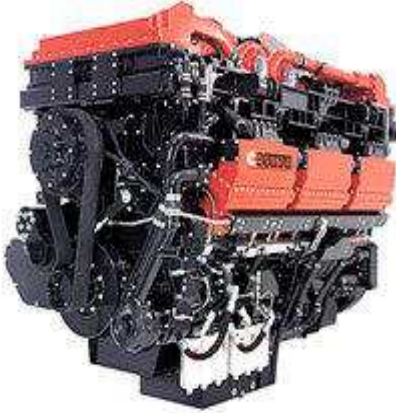


Overview - A World-Class Test System

CyFlex Test System is a world-class, highly flexible test system currently in use at major engineering facilities in the U.S. and around the world. Because of the power and flexibility of the CyFlex Test System, it can be applied in testing and measurement applications that range from small, simple tests managing several parameters, to very large, complex tests involving hundreds of real-time measurements.



Reduced Costs, Greater Productivity

Cost reduction will come from a variety of sources:

- Improved throughput and reduction in testing bottlenecks will compress the development time both reducing costs and supporting on-time delivery to market.
- “Local” hardware systems are reduced saving maintenance and calibration costs.
- Unattended testing requires fewer technicians and/or overtime for weekend testing.
- Empowered users get more done in less time (see notes below).
- With the Enterprise license, the user no longer needs to pay for additional licenses to add test cells.

Improved Test Cell Utilization

- unattended testing of complex operations means utilization can go to a 2nd and 3rd shift of operation
- event-driven communications means no idle time do to lack of communications

For organizations offering test services, increased revenue and margins will result from:

- Increased test capability, allowing a broader range of services and adding more value.
- Improved resource utilization through automation.
- Increased quality of results, resulting in higher customer satisfaction and repeat business.

Software Strategy & Architecture

Empower users

- User control of functionality
- On-line Support
- Event driven communications via pagers, email & remote access

Organization-wide common approach

- Can be used in engineering and manufacturing

Highly Integrated Design

- Many traditional hardware functions performed by software
- Reduced hardware complexity
- Unattended complex testing
- Model-based diagnostics enable sophisticated fault detection

Event-Driven

- Inter-task communications & synchronization mechanism
- Events are both signals and messages
- Tasks remain inactive until an event is received

Networked test systems

- Upgrades via FTP
- Test monitoring from remote sites (your home)
- Remote consulting & help

Modular

- Task-based functions are narrow and specific (low coupling – high cohesion)

Layered

- A logical view / classification of modules with design rules
- Minimize device and operating system dependencies

Improved Test Cell Utilization and Flexibility

CyFlex comes with a test cell utilization tracking tool so you can baseline where you are now and track your test cell utilization improvements over time.

Utilization improvements from the software will come from

- a) unattended operation of complex operations,
- b) event-driven communications to technicians and engineers (pagers, cell-phones, emails from test cell) and
- c) new test configurability and expandability.

The software can safely run unattended tests allowing use of test cells 3 shifts a day, 7 days a week.

Supported I/O Hardware

Analog Input

National Instruments FieldPoint
 Metrabyte DAS16 family (DAS16G2, DAS1600)
 •Multiplexers (EXP-16, EXP-GP,ISO-4)
 •Computer Boards CIO-MUX16,
 Metrabus family
 Analog Devices RTI-815
 Computer Boards CIO-AD16JR-AT
 Data Translation 2801
 Hewlett-Packard HP-3852 sub-system
 DGH Serial bus I/O family
 MTL Transport
 •Universal AI (25mv to 5v and TC)
 •RTD
 •High Level & 4-20ma
 •Strain Gage

Datel PCI416 family
 Opto Optomux & Ethernet Snap IO
 Scanivalve - Ethernet thermocouple module

Analog Output

National Instruments FieldPoint
 Metrabyte DDA06, DDA15, DAS16,
 DAS1602
 Computer Boards CIO-DAC08, CIO-DAC16
 Metrabus MAO-8, MAO-12
 MTL Transport
 Opto Optomux & Ethernet Snap IO

