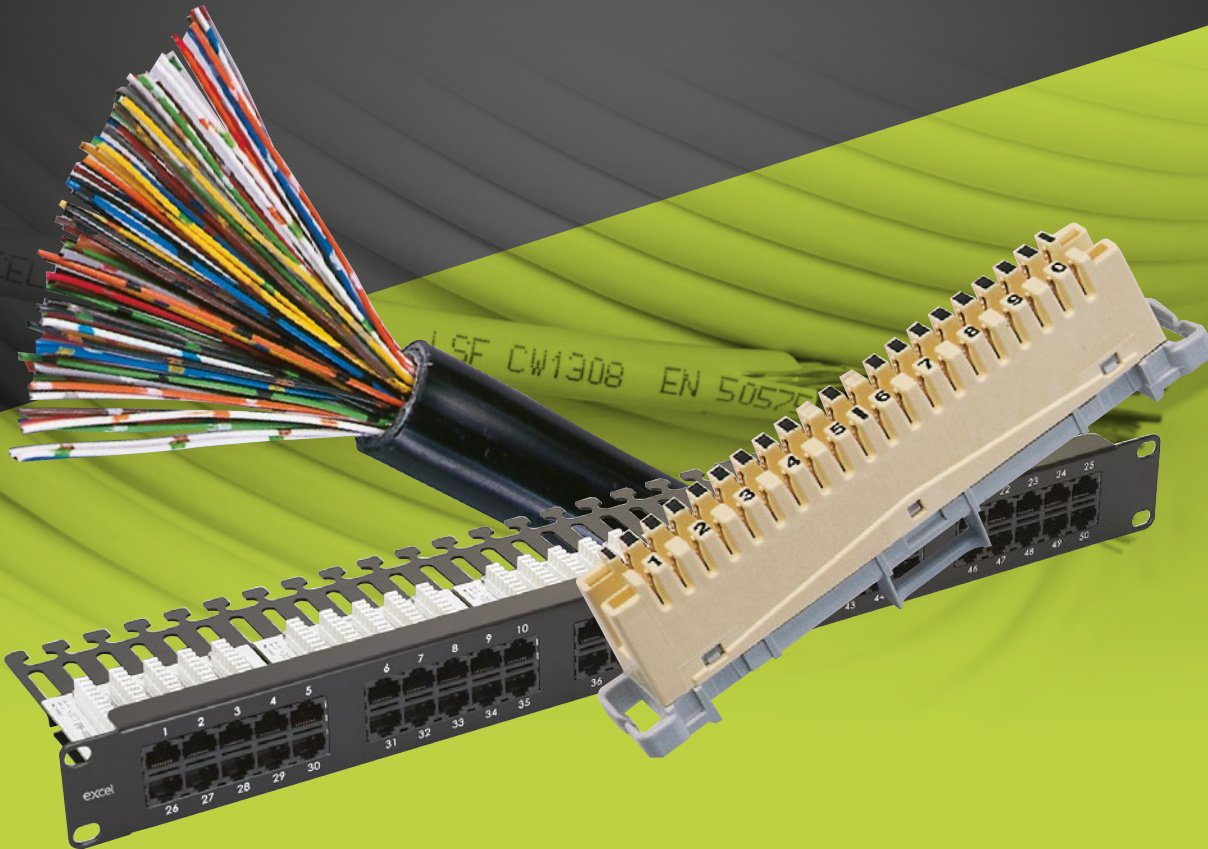


Excel Voice Cabling Systems

www.excel-networking.com/copper/voice-cabling

Section 9



Excel Voice Cabling System

The **Excel range of Multipair Voice Cabling** is an end-to-end solution that includes both cables and connecting hardware in addition to mounting frames and accessories.

This product range owes its history to POTS (Plain Old Telephone Systems) and is based on the use of Analogue voice circuits. This means its design heritage may be traced back to BT, but it, in fact, goes back even further to the original Post Office Telecoms that BT was split from a long time ago. It is not classified in the same way as the Data Cabling Systems are.

