A Solution For The Testing of ‘Complex Passives’

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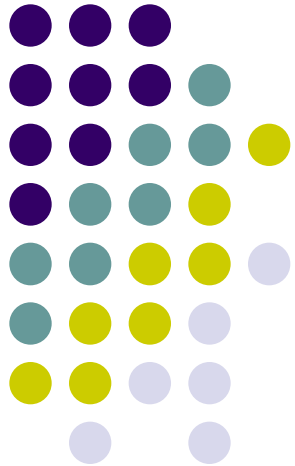

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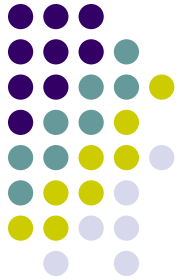
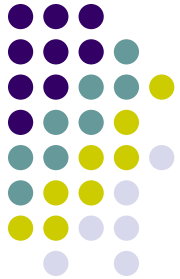
Examples of complex passives



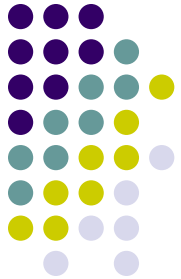
- Multiple relays within one housing such as those for ATE matrix applications, automotive window control and redundant safety circuits.
- Relays with in-built over-voltage protection for contacts and / or coils provided by varistors or diodes.
- Connectors with in-built filtering components, for example to limit EMC transmission.

Why complex passives are becoming popular



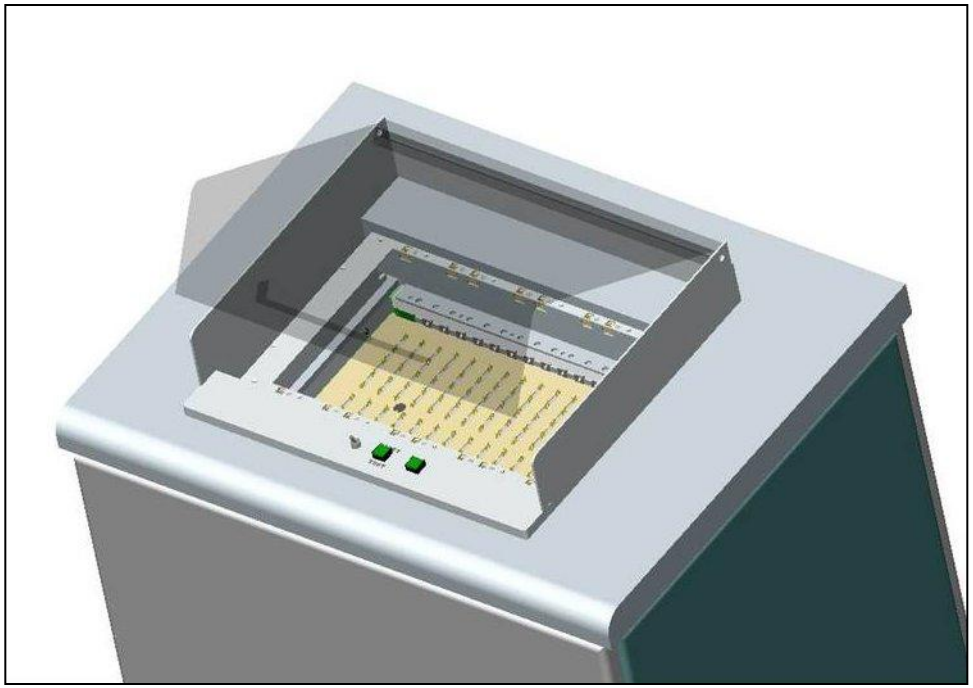
- Improves the modularity and reliability of the system within which it is a part.
- Often improves electrical performance over other solutions – ‘tighter’ environment.
- Has added value attraction for manufacturer and cost efficiency for system designer.
- Can be used to retrofit added capability to existing systems in the field.

But manufacturing complex passives demands flexibility.



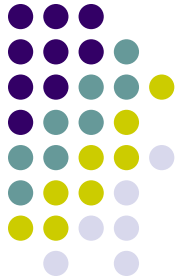
- Manufacturing methods need to be flexible to accommodate higher pin counts, more complex assemblies and probable lower volumes.
- Lead times need to be kept short to respond to customer demands and remain competitive.
- A test capability must be in place that is flexible in both test capability and fixturing to handle these devices.

