Burn-In, Life-Test and Qualification System
Low Power System

Yelo Ltd is a leading provider of photonics test, automation and qualification systems with a long pedigree in supplying the key names in the industry. Based on our many years of experience, the Yelo Burn-In, Life-Test and Qualification System sets new standards of flexibility and cost-effectiveness for photonics design and manufacture. In-depth understanding of photonics components development and manufacturing processes means our standard platform can be simply adapted to suit a wide variety of photonics applications.

The system architecture, electronics, mechanics and software have a common modularity across the family of products. The selection of an appropriate test system will depend on the power requirements of the device-under-test.

Low Power System Overview

The Yelo Burn-In, Life-Test and Qualification System provide a modular tightly temperature controlled environment in which to test photonics components such as multi-chip edge emitters, VCSELs, photodetectors (both PIN and APD), transmitter and receiver modules and more. Devices can be tested either packaged or in the chip-on-carrier form, and can be tested with in-situ optical measurements – no need to remove the emitters to do pre and post burn-in / periodic LIV plots. These systems use air-cooling which limits the heat removal from your devices.

The modular construction is optimized for flexibility so that the system can be used for low quantity testing in the laboratory, but can also be easily scaled up to test up to 2,048 devices in production. This flexibility also allows simultaneous testing in up to 128 different temperature zones.

Different drawer types are available to allow for testing of various low-power transmitters and receivers.

Built-in precision instrumentation allows NIST (National Institute of Standards and Technology) standard accuracy for the stimulation and measurement of individual transmitters and receivers while at the same time maintaining constant drive to the remaining devices for applications such as burn-in or life-test.

There can be up to 16 drawer units, within each of which, the electrical and mechanical connections to photonics devices are completely flexible. Off-the-shelf fixturing includes high-accuracy pogo pins for chip-on-carrier devices, zero-insertion-force connectors for packaged devices and TO headers.

The overall architecture significantly lowers the system cost by integrating the traditional components of oven and drive/control electronics. The resultant system has a lower cost and smaller footprint, while still being quickly interchangeable with no need for external interconnection cables.

yelo Test Systems

Burn-In, Life-Test and Qualification System

Benefits

- Lower cost by design due to integration of ovens and control electronics
- Modular construction allows the system to be cost effective for both low and high-quantity use
- Simultaneous testing of different products for maximum flexibility
- Simple expansion route by adding more modules and drawers – the system will grow with the photonics component through its life cycle from design into production – start with 1 drawer and expand effortlessly later
- Expands to high device counts, up to 2,048 low-power transmitter/receivers
- Up to 128 temperature zones, allowing flexibility of test regimes and batch testing
- Flexible uses include burn-in, life-test and qualification
- High-quality instrumentation can be swapped out for periodic re-calibration, which ensures drifts measured are due to the devices under test and not the test system
- High-accuracy stimulation and measurement for more accurate results
- Option of lower-cost instrumentation system to optimize cost / performance
- Standard or tailor-made fixturing with full flexibility
- Full L, I, V testing
- Simply configured for transmitters (laser diodes) or receivers (photodetectors)
- Minimum footprint to optimize clean room floor-space
- Flexible, clear user interface programmed in National Instruments LabVIEW
- Full results data logging to ODBC-compliant databases
- Modular construction provides easy maintenance

Technical Specifications

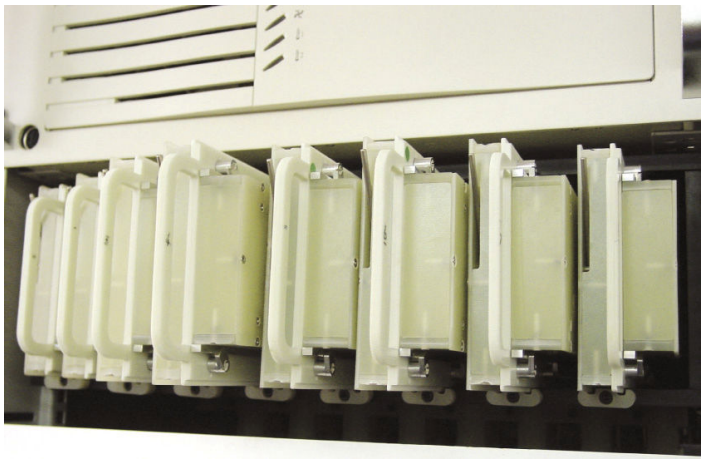
Hardware

- Number of devices per drawer: generally up to 128 depending on power dissipation
- Number of drawers per rack: 1 to 4
- Single rack with controller covers up to 512 devices; one controller can also control up to three more racks, for a total of 2,048 devices
- Potential to double capacity to 1024 low power devices per rack, 4,096 per system
- Combinations of low power lasers and receivers possible in same system
- Temperature 25°C to 150°C, accuracy +/- 2.5°C.
- Various laser drive current options available with 12 bit accuracy
- Laser voltage range 0.5 V to 10 V or higher as required, APD up to >150V
- All power supplies built in
- Chilled air option allows operation of modules at below ambient
- Voltage/Current source spot measurements
- Photocurrent 500 pA to 200 mA
- All module parameters such as drive current, temperature burn-in time, etc. can be set independently

Designed for both development (Life-test and Characterization) and production (Pre/Post burn-in testing plus burn-in) in one system.