In current times, Multipair Voice cabling systems are used primarily as Emergency Back-up systems such as Emergency Lift Phones and BT RedCare etc (or for Analogue Fax Services). Therefore the Excel Range of Multipair internal telephone cables and components are manufactured in accordance with the relevant BT types.

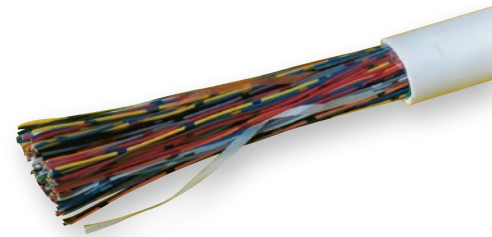
Some Tender Specifications call for Category 3 for Voice Cabling. Whilst CW1308 cables are close they do not meet the exact requirements of the Category 3 standard. They meet the requirements set out by BT.

Cables

All the **cables** start with an individual conductor, the diameter size of which is 0.50 mm Nominal.

Each conductor is insulated with PVC as per BS 6746 and the spark test is at 4.5 KVDC.

These Cores are twisted into pairs and the required number of pairs are then typically laid up in either layers for cables containing up to and including 25 pairs, or in units for items of 32 pairs and above. The pairs are colour coded for ease of identification and in larger pair count cables a coloured tape is used to wrap units of pairs to ease installation. An earth conductor of 1.38mm plain copper is included in certain larger pair count internal grade cables.



CW Cables

All cable sizes are based upon the number of pairs in the outer sheath and various lengths.

CW1308 comes in the following pair counts: 2, 3, 4, 6, 10, 20, 25, 32, 40, 50, 100, 160, 200, 320. Cables generally have a white outer sheath, however black can be supplied in certain cables.

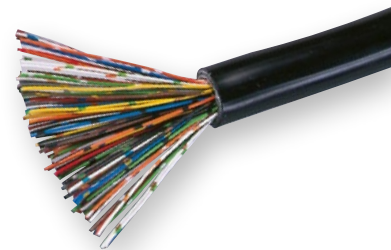
CW1308B are available in pair counts of 10, 20, 25, 50, 100, 200.

CW1128 are available in pair counts of 5, 10, 20, 50, 100. This range is also available with two further 5 & 10 pair count cables with larger 0.9mm conductors. Typically for longer distance applications.

CW1128/1198 are available in 5, 10 pairs.

Cable Construction

- **CW1308** – Internal Grade Low Smoke and Fume Cable
 - These cables are manufactured in accordance with BT type CW1308.
- **CW1308B** – Internal/External Grade Low Smoke Zero Halogen Cable
 - Is constructed in a similar way to Standard CW1308 but is suitable for Internal and External use due to a UV resistant jacket. The cable's specification is further enhanced by the use of Low Smoke Zero Halogen (LSOH) Outer Sheath.
 - CW1308B cables are also available in Euroclass B2ca
- **CW1128** – External Grade Cable
 - This range of cables is made up from conductors of solid plain copper insulated with cellular (foamed) polyethylene. These conductors are twisted into pairs and the required number of pairs are laid up into units which are identified by coloured tapes. The cables are petroleum jelly filled and sheathed in black polyethylene, and are manufactured in accordance with BT type CW 1128. Suitable for installation in external ducts that are liable to flooding for extended periods.



- **CW1128** – Armoured External Grade Cable.
 - o These cables are manufactured as the External cables detailed previously but have the addition of a steel wire armouring for direct burial applications. The cables are manufactured in accordance with BT type CW 1128/1198.
 - o Please refer to the table at the end of this section for colour code details.

Category 3 Cable

Excel Category 3 UTP Cables are manufactured, tested and verified to the EIA/TIA 568B and ISO11801 standards for Category 3 performance and are fully compliant with the IEC60332-1 specification. Cables are metre marked to avoid waste.

Cable Sizes

All cable sizes are based upon the number of pairs in the outer sheath and various lengths.

