

Distribution Cabling

Telephones are connected back to their exchange via a pair of wires in a cable. Such pairs are always twisted so that each wire remains close to its partner.

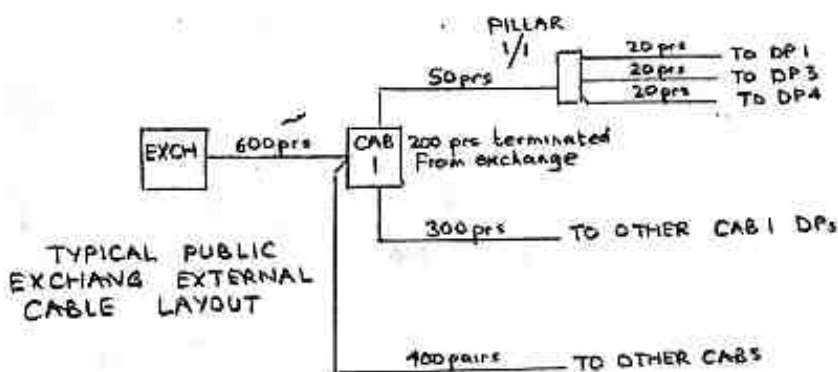
This is important as each wire is then as likely to receive the same amount of interference from other pairs as its partner. As such interference will be in the same direction in each wire of the pair, they will be in opposition at the telephone or exchange and not cause a current that will flow around the circuit. Crosstalk is due mainly to differences in the wire to wire capacitances in which cancellation cannot be perfect.

To reduce crosstalk pairs are generally laid into a cable using a twisting process which means that any two pairs do not lay alongside each other for too long.

Most small cables have a core of a small number of pairs twisted together, followed by layers of pairs which then twist in opposite directions and have different lengths of twist or “lay”

Internal cables are generally finished with a white or grey PVC sheath. External cables usually have black polythene or PVC sheaths to resist sun and ultra violet damage.

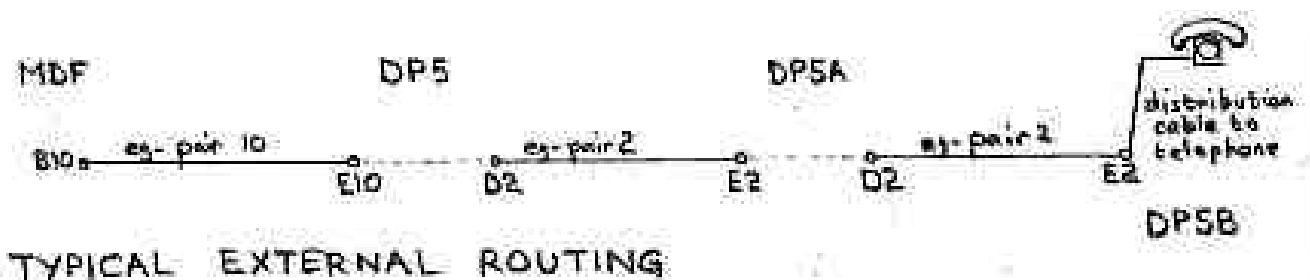
Telephone circuits can be made up of many different cable lengths. However all the cables in the circuit need to have the same characteristic impedance. If a change of impedance were to occur, then some reflection of the signal would occur at that point and this would cause a significant loss in the line. Cables used for telephony generally have a characteristic impedance of about 1200 ohms. Cables designed for data work often have lower characteristic impedances, and although often employed for telephone connections are not really suitable over longer lengths.



Cables from an exchange usually start with quite high numbers of pairs. These pairs are then connected to a number of smaller cables radiating out from the “main” cable. In turn further smaller cables may be employed, the whole arrangement mirroring a tree trunk, branches and twigs. In a public exchange system the “main” cables break down into smaller cables in roadside cabinets or pillars.

Cables start at the exchange “Main Distribution Frame” or “MDF”. They are terminated on fuse mountings on the line side of the MDF. It is useful to remember that external cable pairs generally “count down” both on the MDF and at DPs. (Note that internal exchange cables generally “count up” when they terminate on frames).

Each cable pair therefore has an MDF “bar and pair” number eg B45 when it leaves the exchange. When the pair arrives at the first DP it is terminated on the “exchange” or “E side” of the DP.



Pairs leaving the DP are terminated on the “distribution” or “D” side of the DP.

Connections from the “E” side to the “D” side pairs are made using “jumpers” or straps although in many cases the outgoing “D” cables are terminated directly onto the incoming “E” side cables.

Note that any point in the cable routing the “E” side looks back towards the exchange and the “D&” side looks on towards the telephone.

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