

# INTEPRO SYSTEMS

## FUNCTIONAL POWER TEST SYSTEMS



- :: **Functional and ESS Test**
- :: **Open-architecture Hardware Supporting LXI / IEEE / VXI / PXI**
- :: **“Family” Test Support**
- :: **Powerful Open 32bit Windows® Test Executive**
- :: **Customized Hardware and Software**
- :: **Full Turnkey Solutions**
- :: **ISO 9000 Certified**
- :: **Worldwide Support Network**



## OVERVIEW

Intepro Systems is the choice of power supply users and manufacturers all over the world to meet their design, manufacturing and quality control needs. Our knowledge and expertise in commercial power supplies, distributed power systems, power electronics, and power components make our systems unparalleled for production testing, ESS screening, repair and characterization.

Applications include production functional testing of AC/DC power supplies, DC/DC power supplies, rectifiers, PC power supplies, point of load devices, UPS and more. Intepro systems are also used in the repair and design characterization of these units as well in as a wide range of associated power electronics.

Key to the systems is an open architecture for hardware and software that permits complete flexibility to configure and integrate any third-party instrumentation with a wide range of Intepro and customer hardware. The powerful software test executive supports fast TPS development with and without writing test code. Seamless integration of key IVI packages, such as Intepro's PowerStar Virtual Instruments and Routines and National Instruments' LabView package, as well as support for Visual Basic, let our customers choose the methods and procedures for TPS development and documentation.

This is the basis for Intepro systems being tailor-made test solutions, delivering comprehensive test coverage and high productivity to some of the world's largest-volume manufacturers as well as the affordability needed by niche market producers.

## SYSTEM FEATURES

Systems are configured using open architecture hardware and software including:

- :: Never obsolete, scalable solutions
- :: Powerful 32-bit Windows® test executive with drag and drop test program generation
- :: Hundreds of supported instruments
- :: IEEE-488, VXI, PXI, LXI, Ethernet and USB
- :: Virginia Panel, Hypertronics, Mac Panel interfaces
- :: Specials are OK
- :: Your specifications, our quality solutions



*Intepro family of power electronics test systems*



*Turnkey solutions including fixtures and test programs*



*Automatic handling test system*

## PROJECT MANAGEMENT

Intepro Systems follows a structured approach in specifying and implementing test systems.

All-orders are coordinated by a dedicated project engineer who liaises directly with the customer during all phases of the project including:

- :: System specification
- :: System implementation
- :: Project status updates
- :: Factory acceptance
- :: Maintenance planning
- :: Spares planning
- :: System installation and start up at customer sites
- :: Post-installation support

## PROJECT MONITORING

Projects are reviewed during the implementation phase via routine weekly conference meetings with the customer. Key project design reviews are managed via teleconference meetings or on-site meetings.

Project planning, resourcing, and progress updates are managed using MS Project™ planning schedules. Intepro systems encourage factory acceptance tests with the customer prior to shipping. After factory acceptance, on-site installation is carried at the customer location.

## MAINTENANCE, SUPPORT & SERVICES

### APPLICATION SUPPORT

Full turnkey solutions can be provided including the design and development of application test fixtures and test programs.

### SELF-TEST

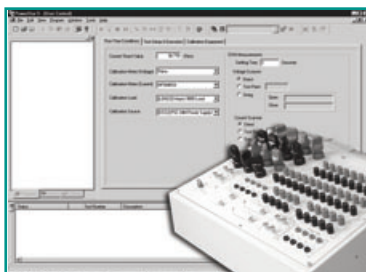
A self-test facility is provided with each test system to carry out an automatic functional check on the test system's hardware.

### CALIBRATION

A calibration adapter and CalStar 5 calibration software facility is used to verify system calibration. Third-party instruments are removed for calibration at an accredited calibration laboratory.



Self-test adapter and software



Calibration adapter

## DOCUMENTATION

- :: Service manuals including detailed system schematics
- :: Manuals for all instruments
- :: System parts list

## SERVICES

Intepro Systems has a worldwide network of support centers that provide a training application and post-installation support services.

