

# Evaluating relay test equipment solutions for features, benefits and costs.



**B.J.Frost** CEng MIEE  
Applied Relay Testing Ltd  
England

# A review of the relay market now at NARM's 50<sup>th</sup> Anniversary

- Up until early 2001 saw spectacular growth.
- Demand has shrunk in last 12 months, affects everyone, key people are being lost.
- Unless we move forward, the relay industry will rapidly become extinct.
- How will we move forward?

**With innovative product design and production.**

# What options are there for innovation?

- Create new and competitive products (obvious!) with lower device cost and improved performance (maybe keeps solid state away!).
- Review manufacturing methods and procedures to lower manufacturing cost and to improve yields.
- Improve information feedback from shop floor production and from customer.

# The current dilemma – stagnate or innovate?

## **Stagnate?**

- Accept existing levels of throughput, reporting and information feedback.
- Accept that elderly equipment becomes increasingly unreliable.
- Accept that your customers and competitors are busy acquiring better test equipment that you are using.
- Assume that your 'key man' will always be around.

# The current dilemma – stagnate or innovate?

## **INNOVATE!**

- Move to higher levels of throughput, reporting and information feedback with appropriately chosen equipment.
- Harness the reliability of well-developed, well-supported, commercial automatic test equipment.
- Keep ahead of your customers and competitors.
- Release your 'key man' for product-related issues.

# Minimising the cost of your innovation

- Choose a system that is 'just-adequate' for your needs (consider throughput and accuracy).
- Look for a system that is easy to install, operate and maintain.
- Consider the implications of creating and managing device test programs, possibly for 100's of parts.
- Maximise device yield and quality with a high level of data feedback (easy report generation)

# A 'just-adequate' test system must suit the nature of the manufacturing process

- Automatic lines target high throughput, less human error and effective handling of small parts – needs a high speed, parallel test architecture system.
- Manual cell production uses one or more operators working on a specific production task. Here a lower cost sequential test system can be more cost effective.

# ART's equipment range

	<i>RT290</i>	<i>ReFlex 20</i>	<i>ReFlex 10</i>
Typical application	Automated line, lab,	Manual production line, laboratory,	Manual production line
Test method / time	Parallel 0.5s	Parallel 1s	Sequential 2s
Typical accuracy	0.3%	0.5%	0.8%
Max throughput, basic tests	>8000 parts / hr	>3000 parts / hr	>1000 parts / hr
<b>System Cost</b>	<b>\$38000</b>	<b>\$19500</b>	<b>\$7500</b>



