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July 2, 1996

Mirna,

For the chron file. Attached is a product description of the Hekimian REACT support system that Dan Bennett sent us today via DHL. This is in response to our matrix items 16D (4605), 16E (4610), 16G (4620). Also attached is a description of GTE's Customer Network Controller (CNC) which we received via fax from Dan Bennett today. This is related to our matrix items 16A (4590), 16D (4605), 16E (4610), 16F (4615) and 16G (4620).

Thanks

Brian

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It's amazing what we can do together.

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DATE: 7/2/96

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COVER PLUS 6 PAGES

FROM:	DEPT./LOCATION:	TELEPHONE #:
<u>Al Wood</u>	<u>Srv Act</u>	<u>214/718-1682</u>

COMMENTS:
Net Serv (Customer Network Control)
description & information

Return FAX Number: (214)719-7350 other _____

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Description

- ABILITY TO REMOTELY ACCESS AND MANAGE FACILITIES.
- CONTROL IS ACCOMPLISHED THROUGH DCS CONTROLLERS.
- CONTROLLER IS DSSII NORTEL EQUIPMENT
- CNC PROVIDES ACCESS TO A VIRTUAL PARTITIONED AREA OF CONTROLLER.

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EQUIPMENT / SOFTWARE REQUIREMENTS

- SPARCStation 20, 32 MB RAM, 1GB disk, monitor
- 32MB memory expansion board (Sparc 20)
- S-Bus fast SCSI-2 Ethernet card
- Internal SunCD Plus — 7x24 H/W warranty
- 14 GB 8mm tape desktop BU drive
- US UNIX Country Kit — Sun OS on CD-ROM
- RTU's
 - Ingress net, protocol, & Window/AGL runtime
 - DV-Tools Runtime
 - OSF/Motif
 - DSSI/OVS

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CNC CONSIDERATIONS

- TO AUGMENT EXHAUSTED FACILITIES AN ORDER WILL BE REQUIRED TO OBTAIN ADDITIONAL FACILITIES.
- CNC PROVIDES MONITORING AND CONTROL OF ASYNCHRONOUS FACILITIES AT THE DCS.
- FACILITIES CAN BE CONTROLLED AT SPECIAL DCS HUBS.
- REARRANGEMENT CANNOT BE MADE IN THE MIDDLE OF DESIGNED CIRCUITS / FACILITIES

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CNC FEATURES

- CAPABILITY TO CHANGE, REARRANGE, REROUTE OR OTHERWISE CONTROL CIRCUITS.
- ACCESS TO A GRAPHICS REPRESENTATION OF THE NETWORK.
- MAY VIEW DCS GENERATED FACILITY ALARMS.
- A PRE PLAN CAN BE ESTABLISHED.
- INITIATE CHANGES FOR FACILITY PATHS AUTOMATICALLY.
- DEDICATED OR DIAL UP ACCESS TO THE CONTROLLER.

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DSSII FEATURES

- EVENT LOGGING SYSTEM (ELS)
- SERVICE MANAGEMENT SYSTEM (SMS)
- ALARM SURVEILLANCE SYSTEM (ALS)
- TOPOLOGICAL DISPLAY (TOD)
- SELECTED OBJECT TOOL (SOT)

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CNC BENEFITS

- ABILITY TO RECONFIGURE NETWORK.
- MINIMUM NETWORK SET UP TIME.
- CONTROL ADMINISTRATIVE AND LABOR COSTS.
- CIRCUIT ORDER IS NOT REQUIRED FOR CIRCUIT CHANGES.
- ABILITY TO SEE NETWORK ALARMS.