### TRAINING

The following training courses are available:

#### BASIC TRAINING

Introductory training covering system hardware, software and maintenance.

#### ADVANCED SOFTWARE TRAINING

Advanced training covering the generation of special tests and instrument drivers.

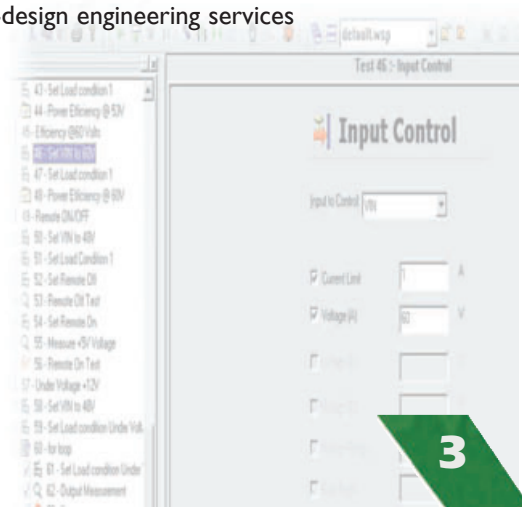
#### MAINTENANCE CALIBRATION TRAINING

Detailed system descriptions, routine maintenance, troubleshooting, self-test, calibration and system documentation.

#### POST-INSTALLATION MAINTENANCE SERVICES

These include:

- :: Warranty support
- :: Maintenance contracts
- :: On-site call out
- :: Calibration
- :: Return and repair
- :: Telephone technical support
- :: Application support
- :: Remote diagnostics
- :: Spares planning
- :: Software support
- :: Upgrades
- :: Post-design engineering services



## POWERSTAR 5 POWERFUL FACILITIES INCLUDE:

- Application-specific test libraries
- Drag and drop program generation
- Comprehensive test sequencing control
- “Family” testing made easy
- SQL™ and MS Access™ database reporting
- High-speed performance
- GUI/IVI programming
- In-environment LabView™ support
- Virtual instrument support
- Visual Basic™, Atlas or IEEE-1641 programming

## INTRODUCTION

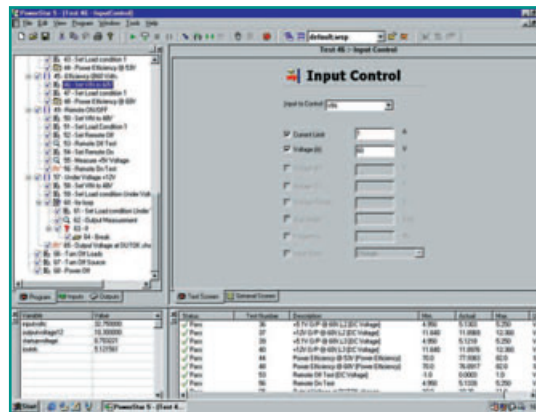
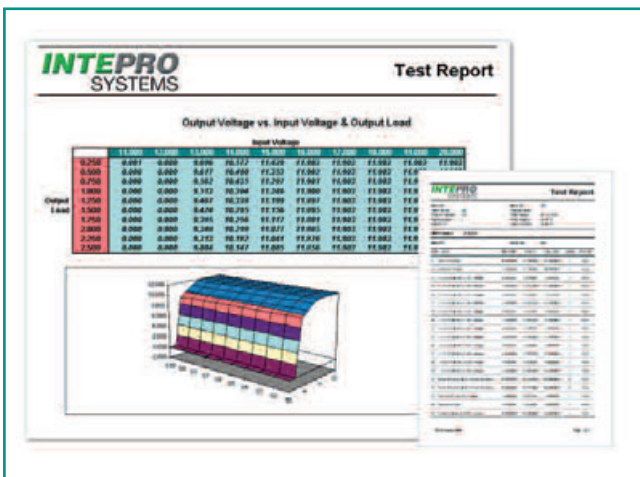
All Intepro test systems include PowerStar 5, an open-architecture test executive that has been field proven since 2000 and still is the most powerful, user-flexible software available for functional, verification and ESS testing.