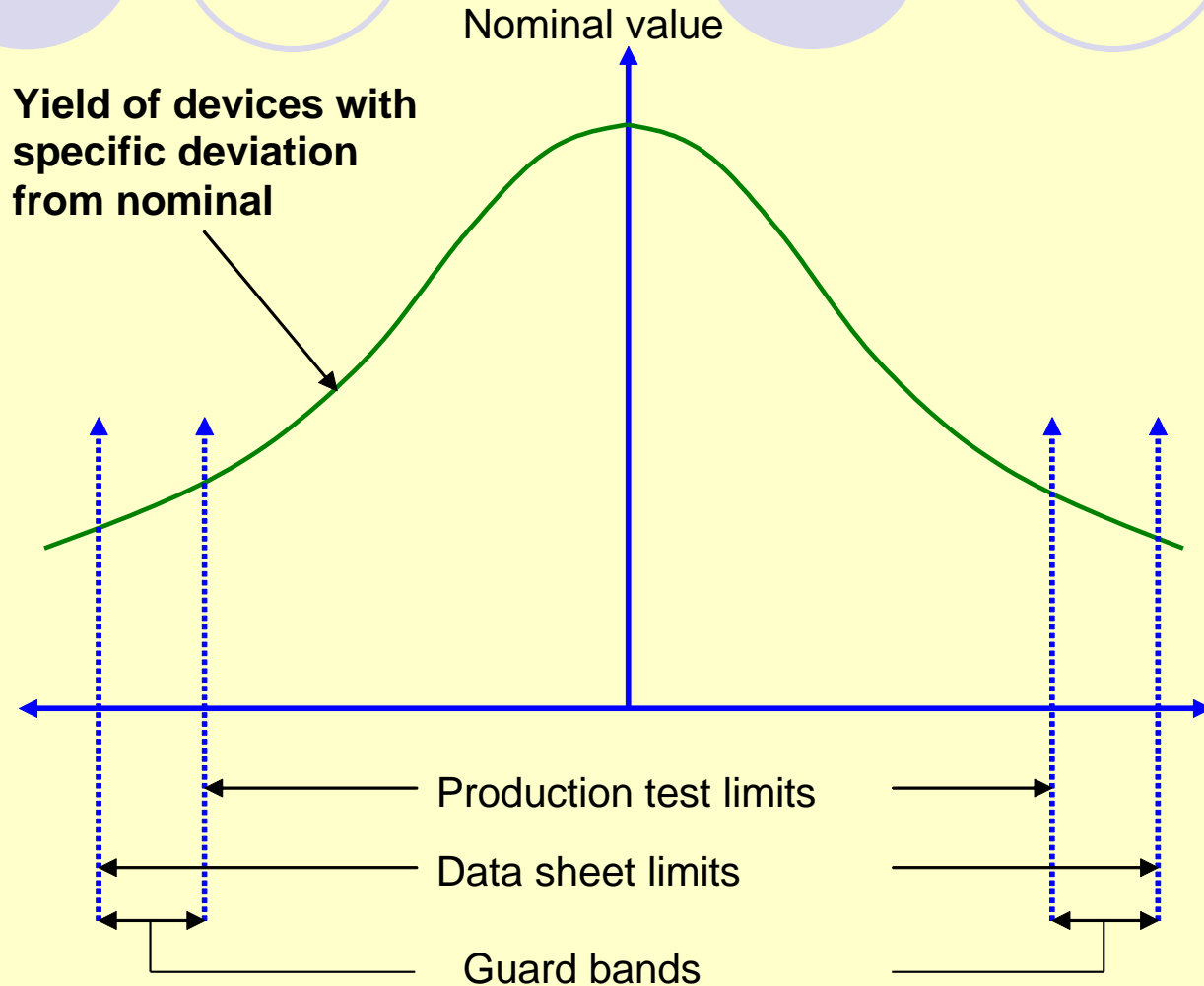


# ART has an innovation in low-cost test equipment for 2002 – the ReFlex 10

- A new low-cost relay test system - the ReFlex 10.
- At under \$8000 it brings fresh cost options to your test decisions.
- Fits completely within our existing range of equipment and accessories.
- No longer does low-cost mean second-best.



