An Advanced Test Solution for Relay Stick, Miss and Functional Testing

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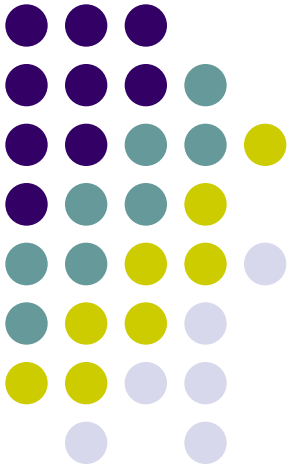

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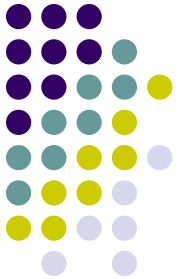
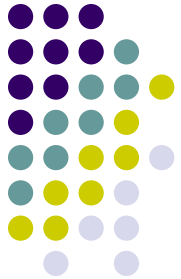
Presentation outline.



- To show how Applied Relay Testing Ltd has given Stick, Miss and Functional testing a complete ‘makeover’, resulting in a new low cost turn-key life-test system that provides:

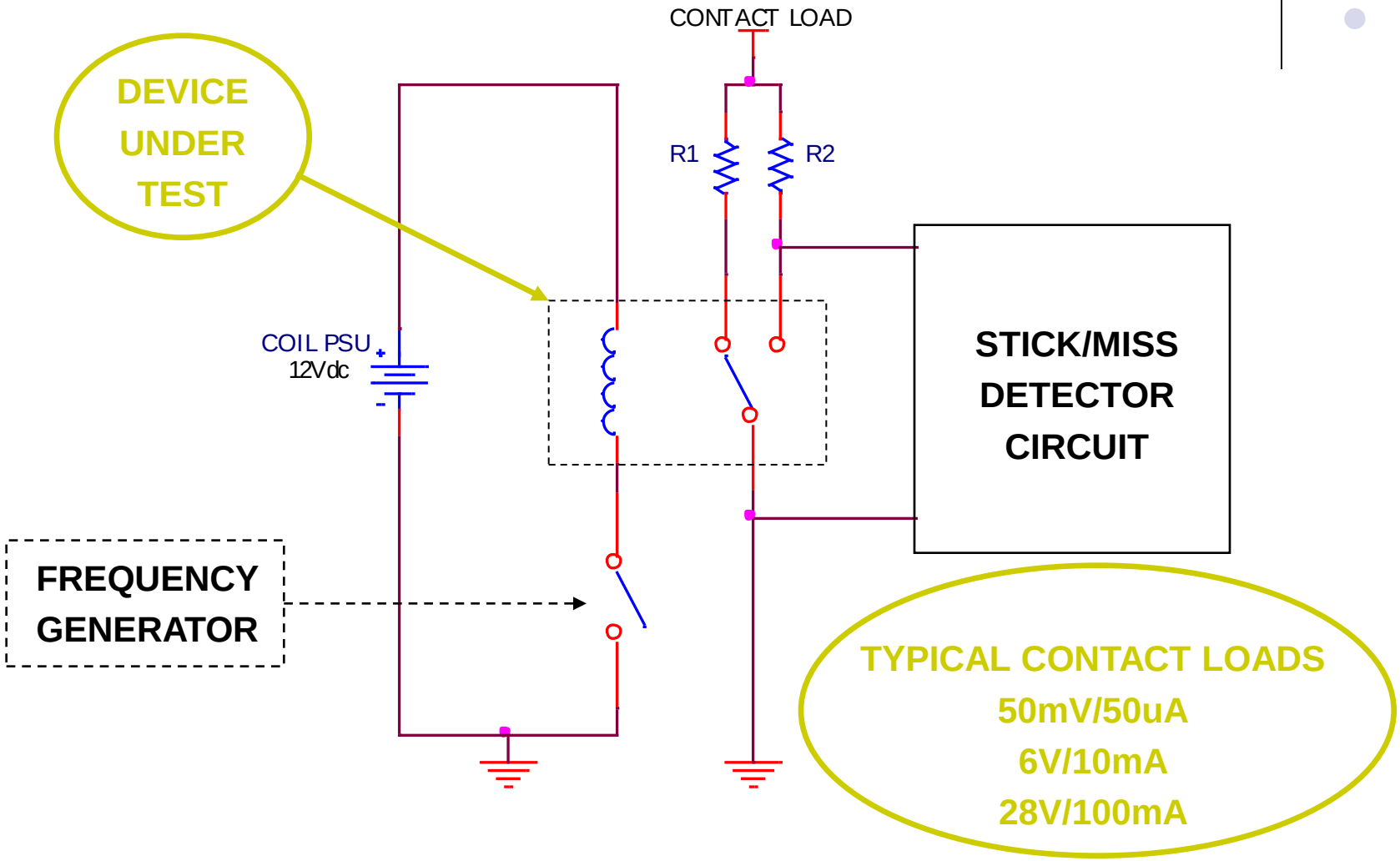
  - Provides ‘stick’ measurements in addition to ‘miss’.
  - Pull-in/drop-out voltage testing.
  - Full data-logging.
  - Automated report generation.
  - Meets MIL-spec requirements.