Key to its flexibility is PowerStar 5’s ability to let users create test programs using variables instead of values. This results in a single test program for an entire family of power supplies, cutting development time, and reducing support efforts and documentation.

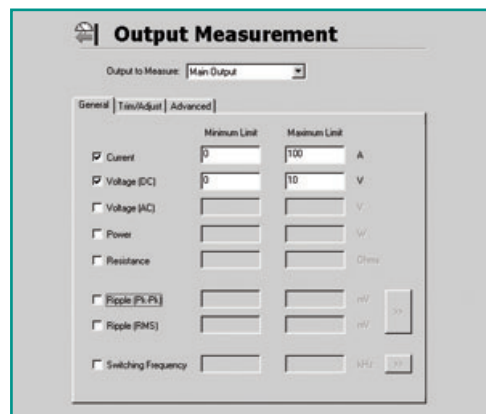
These variables can be static or dynamic, allowing the program to set up the power supply outputs or configuration and then test the unit to its defined limits.

## TEST SETUP

With a true open-architecture structure, PowerStar 5 facilitates the engineers’ job of quickly developing comprehensive test programs. Engineers create the TPS by simply selecting from nearly 200 standard tests routines, limit checks, data logging or data exporting functions. They can also write their own test libraries or instrument drivers with the built-in VBA (Visual Basic for Applications).



Test development window



Test program window showing a data entry input screen.

Major advantages of this are

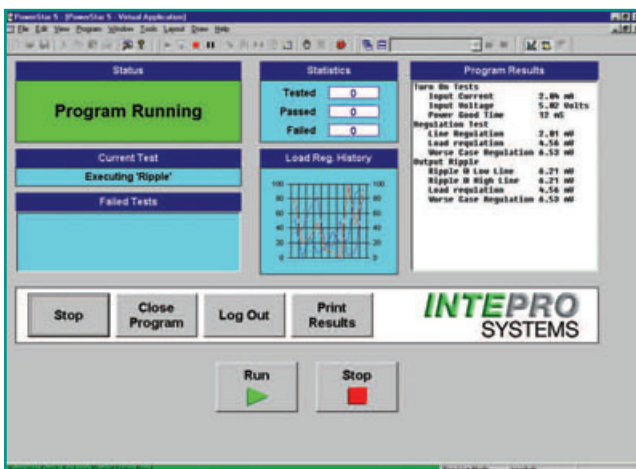
- :: Users can generate fill-in-the-blanks test programs using predefined tests.
- :: Variables as well as numeric values are supported in the test menu.
- :: Users can customize library tests or generate their own special tests.
- :: Standard libraries are provided for comprehensive control of test sequence execution including 'for\_next' and 'while\_end' loop controls,

Engineers can structure the tests sequences into a number of test groups. Variables are used for flow control structures in the test sequences, making the TPS perfect for families of power supplies and for supplies with programmed outputs.

## DEBUGGING TOOLS

PowerStar 5 goes beyond ease of test programming with a comprehensive group of tools to help test integration.

Transmission logging provides comprehensive, low level information on exchanges between the software and the hardware to facilitate debugging test programs and creating special tests.



User defined operator screen created using the virtual

## VIRTUAL INSTRUMENTS

With PowerStar 5, users can build graphical virtual instruments (VIs) instead of writing text-focused programs. Users can quickly create front panel user interfaces to support interactive control of the test system instruments or call LabView VIs. This is very useful for debugging and design characterization applications.

## TEST DEVELOPMENT KIT (TDK)

The TDK facility is a built-in development environment for PowerStar 5's ATE test executive, providing a powerful means for users to create custom, data-driven tests, drivers within PowerStar 5 or test programs.