ART is introducing a tester for complex passives, the Reflex 950



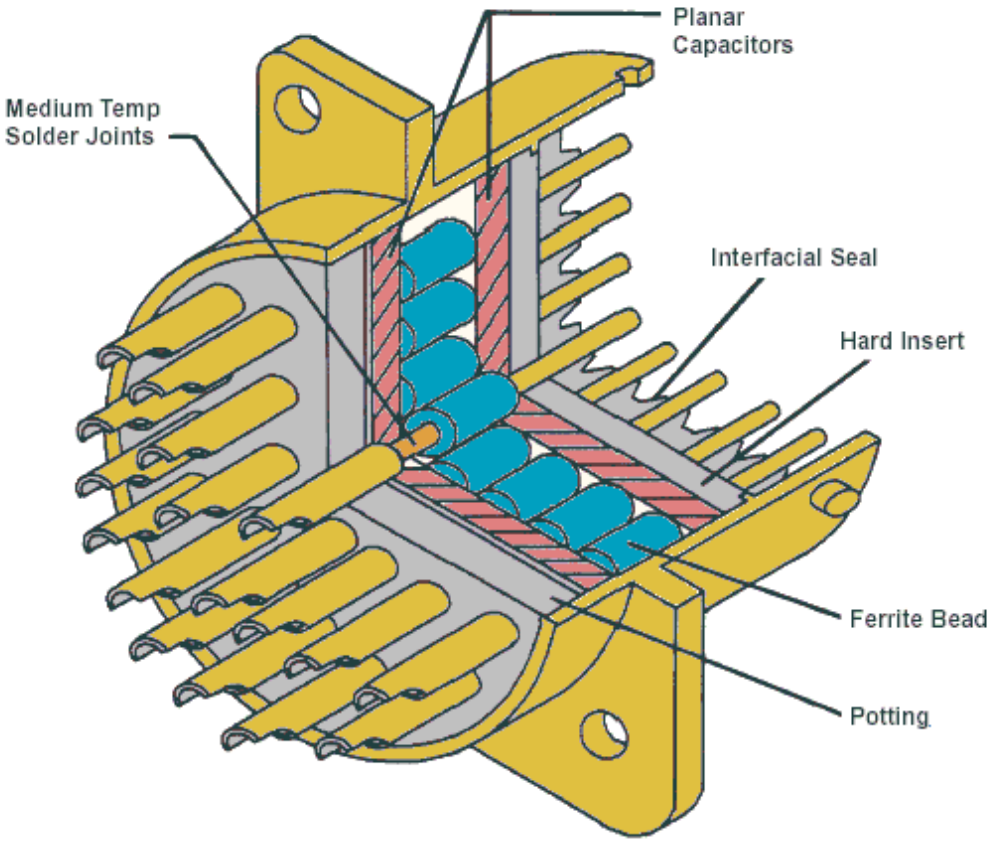
- Up to 160 fully Kelvin pins.
- Wide range of electrical tests.
- Excellent low-voltage performance
- HV tests to >2kV

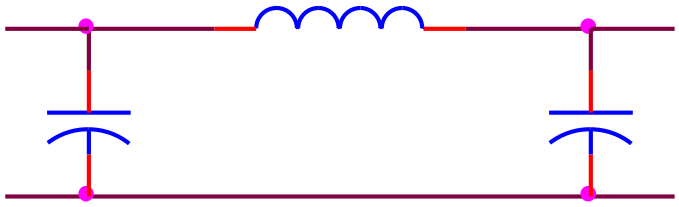
Reflex 950 main features



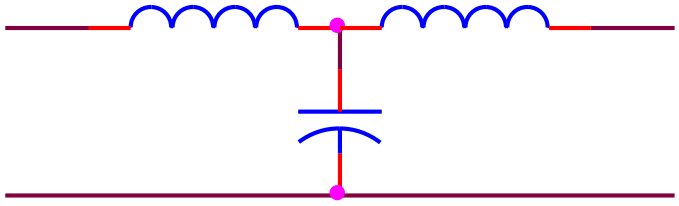
- HV tests for Hipot (breakdown) and leakage current (I.R) to +/- 2kV DC, 1500VAC .
- Low-voltage tests for Capacitance, DF, resistance.
- Voltage clamp test (e.g. zener devices).
- Internal GPIB bus for test expansion.
- Integrated zero-force fixture insert for tight electrical environment.