What is stick and miss testing?

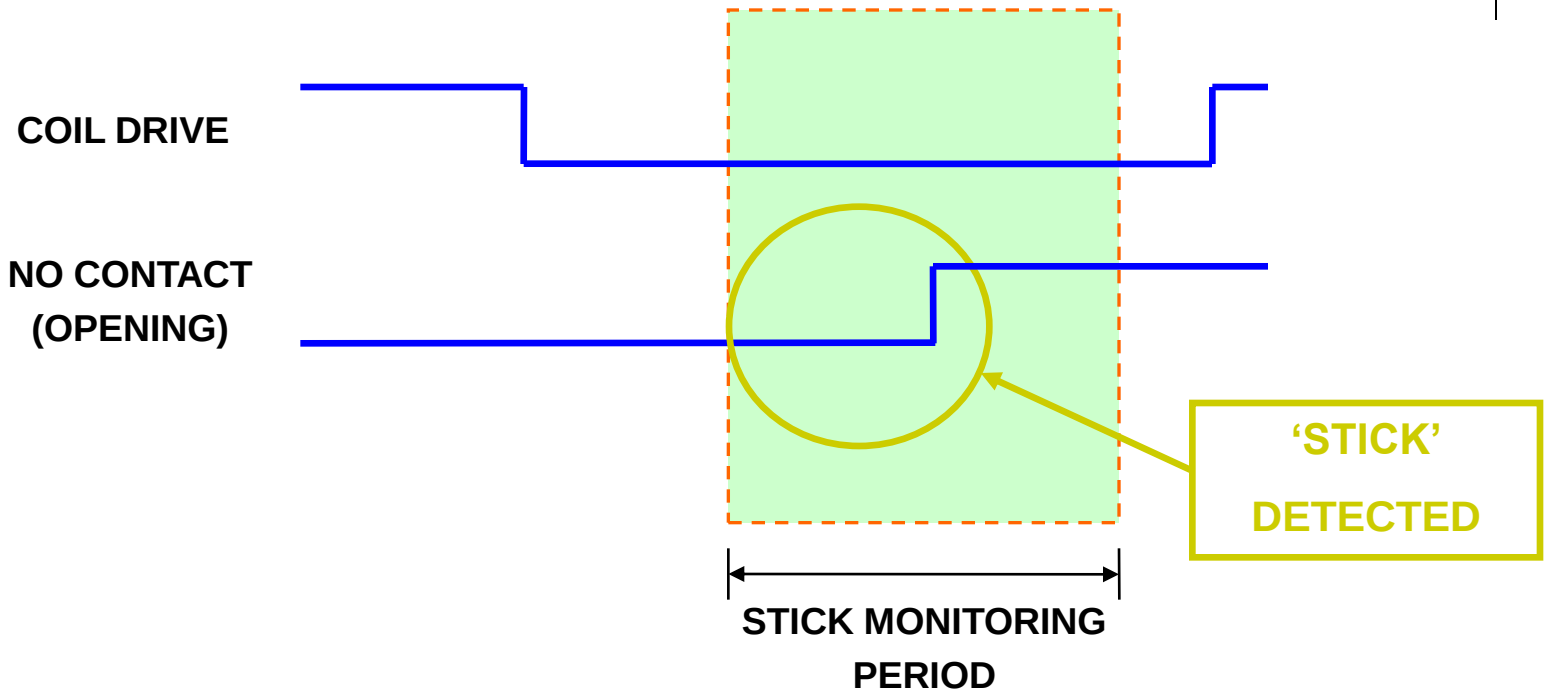


- Associated with ‘life-testing’ phase of electro-mechanical relays.
- Allows the life expectancy of an electro-mechanical relay to be determined under specific coil switching and load conditions.
- Simple ‘Go/No-Go’ test methodology.

Typical stick and miss test environment.

