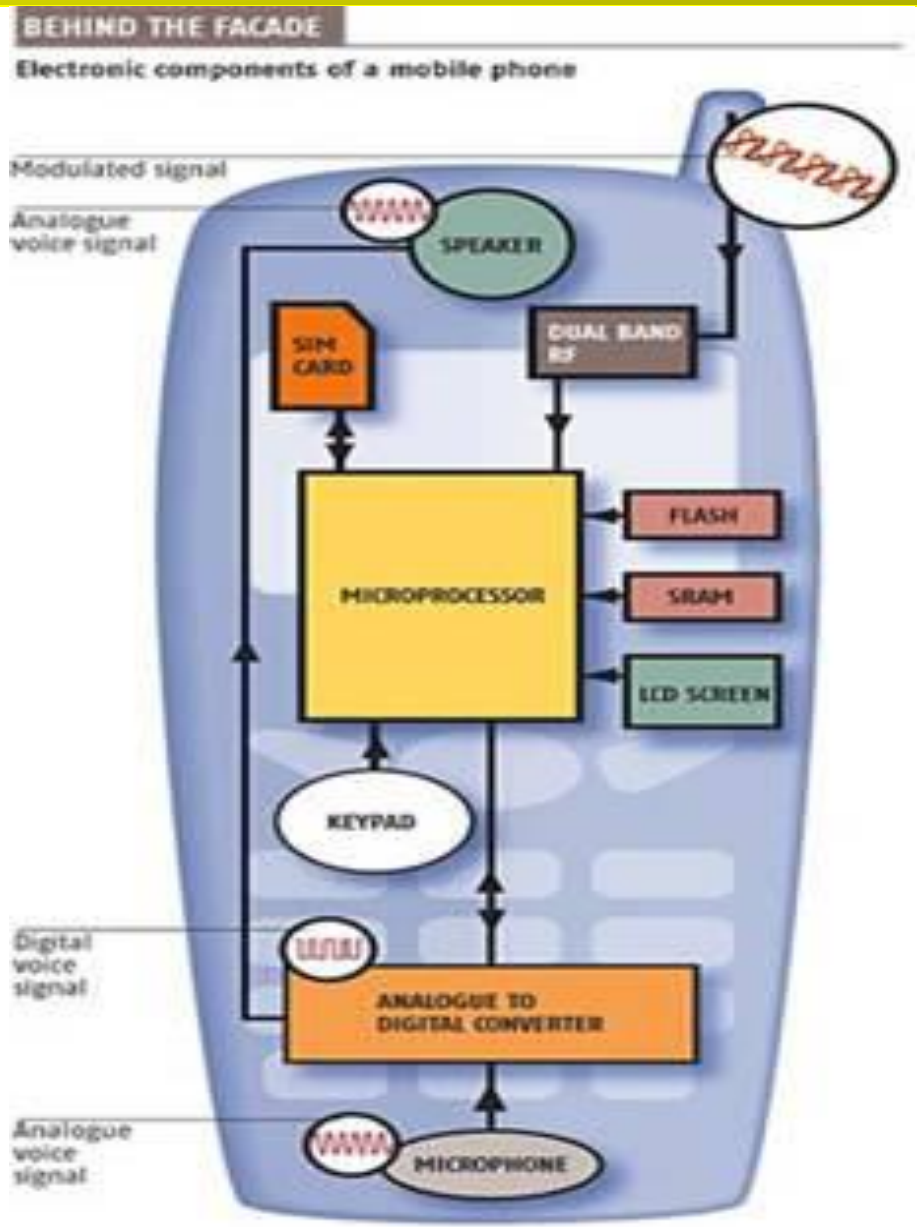
1. Higher speed of dialing
2. Support for End-to-End signaling



TOUCH-TONE DIAL TELEPHONE

1. Advantages of Touch-tone dialing:
   a) Shorter time taken to dial compared with pulse dialing which take 12 sec to dial a 7-digit number.
   b) Equipment in common control switching systems are not tied up for the whole duration of the call.
   c) End to end signaling is possible since the touch-tone-dialing works in the voice frequency band.
   d) Using push button instead of a dial in more convenient to the user.
   e) By using a combination of two sets of frequencies, touch tone can support a wider number range and more characters.

INSIDE THE MOBILE PHONE



MOBILE STATION/PHONE

- Mobile Station consists of two parts:
  1. Subscribe Identity Module contains:
     - Subscriber related information
     - PIN and PUK codes.
     - Network access information

     SIM card can be updated over the air.
  2. Mobile Equipment containing the phone hardware and firmware.