



HYBRID COPPER-FIBRE TEST SYSTEM

The world's first fully integrated test system for hybrid electrical and optical harnesses

Modern aerospace and rail systems are increasingly adopting hybrid connectors - combining fibre optics and electrical conductors in the same shell.

Until now, testing these complex assemblies has required multiple systems, added time, and specialist knowledge.

The Hybrid Test System from MK Test Systems and AVoptics offers a unique integrated approach. It provides automatic validation of both copper and fibre connections in a single, streamlined test process.

At a glance:

- Hybrid testing in a single system
- Combined testing of electrical and optical links, ideal for ARINC 600, EN4165, Radiall EPX, M29504/38999 and more.
- Compact, half-rack design - suitable for field and lab use
- Built-in high voltage capability
- Civil & defence aerospace | Rail | Maritime | UAVs | Vetronics | Space
- Co-created by MK Test Systems and AVoptics with funding from NATEP (National Aerospace Technology Exploitation Programme)



What makes the Hybrid Copper-Fibre Test System different?

- Hybrid Testing in One System: Supports combined testing of electrical and optical links, ideal for connectors such as ARINC 600, EN4165, Radiall EPX, and M29504/38999.
- Single-Ended Optical Testing: Reflective and return loss testing using novel power harvesting methods - no need to access both ends of the cable.
- Electrical Testing to 2500V DC: Built-in high-voltage capability using latching relay switching (46 test points per card) with FPGA control and fault protection.
- Compact, Modular Design: Up to 9 slots in a rugged half-rack format, expandable and suitable for field or lab use.
- Automated, Deskilld Workflow: One-click software simplifies testing with minimal training required.

Benefits for OEMs, MROs, and System Integrators

- Faster Fault Diagnosis: Locates breaks, shorts, misroutes, and reflection faults in hybrid assemblies quickly and accurately.
- Portable and Scalable: Suitable for field diagnostics, production line QA, and lab development environments.
- Future-Ready: Designed with expansion in mind - optical module scaling, channel routing detection, and integration with upcoming harness types.



The Hybrid Test System is currently in early deployment, and customer demonstrations and preproduction developments are underway.

Get in touch to explore how this system could improve your operations.

Inside the system

- Optical Modules: Supports multimode and single-mode fibre with integrated circulators to improve signal stability; APC connectors reduce back reflection for cleaner measurement.
- Return & Insertion Loss Calculations: Power ratio-based measurement techniques eliminate the need for absolute calibration, improving robustness in the field.
- High Voltage DC Module: Microcontroller-driven control with PWM-based waveform generation, isolation relays, and fault detection for safe and reliable operation.
- Control Hardware: A universal main control unit coordinates optical and electrical testing, with Ethernet connectivity and expandable card-based architecture.
- Connector Interfaces: Designed for use with MT/APC (12 or 16 channel) connectors, with flexibility for various harness types at the test end.

About us

MK Test Systems have been a leading manufacturer and supplier of automatic harness testing systems since 1991. Leading aerospace, defence, and rail companies rely on our systems to test their products; we have successfully designed, delivered and implemented over 3000 test systems into 34 countries.

Contact us

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