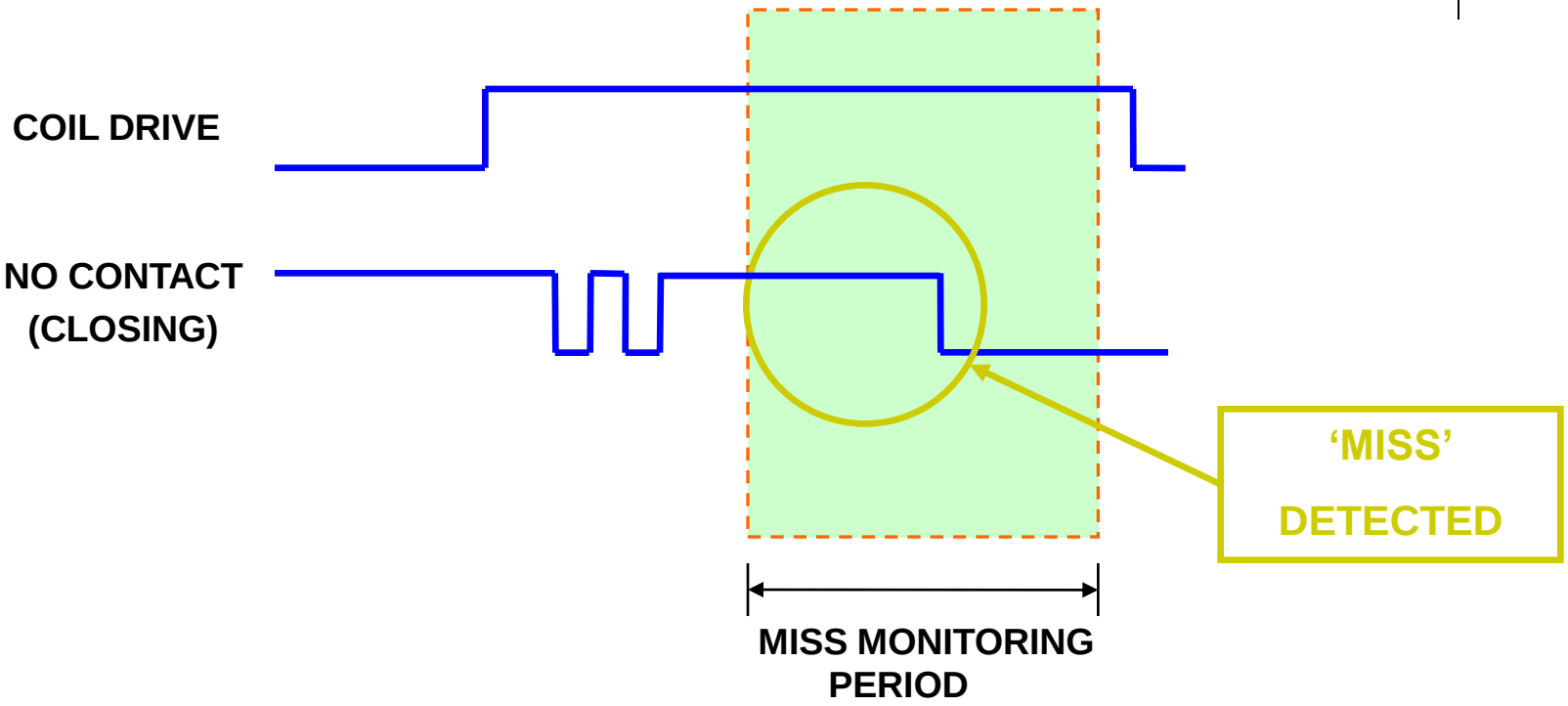


Stick detection explained.



- STICK - Measurement of whether a contact is still CLOSED during the period that its expected to be OPEN.

Miss detection explained.



- MISS - Measurement of whether a contact is still OPEN during the period that its expected to be CLOSED.

The traditional stick and miss detector circuit.