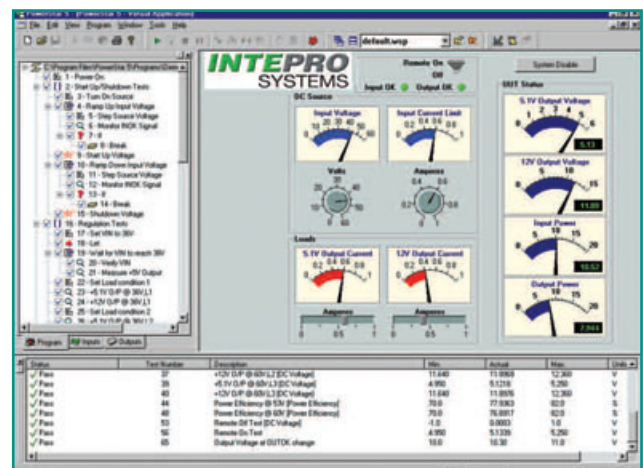
## ATLAS/IEEE-1641

PowerStar 5 is fully compatible with ATLAS or IEEE-1641 and may be run as a module within an ATLAS or IEEE-1641 system environment.

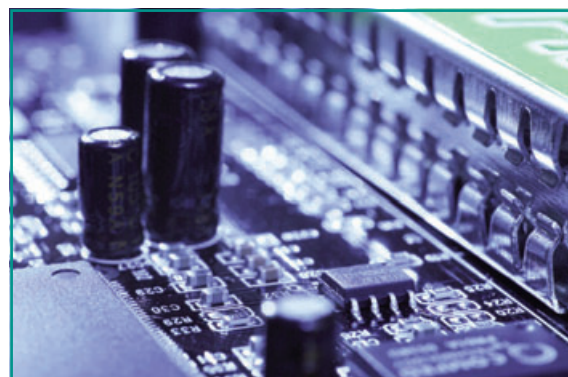
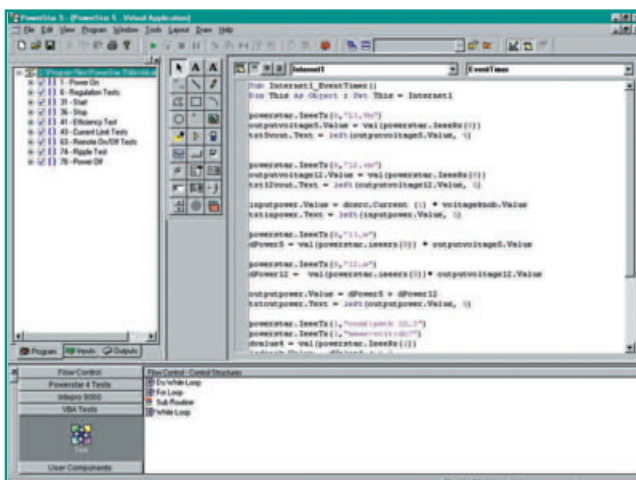
## TEST RESULTS

PowerStar 5 results are written to an SQL or MS Access® database. The package has facilities to query results for tested units as well as user-customizable reporting.

Test support is provided throughout the product life cycle, from design characterization to volume production testing, maintenance, faultfinding and repair.



Virtual applications used for debug and manual control



## HARDWARE CONFIGURATION

### OPEN BUS ARCHITECTURE

Intepro test systems are built around industry-standard open-architecture hardware platforms that enable integration of commercial off-the-shelf (COTS) instruments from such major vendors as Agilent, National Instruments, Cytel, Fluke and others.

Our engineers carefully select, test and then integrate a wide variety of DVMs and DMMs, oscilloscopes, counter-timers, function generators, DC sources, AC sources, electronic loads, including water-cooled loads and spectrum analyzers including:

- :: LXI modules
- :: VXI modules
- :: PXI modules
- :: IEEE 488 instruments

In addition, Intepro manufactures and integrates its own instruments that are specifically designed for power electronics testing including:

- :: Digital I/O
- :: Scanner modules
- :: Relay modules
- :: Function generators
- :: Counter timers
- :: Digitizers

All modules are expertly assembled into a variety of 19" racks. Multiple cabinets may be used to configure larger systems.