# How product accuracy influences device yield



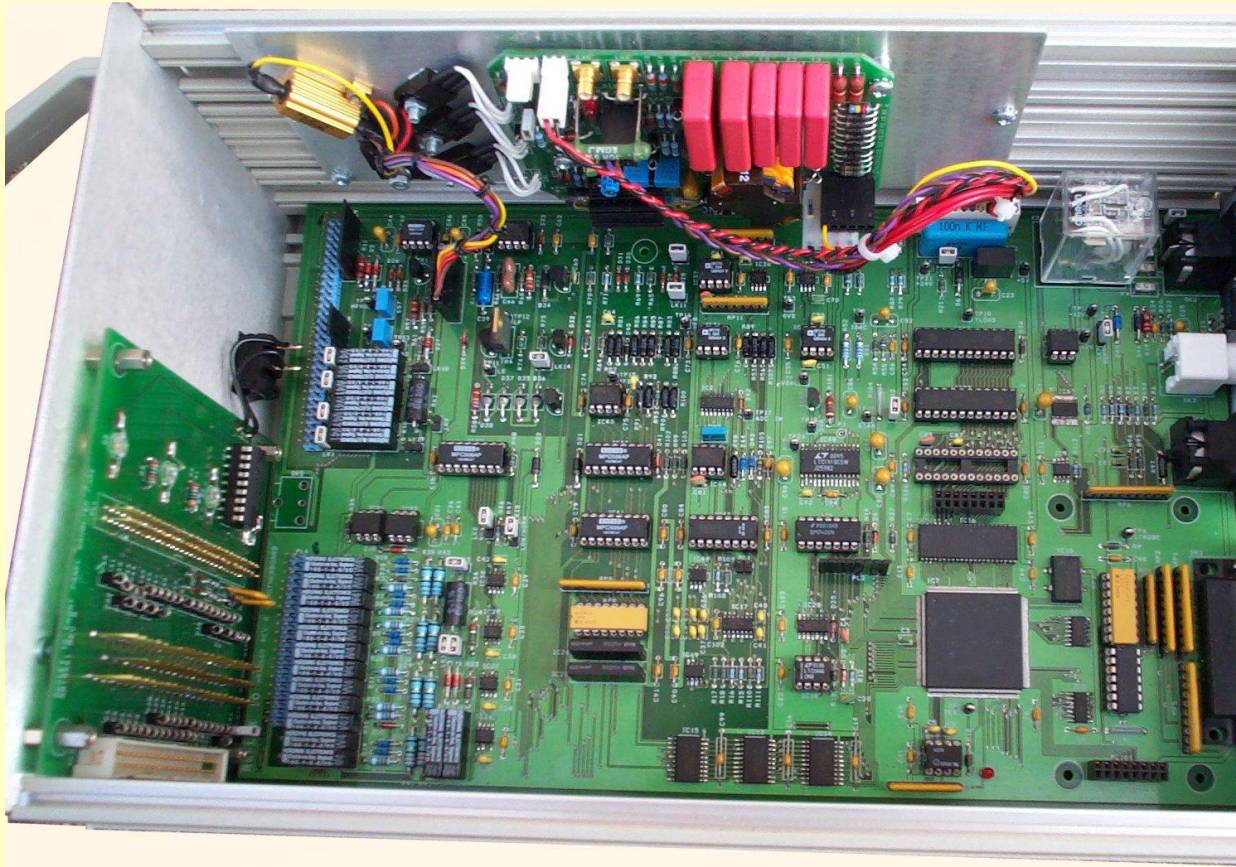
# Low-cost relay test equipment has traditionally suffered from....

- Tricky installation
- Limited test capability.
- Limited possibilities for self-test, calibration and maintenance.
- Limited documentation and support.
- Limited stability and reliability.
- Cut-down or poor software

# ReFlex 10 solves those traditional low-cost limitations with ...

- Ease of installation – simple PC parallel port connection.
- Runs all standard relay tests using the common ArtWorks software platform.
- Integrated self-test, external auto-calibration.
- Online documentation and full ART support.
- New surface-mount technology for improved reliability.