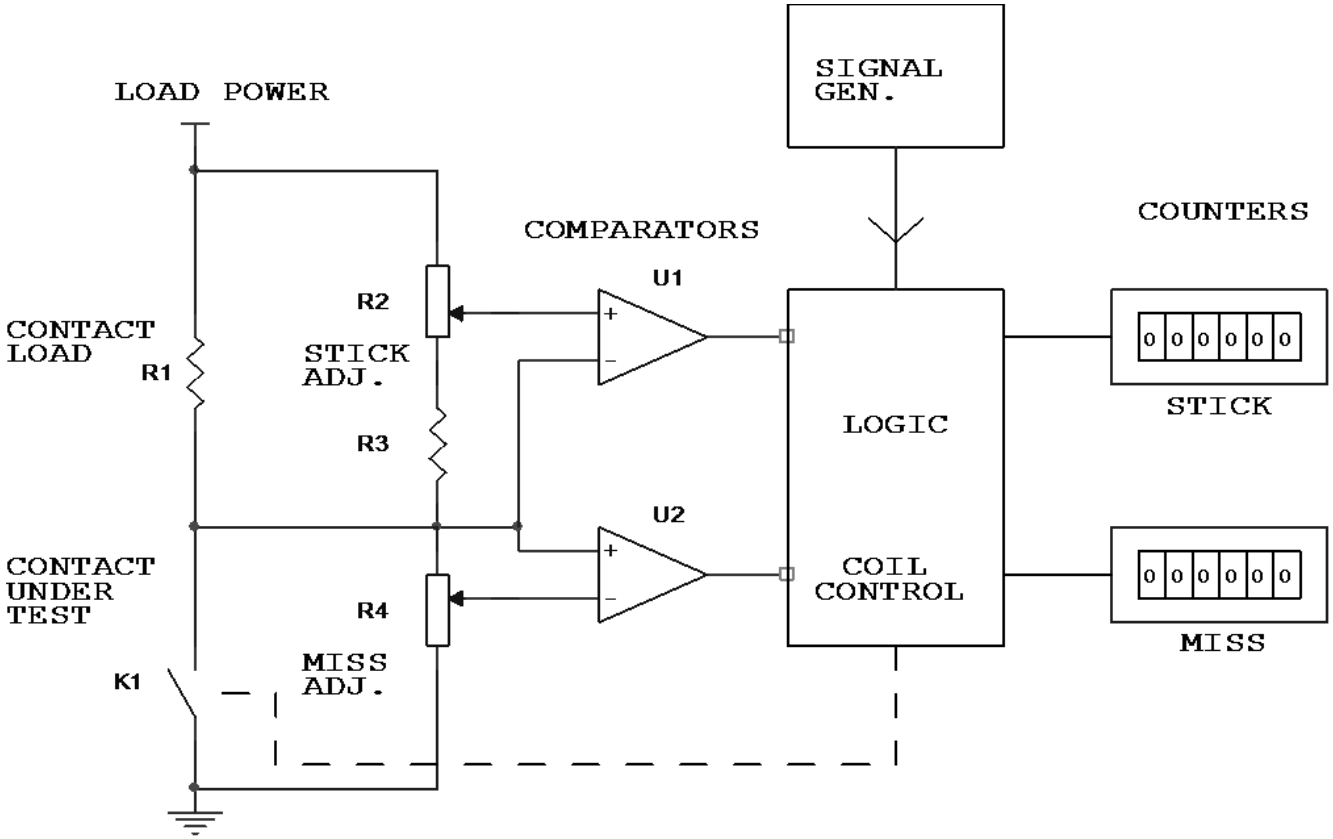


Figure : Simplified Stick and Miss Architecture.

Traditional stick and