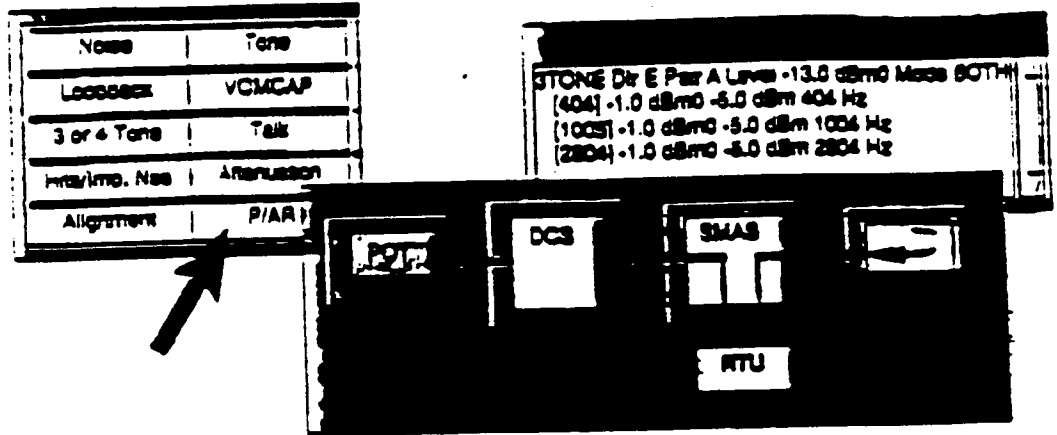
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REACT 2001 Remote Access and Test Operations Support System

Key Features

- All-new system builds on years of Heikimian experience in network testing
- Compatible with Heikimian and other Transaction Language 1 (TL1) test and access equipment
- Performs transmission and protocol testing
- Graphical user interface enhances ease of use
- Rapid test setup and concise display of test results
- Context-sensitive online help
- Flexible client/server architecture allows multiple operation
- Open interfaces to external operations systems



Network Testing Will Never Be The Same

New Generation of REACT

Heikimian's REACT 2001 Remote Access and Test system is the modern operations support system for complete testing of digital and analog network services. The system builds upon Heikimian's REACT 2000, the industry's leading operations support system for remote testing, but is an entirely new platform designed to optimize test center performance.

REACT 2001 carries forward the testing capabilities already enjoyed by the large base of REACT users. These capabilities include transmission testing, protocol testing, and performance monitoring. The system has the ability to test a wide range of circuit types. Efficient management of test resources, the circuit database, interactive and automatic testing modes, and the SMARTTEST™ scheduler are also established features.

REACT 2001 integrates leading contemporary designs and standards for user interfaces, distributed architecture, and database management. The system provides a graphical user interface (GUI) that brings new levels of control and ease of use to technicians who provision and maintain analog and digital network services. REACT 2001's flexible software architecture and distributed computing configuration provide the foundation of a robust set of tools for both interactive

and automated testing. The REACT 2001 database is implemented using a relational model to enable information sharing with corporate databases and other operations systems.

Heikimian's objectives with REACT 2001 are to deliver a test system that testers and administrators are eager to use and that meets management requirements for productivity and test duration.

A High Standard for Ease of Use

REACT 2001's graphical and character-based user interfaces provide powerful, yet easy to use, working environments for network technicians and administrators. These interfaces combine powerful features for the experienced technician with ease of use for novices.

The graphical interface allows rapid point-and-click selection of tests and parameters, with no need for repetitive selection of menu items or memorizing of multiple commands. One main window controls test setup and also displays results. The graphical interface can be accessed from an X Window terminal or workstation. The character interface works with VT100 terminals or emulation packages and is suitable for local or remote user access.

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Advanced Design Architecture

REACT 2001's software and hardware architecture makes full use of client/server relationships, relational database structures, and scalable UNIX-based systems. REACT 2001 application software resides on a platform that can be configured to satisfy virtually any operational requirement. The system's client/server modules and Motif-based X Window graphical user interface provide power, flexibility, and ease of use.

REACT 2001 also includes a powerful testing dialog capability using Helimian Command Language (HCL). It allows users to create sophisticated, reusable testing scenarios. REACT 2001's capabilities can be controlled using programmatic interfaces, including the Helimian Command Language Interface (HCLI) and an interface based on the Common Management Information Services Element (CMISE) standard.