Devices which can be tested include:

- Laser Chip-on-Carrier (CoC) Assemblies
- Laser Packages including high power and multi-chip arrays
- Optical and Wireless Modules, Subsystems
- Photodetector CoC Assemblies
- Optical Receiver Packages
- Tunable-Gain-Controlled (TGC) Devices



Technical Specifications

Software

- Flexible, clear user interface displaying the status of units under test
- National Instruments TestStand core using sequence callbacks to allow customization of loading, unloading, reporting and analysis
- Most code written in National Instruments LabView,
- Immediate indication of each module temperature, as well as a good / not good indication for each part
- Simple options for a range of alarm, display and reporting functions including:
  - Programmable alarm conditions
  - Alarm notification via email
  - Graphical display of degradation e.g. Light output vs. time
  - Process monitoring (system statistics, hours, etc.)
  - Data recording to any ODBC-compliant database
  - Graphical displays of device performance during testing
  - Data logging
  - Graphical display of various device parameters
  - Sweep-scans and spot-scans
  - Threshold, resistance and slope calculations
  - Individualized temperature cycling for each module
- All reporting data can be sent to a network drive using the built-in Ethernet connection, allowing data to be analyzed remotely
- Laser control constant current or constant power modes
- LIV plots, zero to maximum drive current
- Up to 1,000 steps per plot
- Burn-in at one temperature, characterized at another
- Dynamic temperature recipe, *i.e.* simple set up of times and temperatures to cycle in different temperature conditions

Why Yelo?

- Proven record of supplying scalable and innovative systems which reduce costs and provide quicker returns on investment
- International presence with operations centers in North America and Europe
- In-depth knowledge of opto-electronic/photonics component technology and processes
- High-reliability mechanics and electronics built in at the design stage
- Complete electrical, electronic, software and mechanical engineering facilities
- Project planning and system design, software implementation, construction, on-site commissioning
- Complete and up-to-date technical documentation
- All projects are ISO 9001:2000 compliant
- All products are CE approved as standard, others on request (UL, CSE, etc.)

Commercial Applications

Yelo burn-in and life test systems have been successfully in use for over 15 years. Some of the applications include:

- Production burn in for high-volume laser products
- Complex characterisations for a university
- Burn-in and life test for VCSELs / edge emitters / PIN and APD detectors
- Production test systems for bi-directional telecommunication components
- Burn-in testing for complex tunable laser products

Technology Partner

NATIONAL INSTRUMENTS™

Q&A

Q: What makes this system so flexible?

A: Conventional systems use a large single oven often connected to the drive and control electronics by cables. The Yelo system instead uses a series of 'mini ovens' which plug into the rack rather like conventional PCBs. As well as significantly reducing the costs, this means that each module is fully independent in temperature, timing and drive conditions. It really is like having a series of fully-independent mini burn-in systems.

Q: Can I test different products at the same time, and if so with what restrictions?

A: Yes, each module is truly independent. This means you can have different modules testing different products fully asynchronously in the system.

Q: Can I use the system for life test and burn-in at the same time?

A: Yes, it is quite common to find a Yelo system with some modules being changed regularly as they perform burn-in, while others are running continuously to produce life test or characterization data.

Q: What type of cooling is used?

A: Low power devices use air cooling, sometimes with a chiller to achieve lower temperatures. There is a direct relationship between power dissipation of your devices and the minimum temperature achievable.

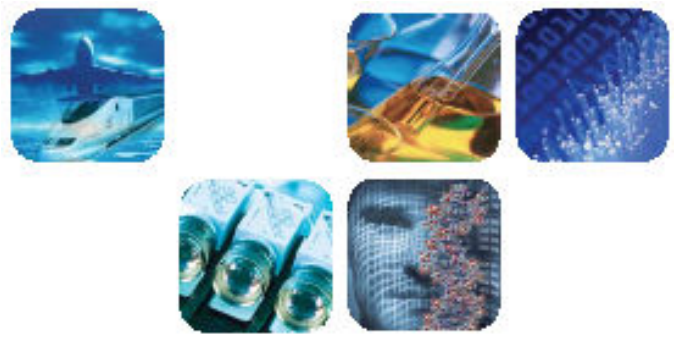
Q: Can I set individual device temperatures?

A: Within the low-power modules device temperatures are usually set per module, usually for a group of 16 (up to a possible 32) devices at a time.

Q: What are the different drawer types and how easy is it to change use?

A: The low power system has two drawer types available:
- Transmitters
- Receivers

See alternative data sheet for liquid-cooled high power devices



Q: What types of modules are available and how easy is it to refixture?

A: There are a growing number of modules available to cater for most common device packages, including DIL, CoC, TO cans, C mount, etc. Yelo are specialists in connecting to increasingly miniaturized packages; contact us for your requirements. Most modules can be refixtured for different packages.

Q: How easy is it to measure light output?

A: All modules are designed to have light measurement added. This can be using detectors directly, via filters or via integrating spheres. Various types of detectors can be used including Si, Ge and InGaAs, - they are usually cooled for stability and increased life span.

Q: What type of chiller is needed?

A: The systems have been used with air-air and water-to-air chillers. The best type will depend on the power of your devices and what is available, for example a factory-cooled water supply.

Q: How is calibration carried out and is it traceable?

A: The system uses industry-standard, high-accuracy instruments which also transfer calibration to the internal source/measuring system. These instruments are calibrated in the normal way and can of course be made traceable.

Q: What if I lose mains or have a system failure?

A: The systems can be supplied with uninterruptible power supplies, which supply the sources and control electronics and enable an orderly shut down. Each drawer in the Yelo system is fully independent; so if a failure occurs then only that drawer is affected. If the PC is shut down or fails testing continues in the drawers – only datalogging is affected.

Q: What is the PC interface?

A: The system is controlled by an external PC; however, each drawer is independent and can be operated without the PC. A single card in the PC provides the interface to the system. The supplied software runs under Windows (usually Windows XP) and includes easy-to-use programming tools. Full datalogging is included providing data exported into Microsoft Access or Excel.