miss detector improvements (1).

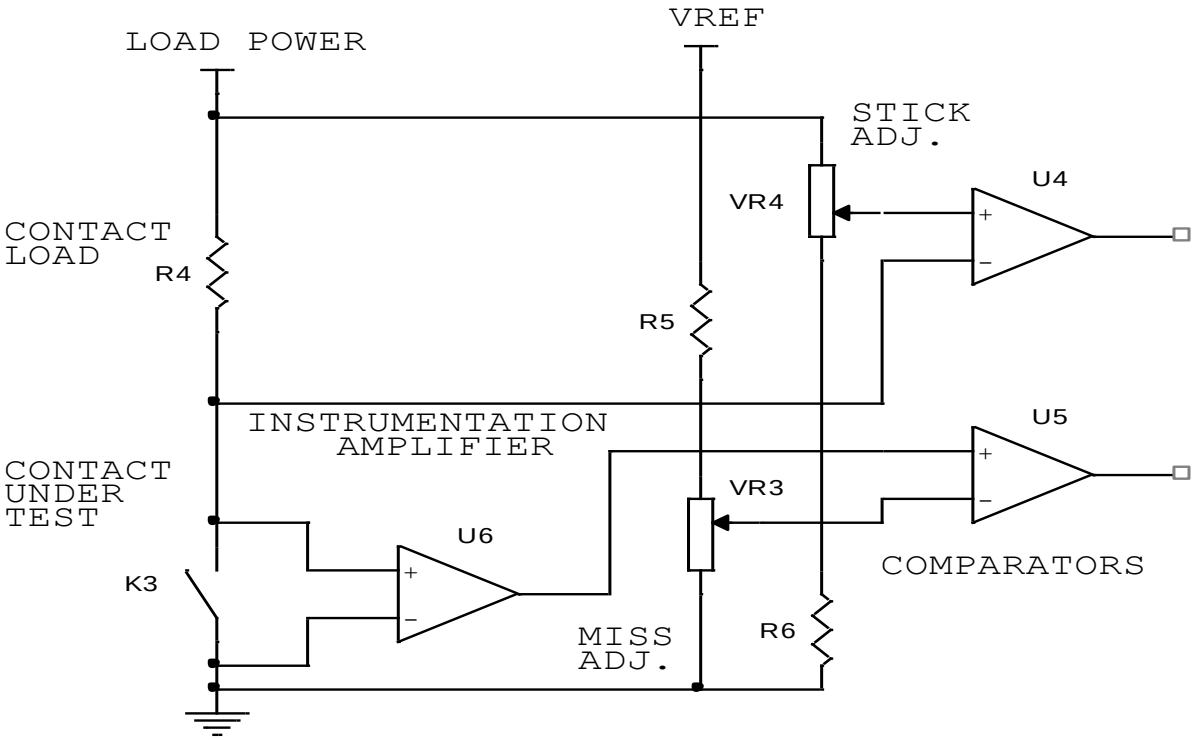
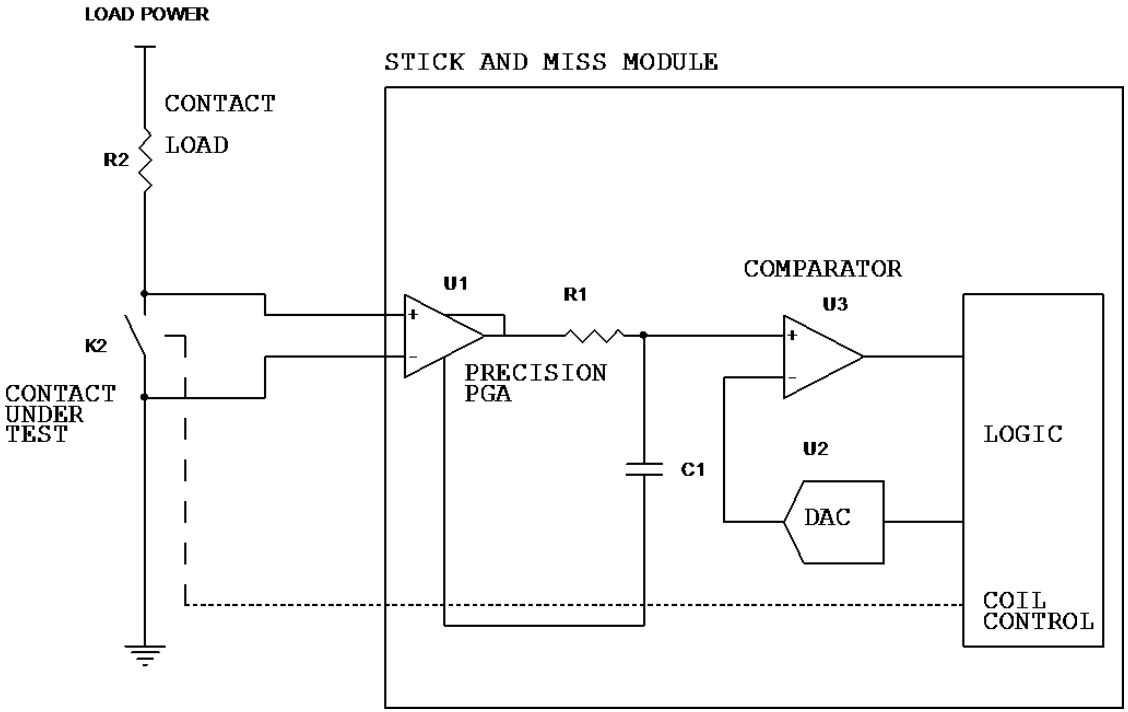