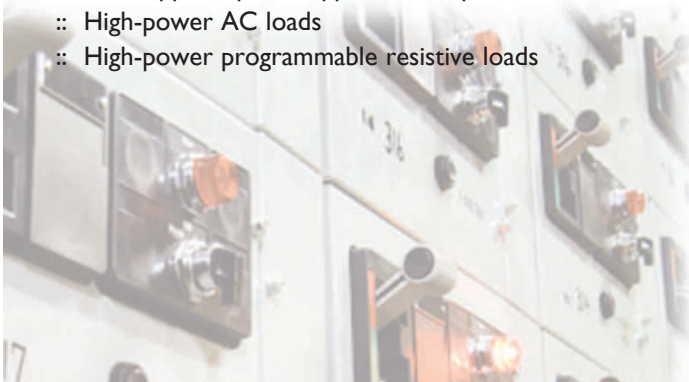
### FIXTURE INTERFACE

Intepro systems can be fitted with industry-standard hypertac/ hypertronics, Virginia Panel receivers and interface test adapters (ITAs). Custom interfaces are also available.

### SPECIAL MODULES

Intepro Systems has wide experience developing special modules to support specific application requirements such as:

- :: High-power AC loads
- :: High-power programmable resistive loads



- :: Software drivers and tests

### SAFETY

The systems contain interlocks and optional real-time safety shutdown modules that cut off power to the unit under test when critical programmable thresholds are exceeded.

### DOCUMENTATION

Comprehensive system documentation is provided, including:

- :: System manuals
- :: System wiring diagrams
- :: Maintenance manuals
- :: Calibration
- :: Self-test
- :: Operator manuals

### ESS/BURN-IN AND PRODUCT LIFE TESTING

Intepro Systems' environmental stress screening (ESS)/burn-in systems are ideal for burn-in and life characterization applications. Intepro integrates a variety of static and electronic loads including "Green Loads" which recycle more than 80% of the power drawn from the AC mains or DC input. These energy recycling loads come in three models:

- ELU60 - 60V/25A/375W
- ELU120 - 120V/65A/5kW
- ELU500 - 420V/25A/10kW

These "LoadSavers" cover a wide range of voltage, current and power combinations. Because up to 80% of the load energy is recycled, air-conditioning and electrical facility costs are greatly reduced.

- :: DC/DC converter test station
- :: Integrated hi-pot and insulation testers



*Combination functional and safety test station*

- :: One fixture for both functional and safety test



*Large AC/DC test system*

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- :: Lo
- :: Gr



*Automatic handling test system*

- :: LXI-based configuration
- :: 30kVA AC source
- :: Scope and spectrum analyzer



*Powerful 2-Bay system design*

Testing of large PSUs & UPSs



*Low-cost bench top test station*

::

- :: Automatic handling solution
- :: Combined safety and functional tests
- :: Reduced handling requirements



*"Green" burn-in test system using*

- High-density modular rack loads
- :: 3-phase AC source
- :: Open hardware and software for easy upgrades

- :: 45 cell DC/DC burn-in system
- :: Recycles 80% of total energy onto the



*I9500LXI - first LXI-based PSU test station*

::

- :: Automatic program selection and loading
- :: Testing of mixed configuration products
- Functional testing for low-power converters
- :: Single-phase AC source
- :: Rack loads and instruments
- :: Low cost solution
- :: Fully configurable
- :: Fast test speed

## Worldwide Support

### SUMMARY

Intepro Systems has years of experience delivering custom solutions under stringent budget and time requirements. A flexible system architecture and a dedicated engineering team together provide technical support from initial system specification design, right through build, test, installation, application and maintenance. Key to this is the assignment of a dedicated project manager to work closely with customers throughout the entire process.

Intepro Systems has built its reputation across all power electronics markets by establishing long-term relationships with its customers and delivering the highest return on their test investment. We look forward to working with you.

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