Testing for Series Faults with OneCheck and the UltraFED™ IIB

OneCheck™

In a typical POTS line carrying DSL, the pair from the central office to the customer premise is not one single continuous copper pair, but rather segments of pairs that are spliced at various intervals depending on the length. A 10 kft copper pair may have several splices between the central office and the customer premises. These splices may be in cross boxes, pedestals, or even mid-span in buried cable.

Over time, these splices can be weakened from movement, environmental effects, and temperature variations. Corrosion and oxidation also contribute to the degradation of a splice. When a splice deteriorates, on either tip/A or ring/B of a pair, it generates a series fault.

A two-ended test provides accurate fault identification for wideband services

Test Challenge

The best way to understand the quality of a copper pair is to measure longitudinal balance. Longitudinal refers to how well balanced the pair is along its entire length. Balanced refers to how electrically similar the two wires in the pair are to each other. A well-balanced pair will be less susceptible to noise ingress issues.

Typically, a longitudinal balance measurement is performed with the far end open. If a series fault is located close to the far end, a longitudinal balance measurement may not clearly show that there is a fault.

A more reliable series fault test should be conducted as follows:

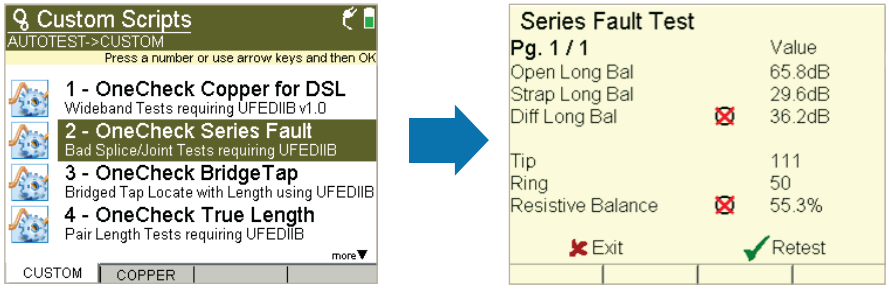
1. Run a traditional longitudinal balance measurement with the far end open.
2. Before leaving the test location, short and ground the pair.
3. Go to the far end and run a second longitudinal balance test.
   The second test should return a result similar to the first.
4. If the second result is significantly lower, a series imbalance is present.
5. While the pair remains shorted and grounded, run a resistive balance test to corroborate the results of the longitudinal balance measurements above.
   Note the significant difference between tip/A and ring/B resistance measurements.

Addressing the Challenge with OneCheck and the UltraFED IIB

An automated series fault test can be conducted with the JDSU UltraFED IIB and the Series Fault test.

The purpose of the Series Fault test is to:

- Show the difference in the longitudinal balance when the pair is in an open versus strapped (shorted and grounded) state
- Show the resistive leg balance—these two results will clearly show if there is a series fault



Running the OneCheck Series Fault test end-to-end between the HST-3000 and the UltraFED IIB simplifies and speeds up series fault testing by:

- Automatically setting the required strap condition and the far end
- Performing all of the measurements described above and comparing the results to isolate the series fault with a Pass/Fail determination

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