

Application note



Are RJ45 and RJ11 compatible and interoperable?

Answer is clearly no.

RJ11 is not internationally standardised thus standards do not require them to be compatible. This results in the fact that RJ11 plugs available on the market damage RJ45 jacks they are inserted in.

• Definitions

What exactly is an RJ45 and an RJ11 connector, how are they defined and what standards are they specified by.

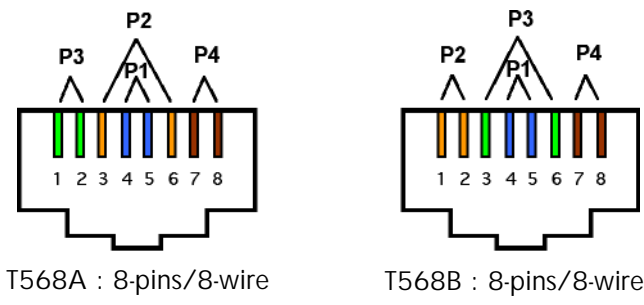
RJ45

RJ45 is the commonly used name for the connector standardised as the IEC (60)603-7, and refers to the 8-position (8-pin) modular jacks or plugs as they are specified in this international connector standard. The IEC (60)603-7 is also the standard referenced for connecting hardware in the international generic cabling standard ISO/IEC 11801.

Connecting hardware requirements as stated in the ISO/IEC 11801 standard:

- Physical dimensions at TO interface refer to the IEC (60)603-7 (see 11801 1st edition, table 23), which is the 8-pin 'RJ45' standard.
- Number of conductors in the cable termination compatibility at the TO is required to be 8 (see 11801 1st edition, table 23). Hence the use of 6-pin or 4-pin connectors (as the RJ11) is not supported as this would not result in a generic solution anymore.

Supported wiring schemes:



RJ11

RJ11 generally refers to a 6-position (6-pin) modular jack or plug. The connector is not internationally standardised and is not referenced in the generic cabling standards. Moreover, the name is also sometimes used for 4-pin versions of the modular connector, which adds to the confusion.

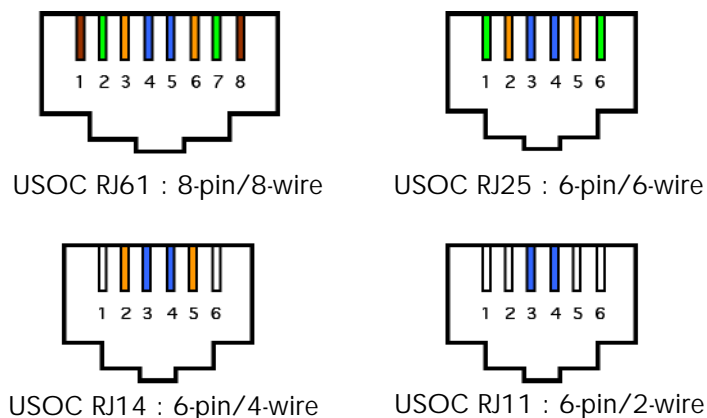
Within the generic cabling standard, not a single reference to 'RJ11' is mentioned, all connectivity is required to be 8-pin. Therefore also interoperability or compatibility of RJ11 and RJ45 is not even an issue.

Origin:

The RJ-names stand for Registered Jack and are USOC (Universal Service Ordering Codes) codes and originate from the Bell system. USOC are a series of Registered Jack wiring configurations developed by the Bell System for connection of customer premise equipment to the public network. FCC regulations control the application of these configurations when used for this purpose. FCC (Federal Communications Commission) is a United States government agency, and issued a document specifying RJ11.



An overview of the USOC connectors and their wiring schemes are given below.



RJ11 is the common name used for connectors developed by Western Electric Co. The form factor is specified as being a 6-pin connector. Original names are WExW, with x standing for the number of 'active', populated or wired pins. For example, WE6W has all 6 contacts populated, numbered 1 to 6, the WE4W interface only uses 4 pins and has the outermost two contacts (1 and 6) unpopulated, while the WE2W only uses the middle two pins. For the RJ11, information sources are contradictory, it is either specified as a 2 or 4 wire 6-pin connector. Adding to the confusion, RJ11 is not only used for referring to the 6-pin connector, but also for 4-pin versions.

- **RJ45 and RJ11: different standards, different dimensions**

Because of dimensional differences between the two (RJ11 is a 4 or 6-pin and RJ45 an 8-pin connector), it is obvious that an RJ45 plug cannot be used in an RJ11 socket. As the other way around would physically be possible (an RJ11 plug is smaller than an RJ45 jack) it could be assumed that the two should or could be interoperable. This is not the case. It is highly advised not to use RJ11 plugs in RJ45 sockets.

As the RJ11 is not internationally standardised, the dimensions, insertion force, insertion angle etc. are not aligned with requirements as in internationally standardized connector designs, and therefore cannot be trusted for interoperability. They might even damage each other. The RJ11 plug is smaller than the RJ45 jack, which causes the plastic at each side to damage the pins on that position in the jack.

Even if an RJ11 plug on the market is found to fit perfectly into an RJ45 jack without damage, the fact that the dimensions are different, makes the connection highly unstable (the smaller plug can move side to side inside the socket and will loose connection).

- **Conclusion**

RJ11 and RJ45 connectors are not compatible nor interoperable because of the reasons explained above. The combination RJ11 plug – RJ45 jack is not expected to work properly. It may even damage the connector. RJ11 plugs should be used with RJ11 jacks, RJ45 plugs are to be used with RJ45 jacks. Nexans has in its product portfolio RJ45 to RJ11 telephone cords to be used to connect RJ11 equipment to its structured cabling system. Therefore Nexans will no longer accept quality claims that are caused by inserting RJ11 plugs in its RJ45 connectivity.

Used information sources:

- ISO/IEC 11801
- IEC 60603-7
- Documentation from several connector manufacturers (AMP, Molex, Western Electric Company, Hubbell, etc.)