# Reflex 10 low-cost design



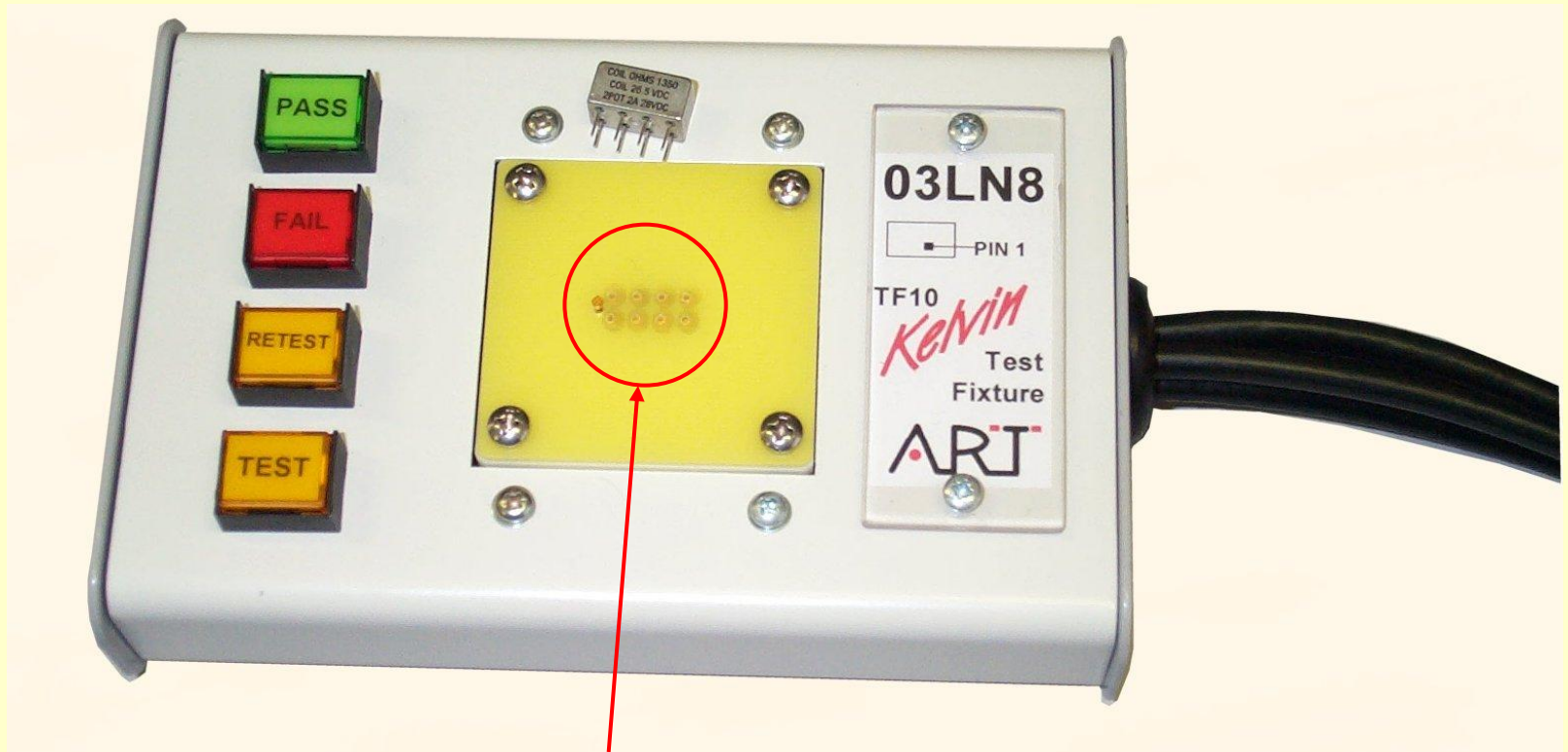
...and very compact footprint



# Innovation in fixturing is important

- Just making it low-cost or simple is not sufficient.
- It should suit the device and the test application.
- Be reliable
- Allow a choice of ways of operator working.