Figure : Additional amplification.

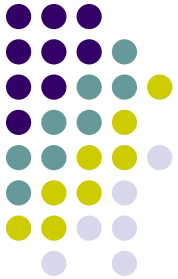
- Addition of a fixed gain (x100), low input offset instrumentation amplifier.

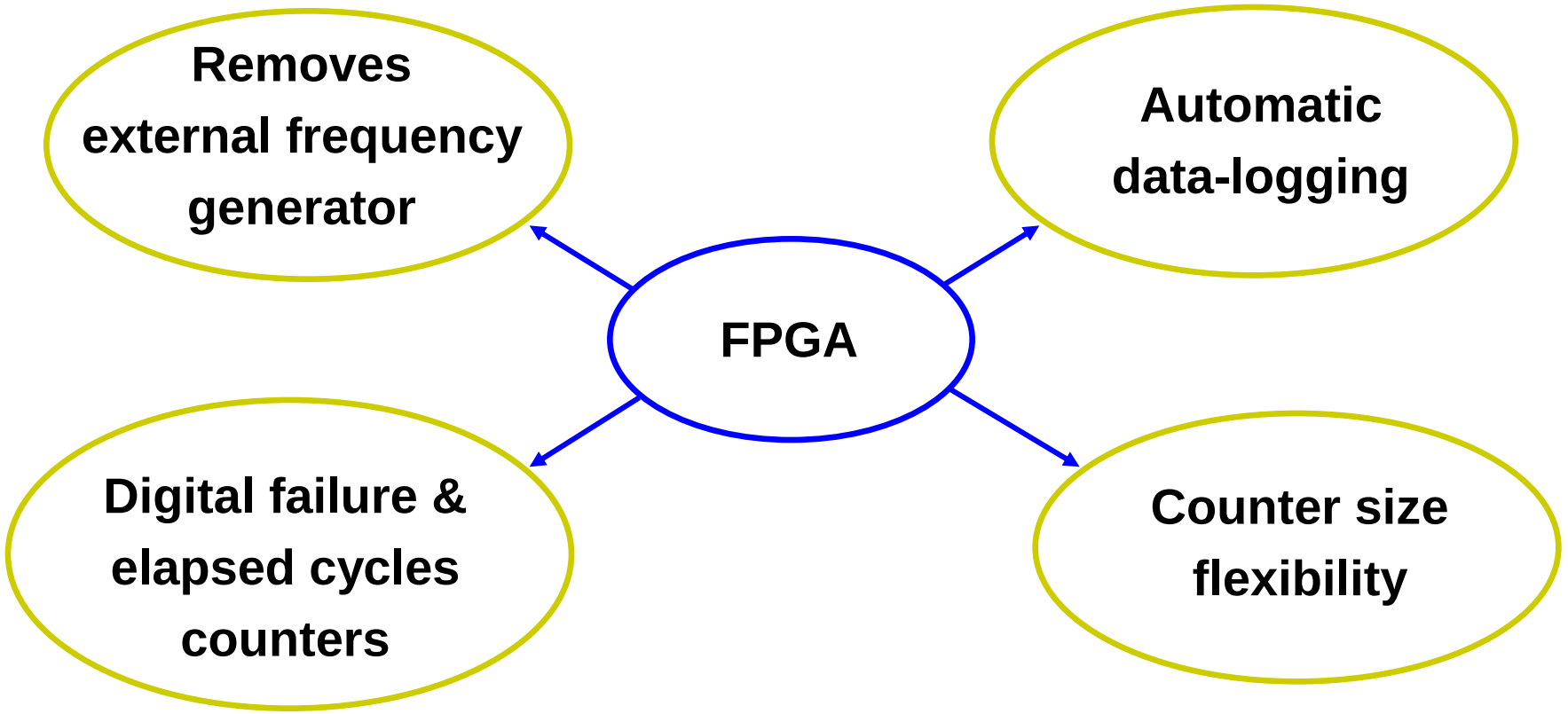
Traditional stick and miss detector improvements (2)



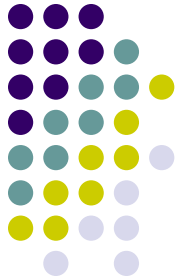
- Addition of Digital to Analogue Converter (DAC) and Programmable Gain Amplifier (PGA) vastly simplifies the circuit.

Introduction of FPGA further simplifies the detector design.