Communciations: AK Protocol, ASAP-3
 Std, TCP/IP, ArcNet, CAN, RS-232, RS-422, RS-485, RS-488/GPIB/HPIB, J1939, J1708,J1587

Digital I/O (any 8255-based board)

National Instruments FieldPoint
 Metrabyte PIO-12, PIO-24, PIO-96,
 PIO-HV
 ICS PCDIO family (PCDIO24-P, etc.)
 Metrabus family (MDI-16, MIO-32, MII-32)
 MTL Transport
 Opto Optomux & Ethernet Snap IO

Counter/Timer (AMD9513-based boards)

Metrabyte CTM-05
 ICS DCC20/A, DCC5-P
 Computer Boards CI-CTR10, CI-CTR05
 Opto Optomux & Ethernet Snap IO

Features

Basic I/O transfer/conversion- collection & conversion ts
Mass flow - computation of mass flow rates of air and fuel: -air/gas, - continuous fuel, -fuel weighing (scales/load cell)
Performance computation - current engine performance characteristics
User-defined computations - continuous or event-driven evaluations of expressions
Statistical sampling - event-driven statistical evaluation of parameters
Hotkey manager - user definable hotkeys
Data display (multi-page) -user-definable arrangement of 6virtual pages of text data
Waveform Recorder - event-driven collection of time series data for several parameters
Test data logger - periodic or event-driven sampling of parameters into ASCII tabular form
 -automatic transfer of results through ftp, nfs, or local storage
Real-time graphics-graphic simulation of an 8-channel strip chart
Duty cycle collection & analysis-binning algorithm for up to 8 parameters with specified x-y grid
Async device handler- configurable communication mechanism from high level commands,
 - used to communicate with intelligent instruments
On/off restriction control-intermittent positioning of a valve to achieve a fixed coefficient at a single engine operating point
PID control- single-input, single-output feedback controller, engine model based feed forward option
PWM control-various methods for generating pulse-width modulated outputs depending on frequency
Limit checking-evaluation of parameters against a limit
PLC simulation-user-definable response to an event
Engine monitor-manage hr meters & range flags
Test scheduler - general purpose, file-driven scheduler of control and data acquisition processes
Engine start - re-starts with user-definable criteria
Stability evaluation - evaluates multiple criteria to determine stability of an operating point
Data transfer to UNIX/PC-LAN - automatic through FTP
Calibration utility - GUI for transducer calibration
Smokemeter interfaces -for Pierburg and AVL smokemeters
2-D & 3-D modeling -2d & 3d table interpolations in user-defined expressions
Test cell utilization tracking & reporting- automatic utilization report generation
Internodal variable & event transfers -real-time transfer of variables from one test system to another - supports use of multiple computers for one application
LabView interface - Interface to LabView tools in NT/98 environment
Emissions Analyzer - Zero and span algorithms, integrated with test flow, Auto-range control (AK support)

Real-time turbo surge prediction- tracking of compressor operating point relative to the map surge line to avoid mapping operations under surge
Real-time curve fitting - continuous evaluation of a dataset for smoothness to determine if sufficient data has been collected for optimization processes
Real-time simulation framework
 - Simulink-based applications can be integrated into CyFlex environment
 - Can be used for vehicle, environment simulation
 - Can be used for prototyping control algorithms
Gas Composition and Properties - Real-time computations of gas composition and properties
Emissions and EGR - Real-time computations
Emissions Transient Cycle - Mapping & Cycle validation
And many more features

Optional Features

History storage/retrieval
 - storage of all measured and computed parameters at sampled rate in a compressed format – can be viewed graphically
Test cell utilization tracking & reporting-graphical displays of facility utilization and current status of test cells
Real-time waveform analysis user-definable real-time extraction of engineering information from collected waveforms.
 *Optional features use third party tool that is licensed separately

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Test Console Running Cyflex