Reflex 950 test application study – a filtered connector



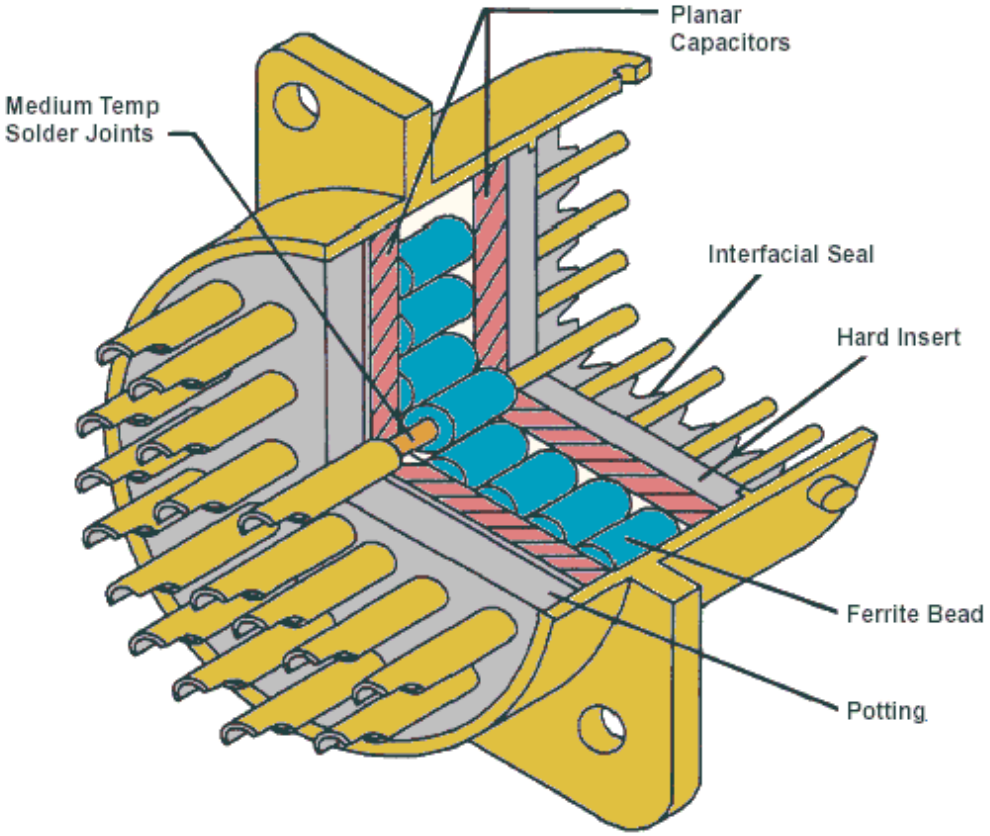


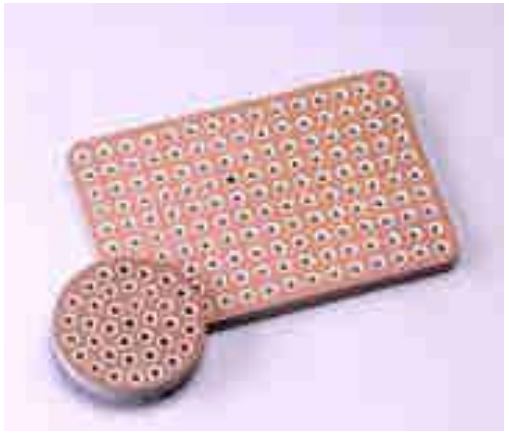
'Pi' Filter

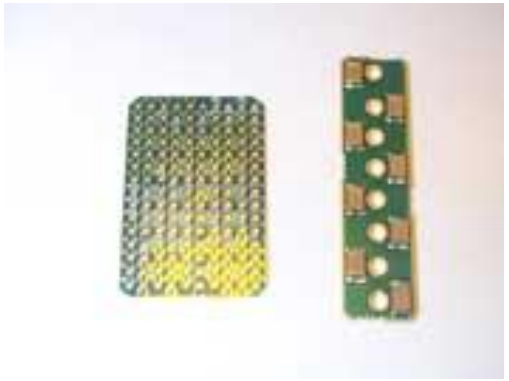


'T' Filter

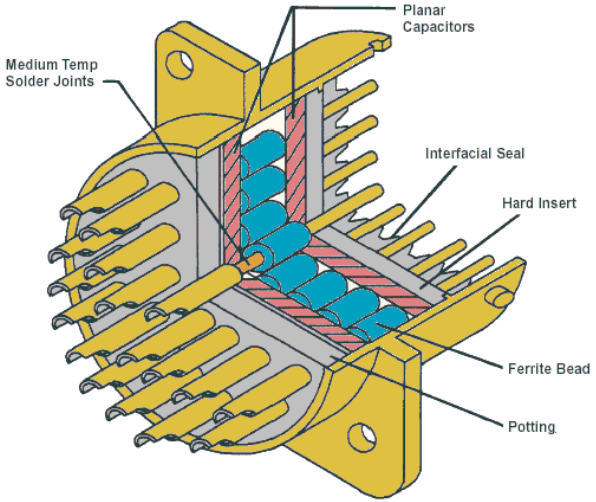
Filter connector construction





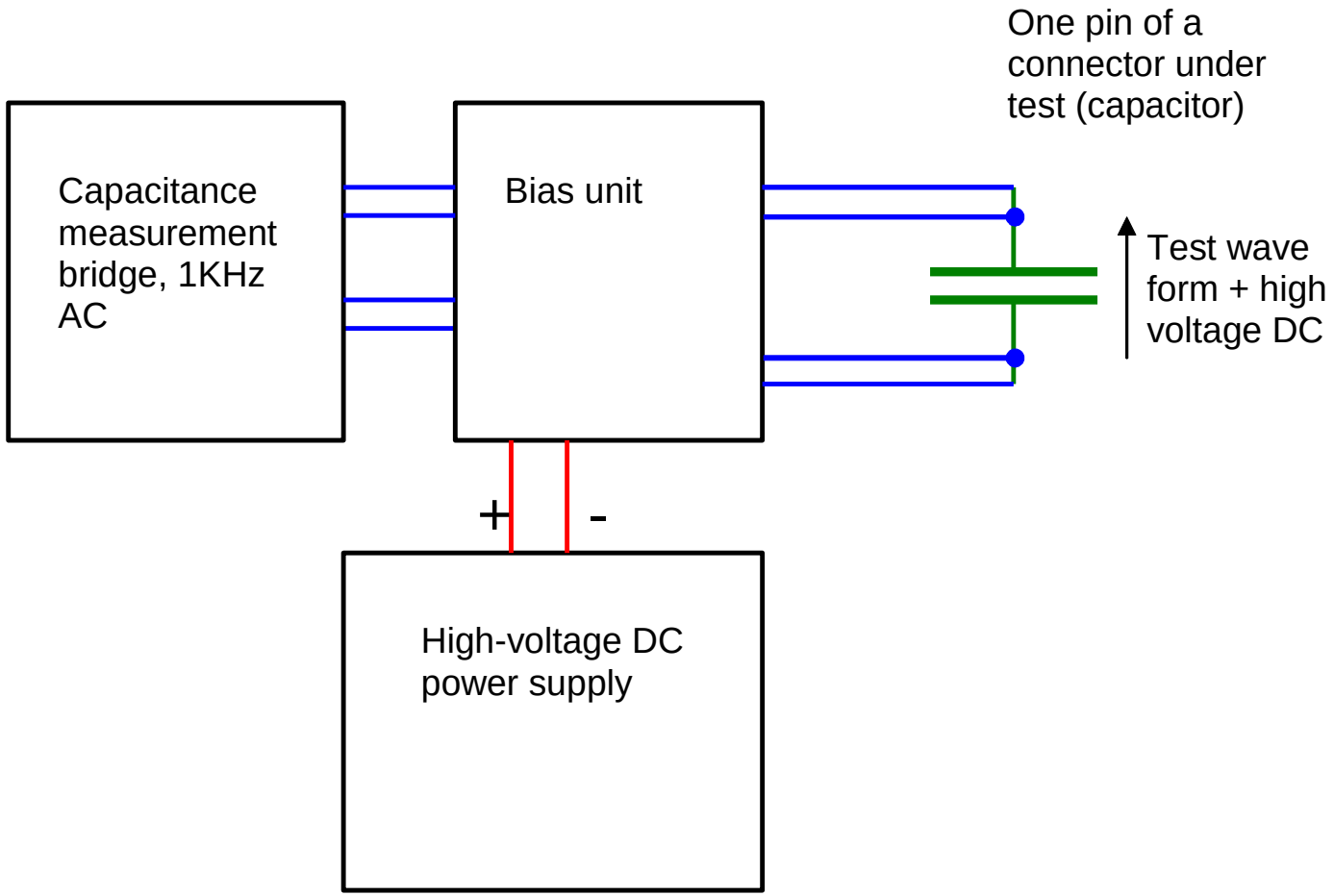


Electrical tests required on a filter connector

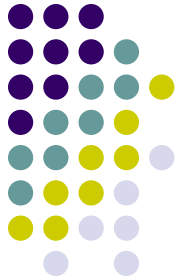


- Leakage (I.R.) between pins and pins-shell.
- Through resistance (a few milliohms).
- Cap / DF of filter.
- Maybe clamping devices (tranzorb / zener).
- …so is similar to relay electrical tests.