25 P	11.50 +/- 1.00 mm
50 P	15.00 +/- 1.00 mm
100 P	20.50 +/- 1.00 mm
200 P	28.00 +/- 1.00 mm
300 P	34.00 +/- 1.00 mm



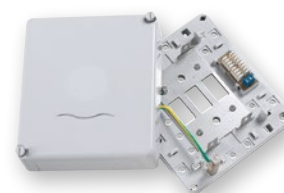
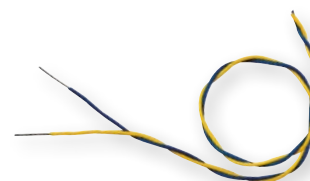
Cable Construction

Available in both PVC and LSOH outer sheath constructions, with Solid Annealed Copper Wire conductors with a minimum nominal diameter of 0.505 mm. Each conductor is insulated with HDPE (high density polyethylene)

Note: Please ensure that you select cables with the correct CPR compliance in accordance with local regulations; in the UK this will be defined with the latest revision of BS 6701:2016+A1:2017.

Connecting Hardware

- **Excel 25, 50 or 60 Port RJ45 Patch Panels**
 - o The Excel voice patch panel is a 1U panel which provides a cost effective method of terminating and presenting Multipair Voice cables. Each panel has 25 or 50 RJ45 ports per 1U and an integral rear cable management tray. Each port is numbered and each can be wired with up to 3 pairs.
- **CW1423** – Jumper Wire
 - o CW1423 Jumper Wire is a Single Pair cable and is insulated with an Irradiated Outer Sheath for use on Distribution Frames.
- **Excel Connection Boxes**
 - o The range of connection boxes includes the 200, 250 and 300 Series, providing connection from 2 to 10 way. Each box is manufactured from high quality plastic and suits all Terminal Strips.



S9

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for
V5

Excel Frames

- Distribution Frames

- **Excel 500 Series Connection Box**

The Excel Series of Connection Boxes offers increased pair capacity while maintaining an industry standard footprint. The stainless steel backmount frame verticals support 237 Style strips giving a normal capacity of 340, 690, 1020 and 1600 pairs depending on the model. The Excel Connection Box Range allows an extra 5 way backmount to be fitted under the standard verticals increasing the capacities to a roomy 390, 780 or 1170 pairs. The door opens through 180° for ease of access. It can be removed entirely using quick release hinges and is easily reversed for left-right opening applications.



- **111B**

The Modular construction of the 111B means that any size of installation can be equipped using a standard building block. The 111B is compatible with older style frames, such as 105 or 108, to allow the extension of existing installations. Single verticals can be joined side by side for wall mounting or back to back to form a free standing system. If height reduction is required, the legs can be removed and the 111B mounted directly on the floor giving an overall height of just 1850mm.

- **108a/City80**

Supplied as a dual distribution frame as standard, the 108a frame has the capacity for up to 1380 pairs when using 10 pair termination strips. The City 80 is an extended version and offers up to 1600 pair capacity. The flexible design allows for mounting frames on the floor with or without the supplied legs - on the wall or back to back.



- **Sub Rack Termination Strip Carrier**

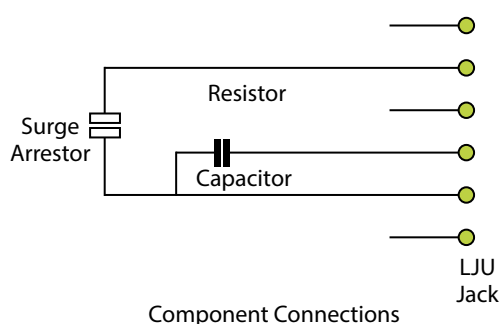
The Sub Rack Strip Carrier is used to mount Terminal Strips in 19" Cabinets. Two styles are available: the recessed version positions the terminal strips inside the 19" cabinet profile and the flat version aligns the strips with the cabinet's profiles.