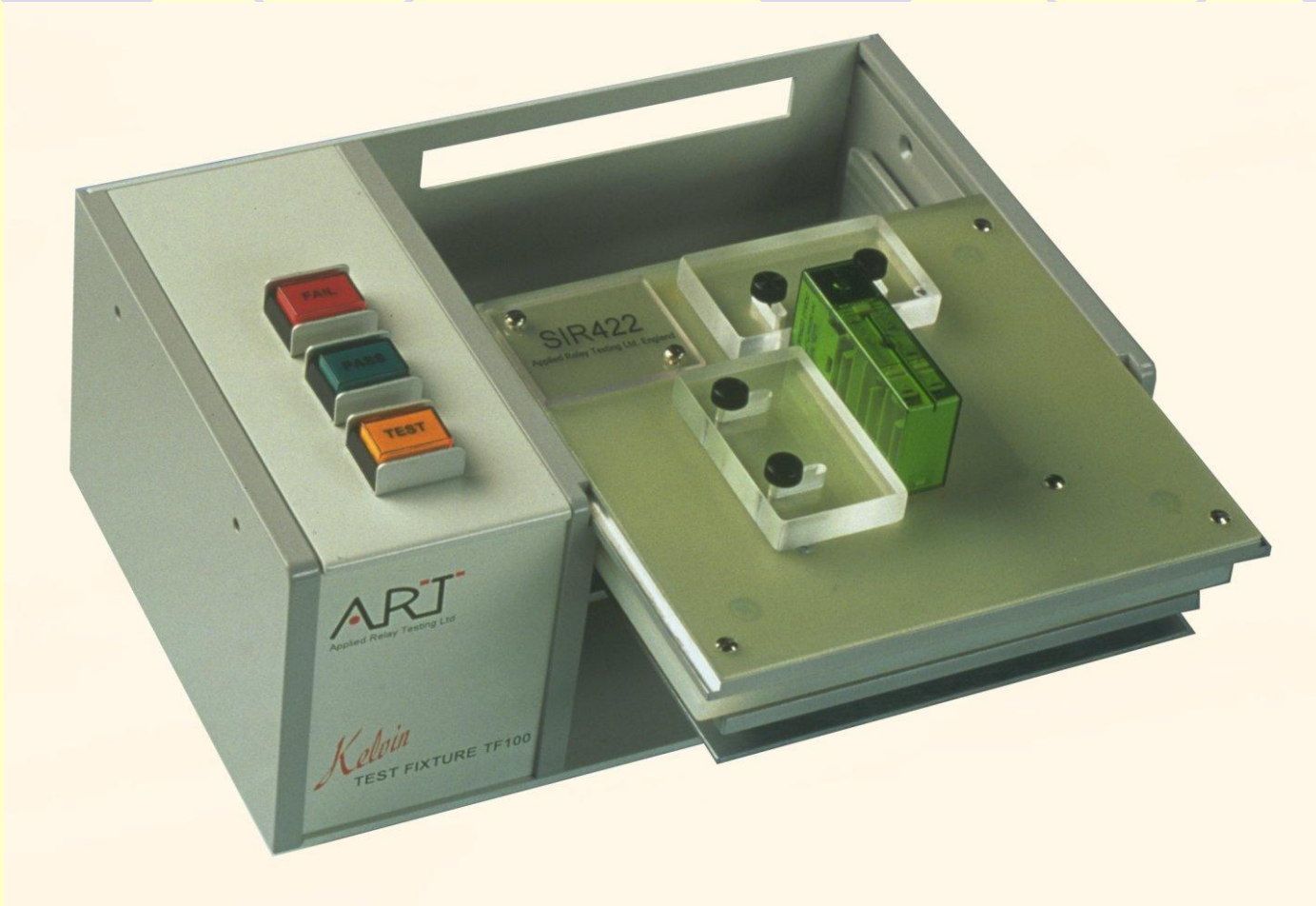
# The TF10 low-cost Kelvin test fixture kit