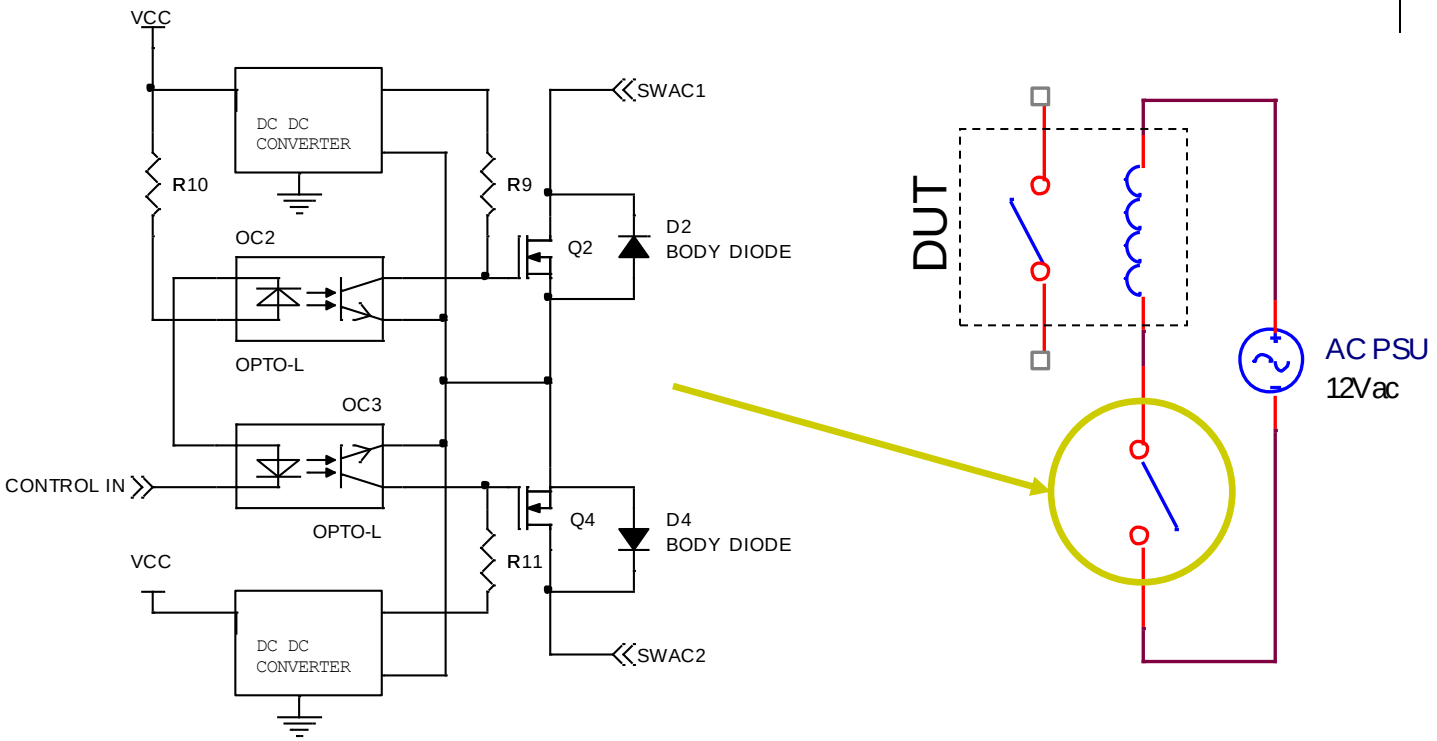


Coil switching requirements



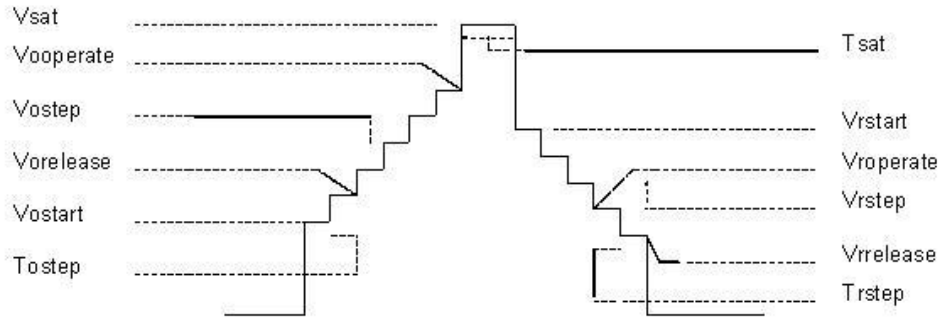
- AC and DC coil switching capability.
- Relay coil switching is truly asynchronous in relation to the AC power supply.
- High speed switching so that greater device cycle rates can be obtained.
- Solid state technology to eliminate reliability issues.
- Switch element should be scaleable in relation to voltage and current requirements.

Coil switching solution

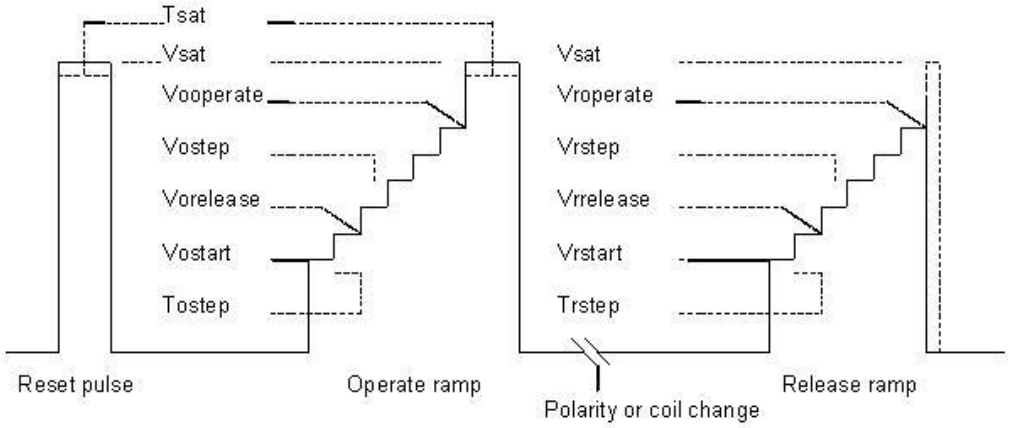


- The solution to an AC switch can be achieved by placing two DC elements back to back, as found in AC PhotoMOS relays.

Pull-in and drop-out voltage testing



Test ramps - monostable device.



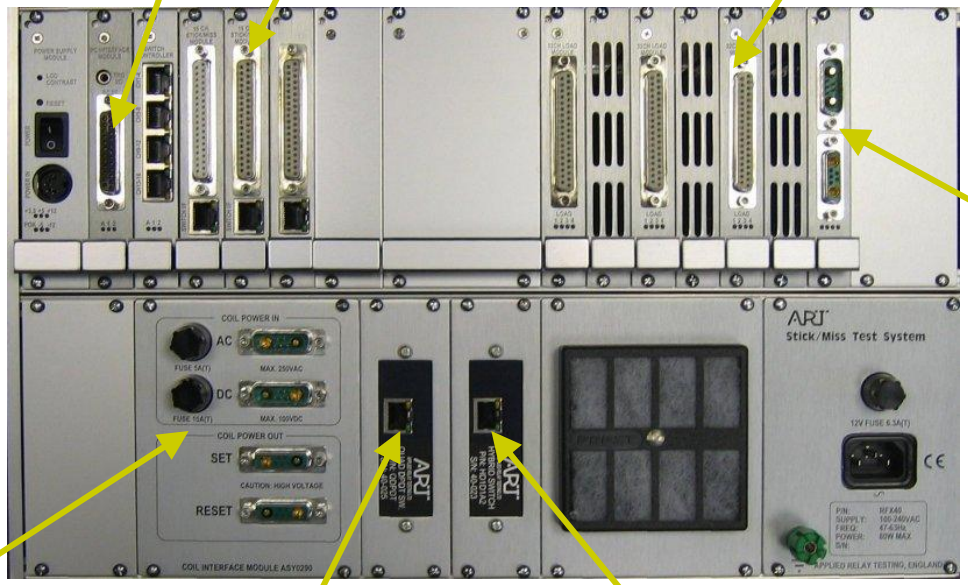
Test ramps - bistable device.