Comprehensive Network Support

REACT 2001, with its family of related Helimian products, is the most advanced solution for interactive and automatic testing of a wide variety of network services, from analog private lines through high-capacity digital services. Powerful capabilities for monitoring, testing, and workflow management are now available in a package that is full-featured, well-integrated, and remarkably easy to use.

Features for the Test Technician

REACT 2001 provides a wide range of functions and features for the network services test technician.

Testing Modes and Options

- Interactive testing allows a technician to rapidly set up tests and view results
- Automatic testing places testing and disposition under control of external systems
- Transmission testing assures error-free operation of analog and digital facilities
- Protocol testing verifies high-level protocol operation using Protocol Vital Signs[®], suitable for frame relay traffic and Switched Multimegabit Data Service (SMDS)
- Testing in database mode uses detailed circuit/access mapping from REACT 2001 database
- Entry of partial circuit ID retrieves list of all corresponding circuits in database

- Testing in nondatabase mode allows manual entry of access point information
- REACT 2001 Emulator Mode simulates testing operations, providing an excellent environment for training or dialog development
- Users can adapt Emulator files to simulate virtually any testing situation

Selecting and Running Tests

- Wide range of circuit types:
 - Analog 2-wire, 4-wire, and 6-wire voice; 3-wire and 4-wire data
 - Channelized voice and data
 - Digital Data Services, including sustracs
 - Fractional T1
 - DS1
 - DS3
- At-a-glance selection of test type
- Quick setup of test parameters
- Easy manipulation of access functions: monitor, route, and release
- Acceptance masks for evaluation of test results
- Edit and program testing dialogs using HCL
- SMARTTEST executive allows scheduling of tests
- Performance data can be retrieved from network monitoring devices
- User can store test in progress
- Repeat last test with one command button
- Test resource table available from testing screen