Making capacitance relevant – measure at working voltage

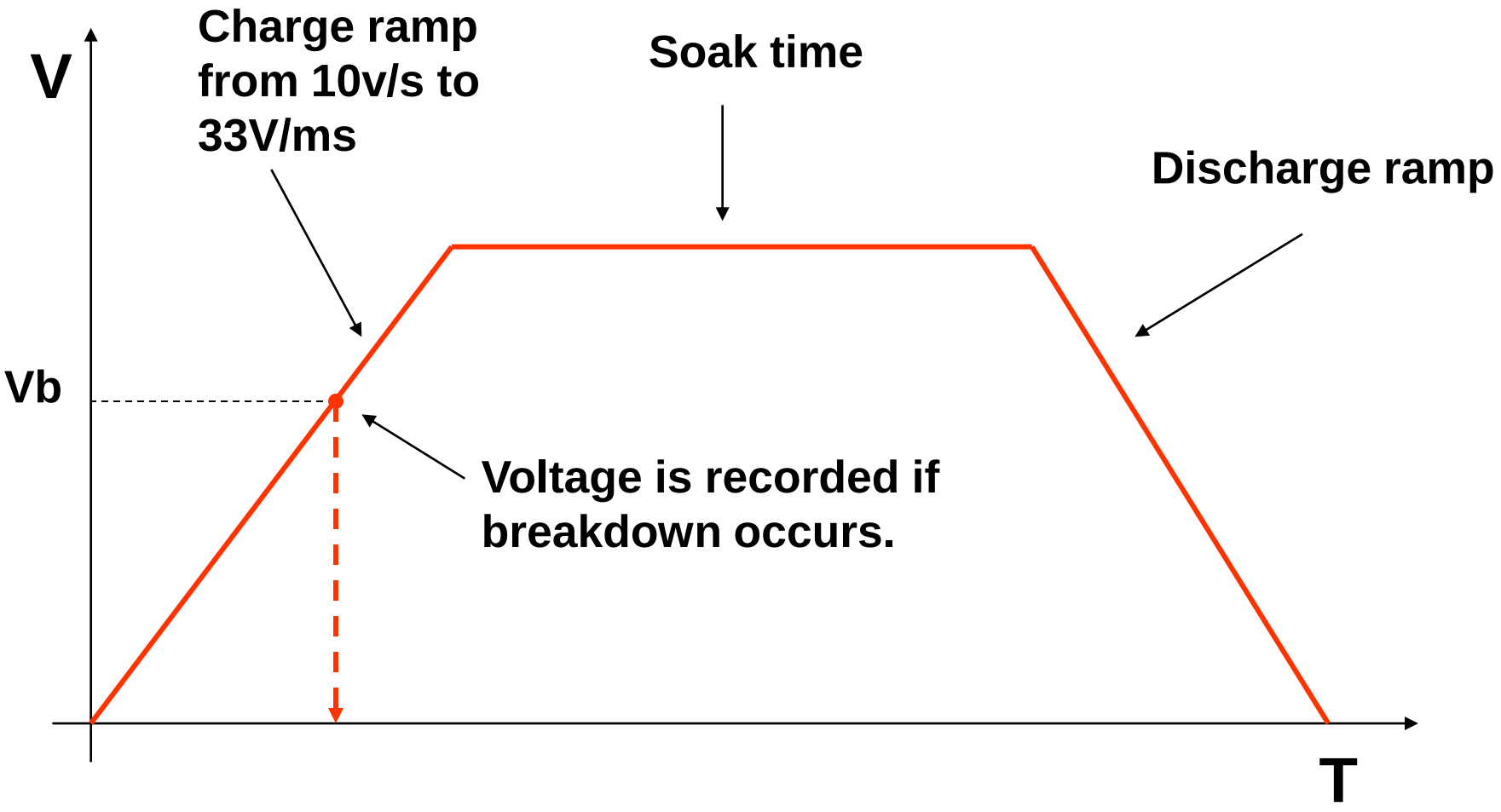


H.V testing is flexible to permit engineering investigation

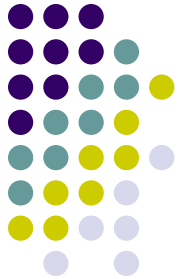


- Newer parts are more dense leading to reduced electrical clearances.
- Reduced clearances must be more carefully assessed.
- The Reflex 950 can measure actual breakdown voltage on every test route - not just pass and fail.

Using H.V test flexibility for investigation.