Reflex 40 - The complete stick and miss test system.

PC interface card

Up to 128 stick and miss device contact channels

32 channel load card



Load power supply inputs/outputs

Coil power supply inputs/outputs

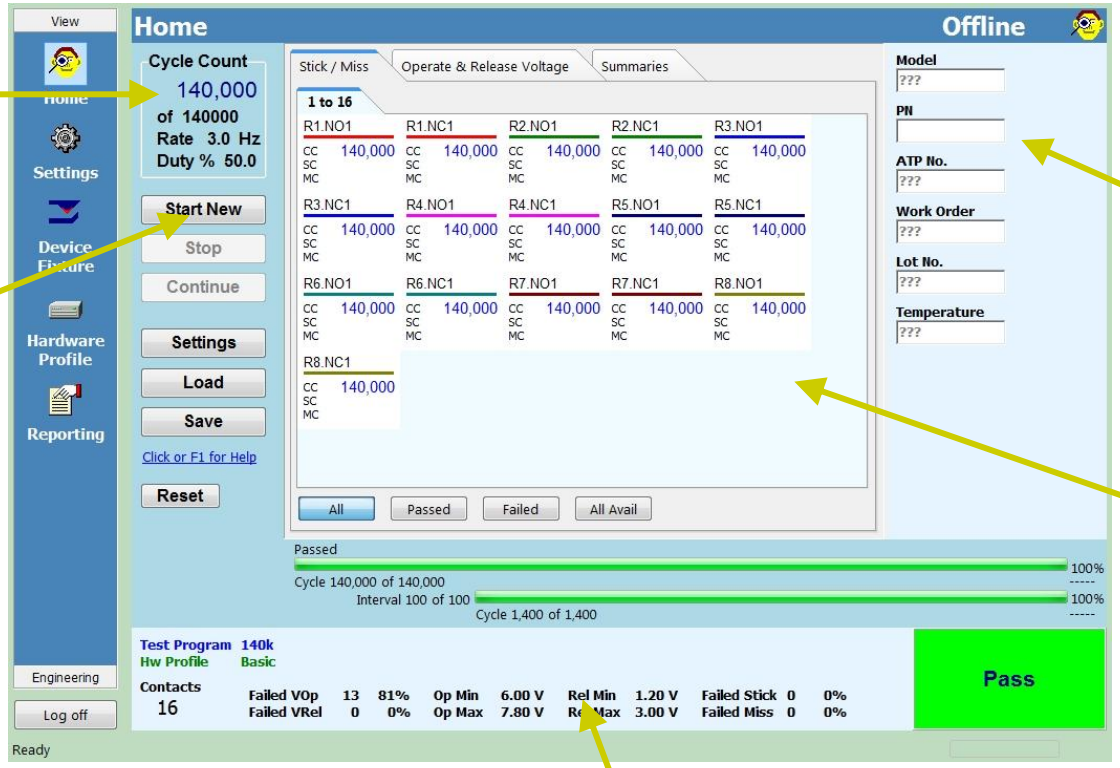
Coil switching (AC/DC switch)

Stick/Miss/Pull-in/Drop-Out mode switching

Reflex 40 software - Home page

Test status panel

Test control panel

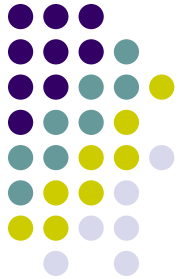


User configurable panel

Stick/Miss test summary tab

User configurable status panel

Reflex 40 software – Integrated reporting.



- Device reports generated from data-logged information.
- Easily customisable to suit individual customer requirements - logos, layout etc.
- Based on standard Microsoft Word™
- Data logged information can also be exported to Microsoft Excel™

To conclude.

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The Reflex 40 Stick and Miss Test system has eliminated many of the design weaknesses of the standard detection circuit.

Key benefits:

- Improved threshold level accuracy.
- Integrated pull-in/drop-out voltage measurements.
- AC and DC coil capability.
- Automated data logging and test report generation.