- Flat (<https://www.excel-networking.com/product/550-278/excel-108a-distribution-frame-dual-bank-1380-pairs>)
 - Recessed (<https://www.excel-networking.com/product/3USRR/3u-sub-rack-recessed>)

Line Jack Units – LJU

Line Jack Unit (LJU) is the term used for the voice outlet and contains a socket to accept the UK telephone plug. Often referred to as the BT Plug. The incoming line from the telephone exchange comprises of a single copper pair (2 wires). This is an analogue system which may be installed in a bus topology within the premise. A bus topology means that sockets are installed in series to provide the same connection to each socket. Depending on where used, the LJUs are available in three different versions: PSTN Master; PABX Master and Secondary. The first LJU within the premise terminates the line, this is the Public Switched Telephone Network (PSTN) Master. The PSTN Master has components inside to split out the ring voltage and also provide a level of protection to the exchange. The resistor and capacitor makes the telephone ring and the gas surge arrestor balances the incoming line if an overvoltage occurs (protection for the exchange). If the telephone line is provided by British Telecom then the PSTN Master is referred to as an NTE (Network Terminating Equipment).

Contents of the PSTN Master



Other Versions




The other two versions are the PABX Master and Secondary. The Private Automatic Branch Exchange (PABX) Master has the above components and configuration with the omission of the Surge Arrestor. A PABX or sometimes referred to as a Private Branch Exchange (PBX) is the telephone system used inside the business or premises. The details of the specific PABX needs to be consulted to determine whether an extension needs a PABX Master or a Secondary. The Secondary LJU has the above configuration without any of the components inside. They are used where a PABX does not need a Master for extensions of for use in extending an extension or home line.

Series Formats

The LJUs are available in different series formats.

- 2 Series – 68 x 68 mm complete with back box for overall depth of 29 mm
 - o Single Outlet
- 3 Series – 86 x 86 mm to fit on a standard UK Single Gang Back Box (not included)
 - o Single Outlet
- 4 Series – 86 x 86 mm to fit on a standard UK Single Gang Back Box (not included)
 - o Double Outlet

Summary

	2 Series	3 Series	4 Series
	 <p>68 x 68 x 29 mm including Back Box</p>	 <p>86 x 86 mm (Back Box not included)</p>	 <p>86 x 86 mm (Back Box not included)</p>
PSTN Master	550-250 Type 2/1A	550-253 Type 3/1A	550-256 Type 4/1A
PABX Master	550-251 Type 2/2A	550-254 Type 3/2A	550-257 Type 4/2A
Secondary	550-252 Type 2/3A	550-255 Type 3/3A	550-258 Type 4/3A

Design and Installation Considerations

As with structured cabling, correct planning and installation must be carried out in line with the established best practices of the industry. Therefore consideration of BS EN 50174 is vital.

It is important to remember that Multipair Voice cabling is an unshielded solution and therefore susceptible to external interference. It is therefore important to follow the separation guidelines set out in BS EN 50174 when installing Voice Cabling in proximity to either Power Cables or Equipment likely to cause interference such as Lift Motors or Generators etc.

Table No. 1 Colour Coding for pairs

Pair Number	Colour of Insulation	
	a - Wire	b - Wire
1	WHITE – blue	BLUE – white
2	WHITE – orange	ORANGE – white
3	WHITE – green	GREEN – white
4	WHITE – brown	BROWN – white
5	WHITE – grey	GREY – white
6	RED – blue	BLUE – red
7	RED – orange	ORANGE – red
8	RED – green	GREEN – red
9	RED – brown	BROWN – red
10	RED – grey	GREY – red
11	BLACK – blue	BLUE – black
12	BLACK – orange	ORANGE – black
13	BLACK – green	GREEN – black
14	BLACK – brown	BROWN – black
15	BLACK – grey	GREY – black
16	YELLOW – blue	BLUE – yellow
17	YELLOW – orange	ORANGE – yellow
18	YELLOW – green	GREEN – yellow
19	YELLOW – brown	BROWN – yellow
20	YELLOW – grey	GREY – yellow