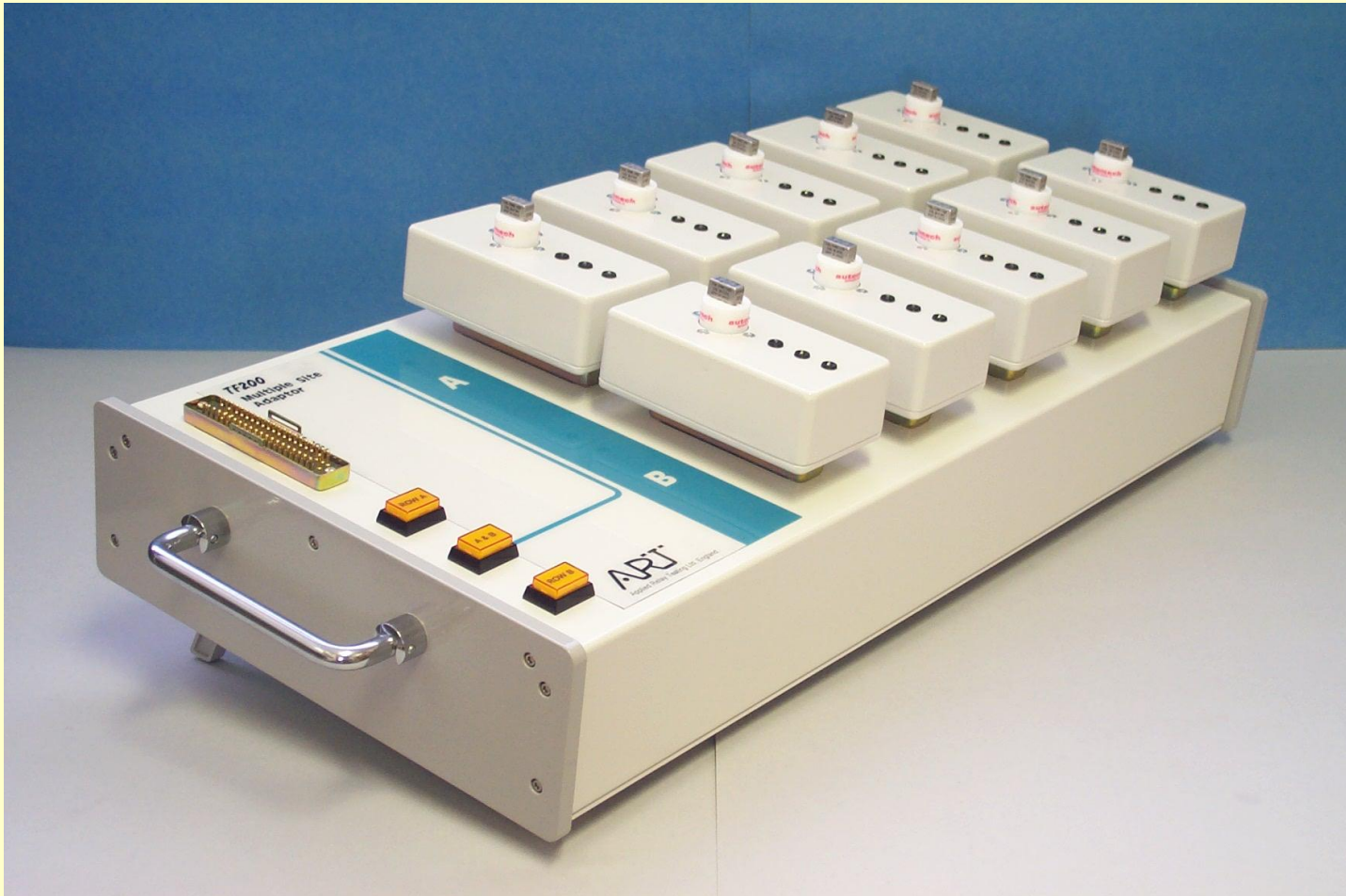
Fully Kelvin connections for **ANY** device down to and including 0.1" pin spacing



# The TF100 air-operated ZIF fixture



# The TF200 multi-device Kelvin fixture



# New software innovations reduce your costs too

- Automatic test program generation
- Automatic report generation.
- Less operator training, secure password interface.
- Intuitive, easy to create and debug relay test programs

# ART's user interface - ArtWorks

	<i>RT290</i>	<i>ReFlex 20</i>	<i>ReFlex 10</i>
User interface	ArtWorks	ArtWorks	ArtWorks
Test programming	Automatic	Automatic	Automatic
Reporting	Reporter	Reporter	Reporter
Fixturing	Common	Common	Common





# Finally ...

- Choose a cost-effective test system just adequate for your needs.
- Use the latest software tools to reduce your costs and improve production yield.
- Remember that out-dated and unreliable equipment has an on-going cost too.
- Don't let your competitors get there first. So, you choose. Stagnate or **INNOVATE!**

Thank you.