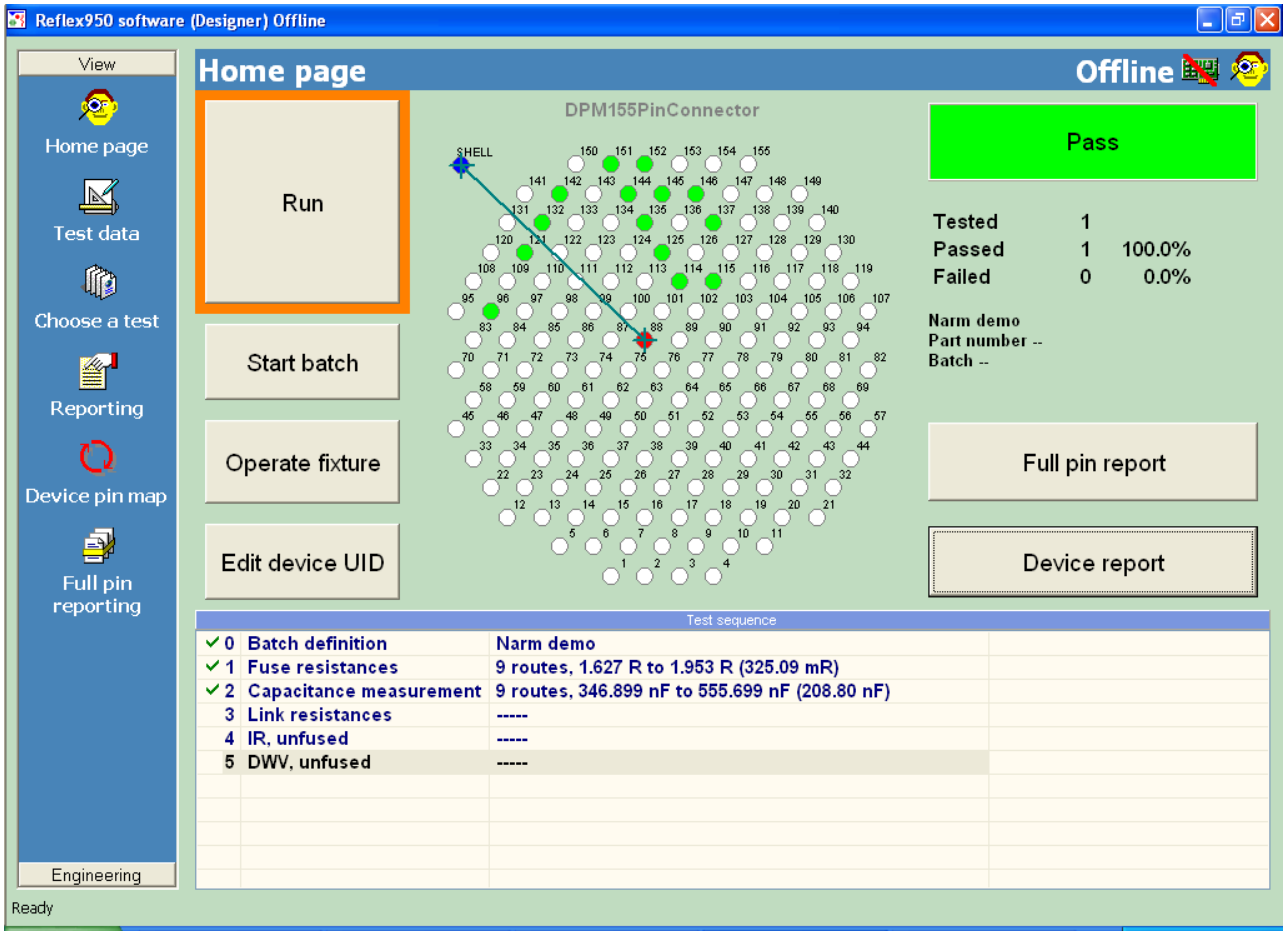


High pin count parts require flexible connection management

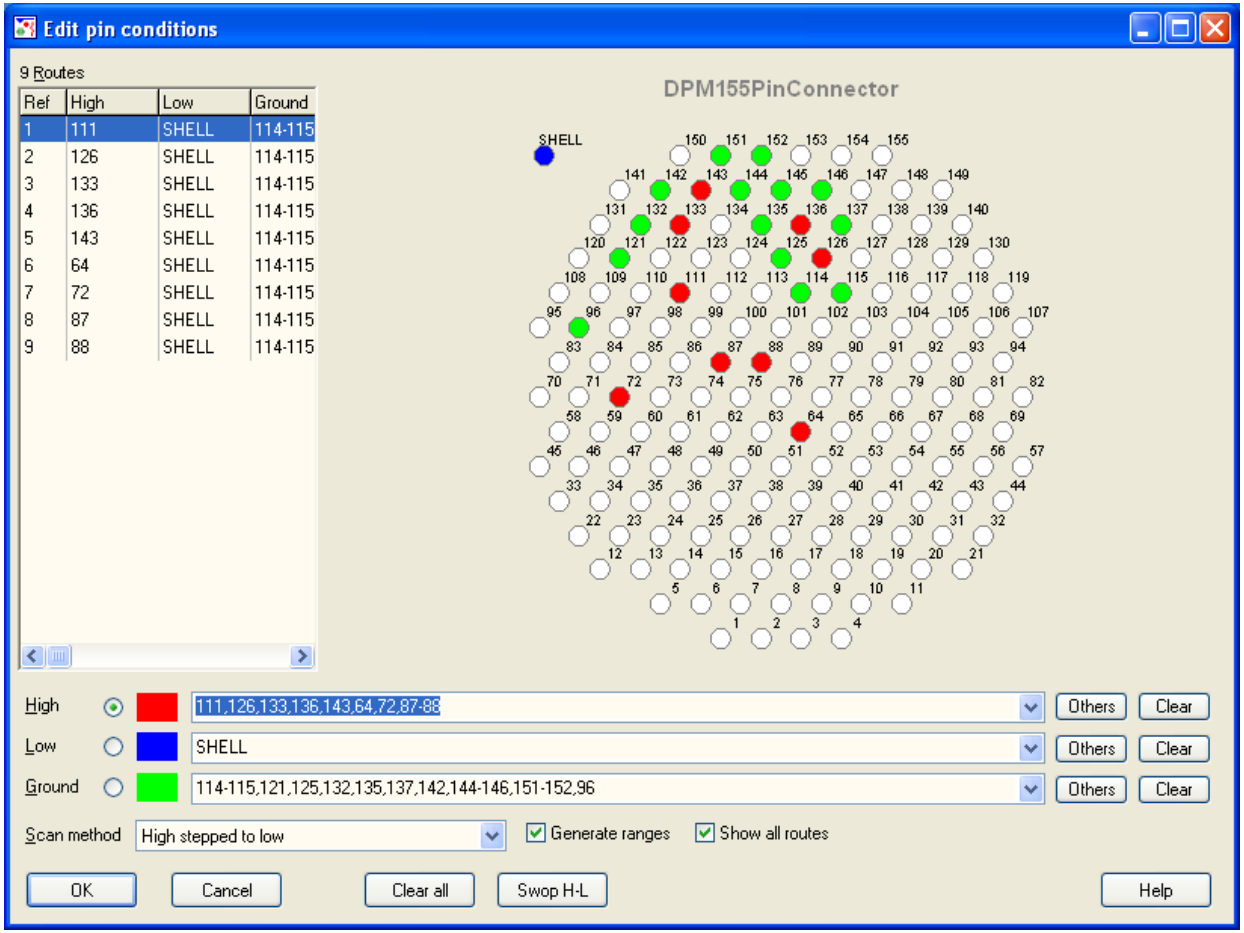


- Editing the connection details of high pin count parts can be error-prone.
- A visual connection editor can help.
- Visual connection techniques can be used to assist test program designer and also for test progress and failure indication.

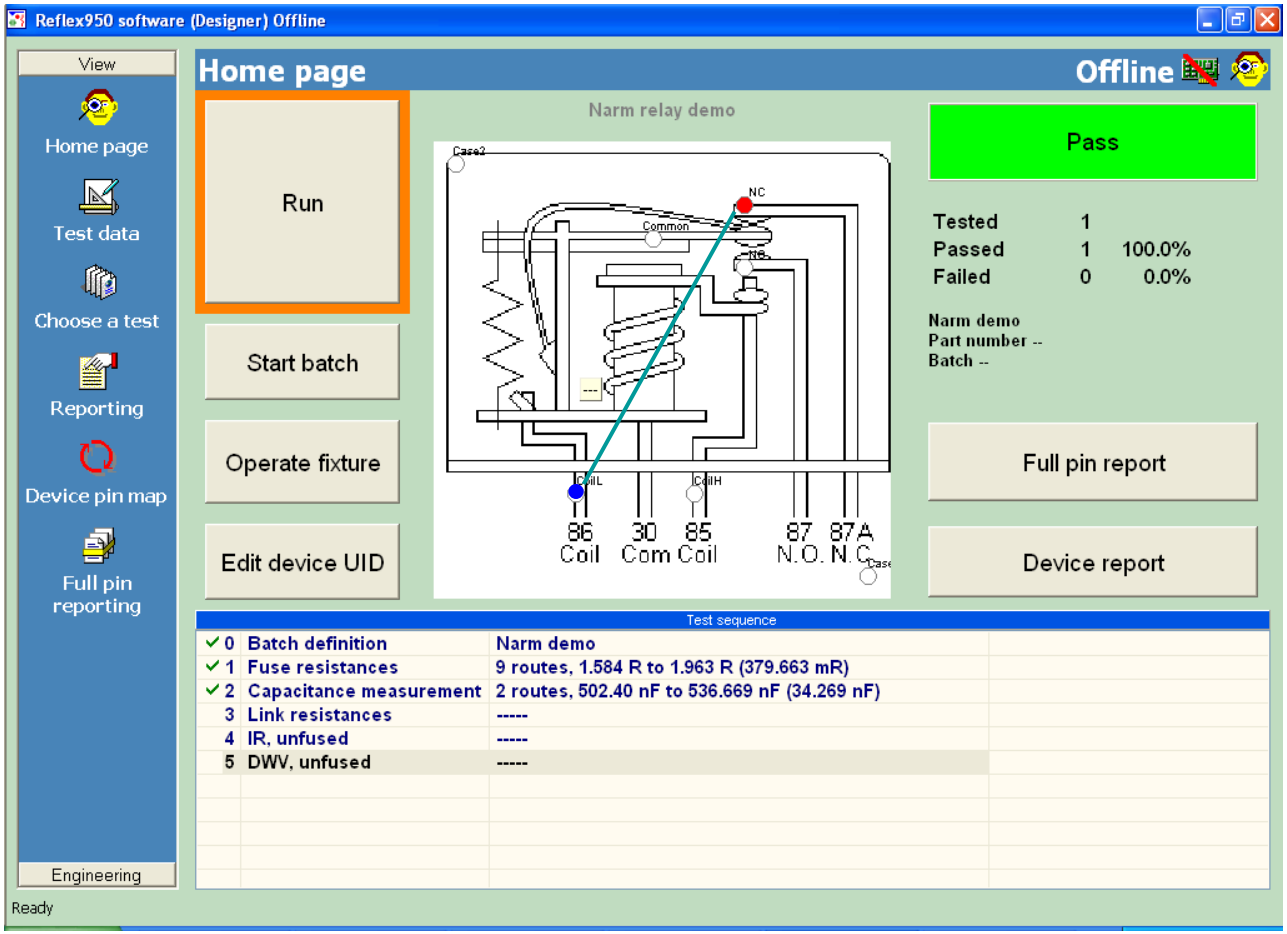
A high pin count connector test route display



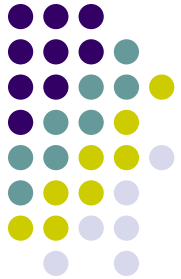
Editing large numbers of pin connections



Test routes can be shown on any device

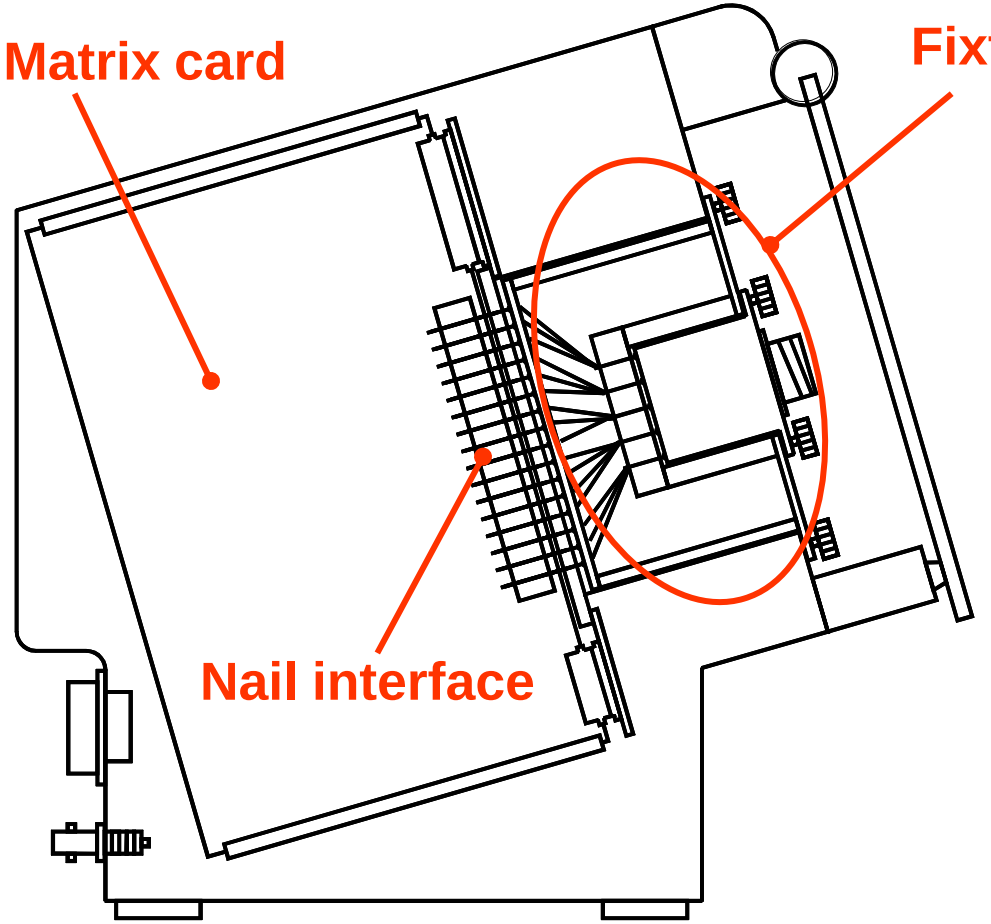


Flexible fixturing is vital when testing parts with many pins.



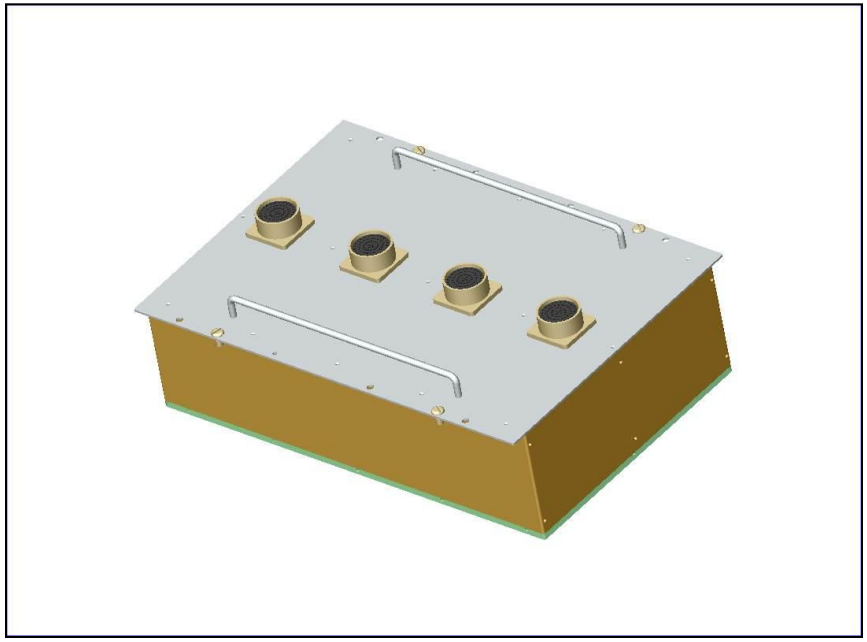
- High pin count parts may be low in volume, resulting in frequent test fixture interchange.
- Device should be very close to test electronics otherwise many wires required resulting in electrical test degradation.
- The best solution is an integrated fixture assembly.

Integrated fixture principle



- Short wiring – excellent electrical environment.
- Flexible mapping to device.
- Easily interchanged

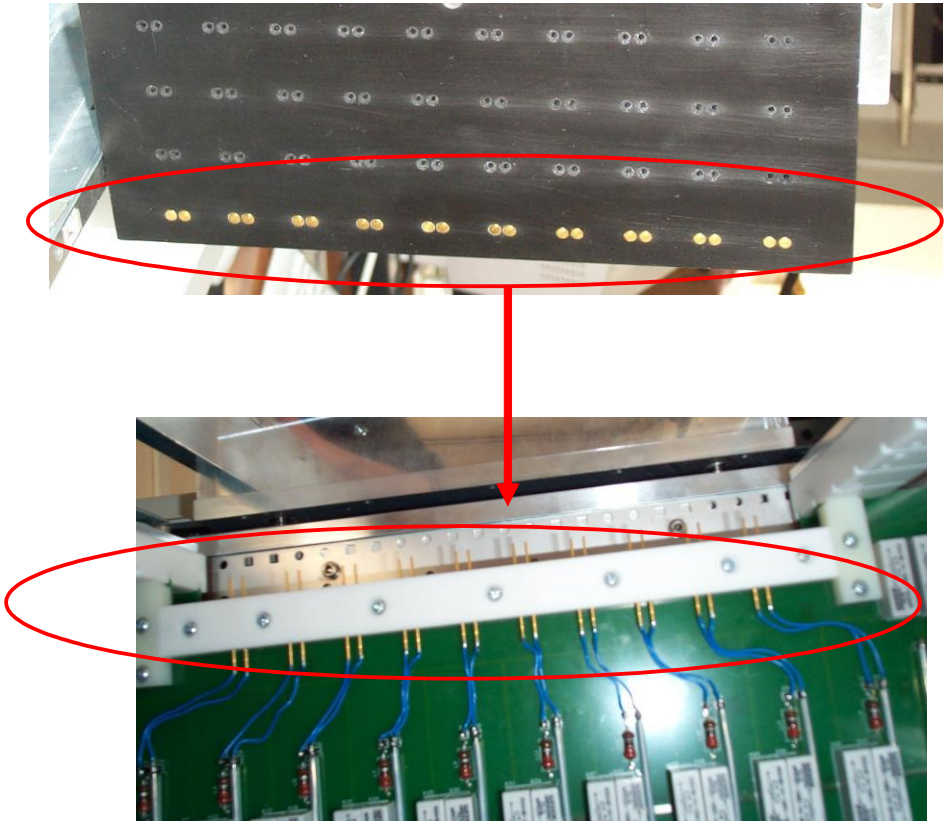
Test fixture insert design



4-way fixture insert

- 1, 2 and 4-section styles.
- Interchanged in seconds.
- Suits almost any part.
- Fully Kelvin with HV to 4kV+

Fixture interface with test system



- Gold spring probes mate matrix card to fixture insert.
- Excellent electrical interface
- Mated I.R better than 10^{14} Ω

Reflex 950 test applications

- Connector testing – filtered devices, individual connectors or harnesses.
- Any multiple passive components - resistor or capacitor arrays.
- Complex relay devices - multiple devices within a package e.g. matrix relays.

In summary

- Complex passive devices are increasing, opening added-value, niche markets.
- Responding to these parts requires flexible manufacturing and test methods.
- The Reflex 950 complex-passive tester has been introduced as a solution for the flexible testing of these parts.

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Thank you.