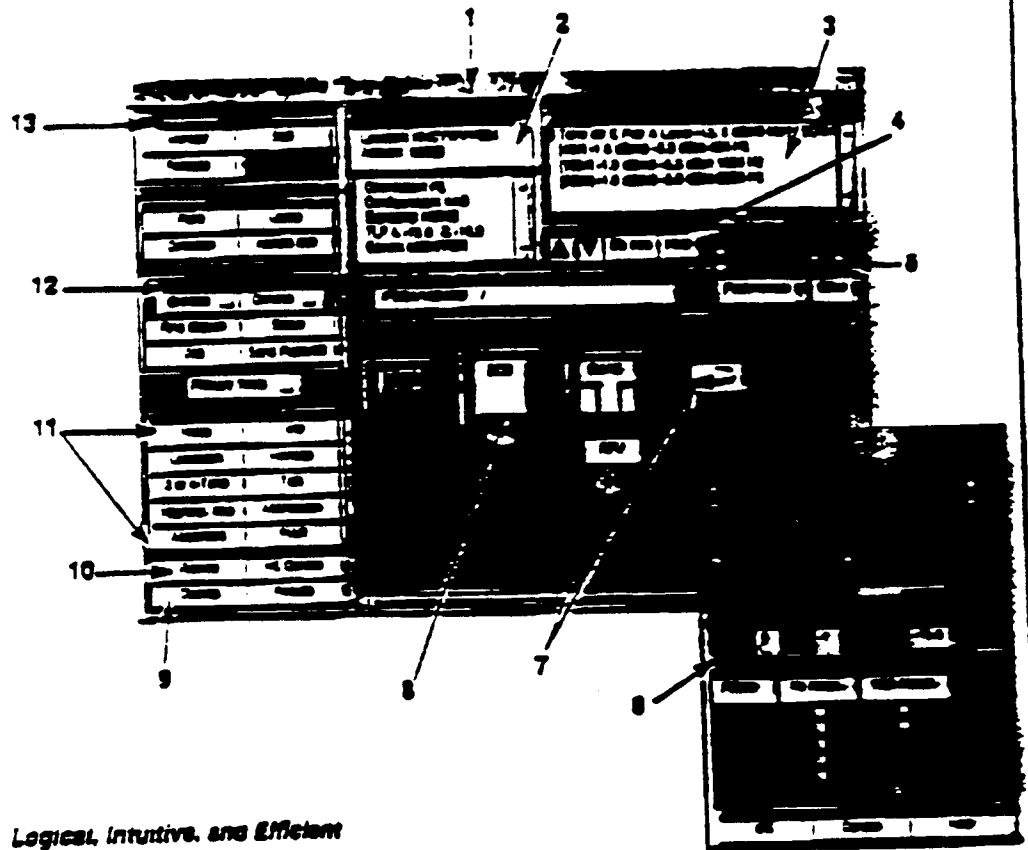
Circuit Layout Displays

- Graphical display of circuit layout and access points
- Testing configuration shows includes our identification, transmit and receive levels, remove test units, and loopbacks
- Tester scrolls display to see all parts of a complex circuit
- Point-and-click on circuit code to open a monitor screen
- Dynamic changes of graphic symbols and color highlight testing activity

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REACT 2001's Graphical User Interface



Logical, Intuitive, and Efficient

- | | |
|---|--|
| <ul style="list-style-type: none"> 1 Enter circuit ID and the test window appears 2 Status window shows test conditions 3 Results appear on same window - scroll to view entire test session 4 Online help for all major features 5 Multiple sessions - run two tests at once 6 Selection boxes open as needed 7 Test units and locations appear when used | <ul style="list-style-type: none"> 8 Graphical circuit layout - click on access point 9 Testing dialogs run complex command sequences 10 Repeat or stop a test 11 Command buttons for instant choice of test functions 12 Quick setup of signaling options 13 Easy control of circuit access |
|---|--|

Additional GUI and Help Features

- Powerful features for the experienced tester are combined with ease of use for novices
- Eliminates menu-walking—provides easy point-and-click selections
- Fast setup increases technician productivity
- Single transaction sets up multiple measurements
- Run multiple test sessions on the same circuit
- Same basic screen layout for all circuits—command buttons, status area, and results preview
- Test window is automatically populated (according to circuit ID) with test selections for analog, HiCap, or digital data items
- Context-sensitive online Help provides detailed descriptions of REACT 2001 testing operations
- Users can add their own notes to the Help displays

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SMA™ Products to Manage Network Services

REACT 2001 is the flagship component of Heikimian's Services Management Architecture™ (SMA), a family of specialized software modules using a common architecture for computing and communications. SMA products work together to provide a comprehensive approach for managing the installation and maintenance of network services. Each software module is a powerful operations support system in its own right, and together they offer the industry's strongest solution for measuring and maintaining high-quality network services.

TRKS Interface Module

This module automatically extracts circuit data from Bellcore's Trunks Integrated Records Keeping System (TIRES) or Work and Force Administration (WFA) systems to populate the database of REACT 2001 or PM Integrator. The TRKS Interface Module keeps the Heikimian systems synchronized with corporate databases and is the precursor to an open interface with Bellcore's Network System Database (NSDB).

Heikimian Database Download Module

To automatically populate REACT 2001's circuit database from a non-TRKS system, Heikimian provides its own data specification and interface. Customers can format their data to meet Heikimian's specification and use this module to process the data into REACT 2001's database.

Automated Workflow Manager (AWM)

AWM provides flowthrough testing of digital and analog network services for provisioning or maintenance testing. AWM grabs trouble tickets from WFA, initiates testing through REACT, analyzes the test results, isolates the problem, and recommends a disposition. All processing is performed without human intervention.

Interactive Workflow Manager (IWM)

IWM provides the REACT 2001 tester with an informative log showing circuits under test, as well as orders or incoming tickets from workforce management systems such as WFA. With a quick point-and-click on the ticket, the tester can open a REACT 2001 test session on the circuit ID or begin an investigation of the circuit's performance with PM Integrator. When testing is complete, IWM hands the ticket back to the workforce management system with test results and tester comments.

Protocol Vital Signs (PVS)

PVS gives technicians the power to troubleshoot protocol-based services, such as frame-relay and SMDS, and to identify customer data problems on private line circuits. Bridging the gap between protocol and transmission testing, PVS monitors circuit performance at the level of protocols including System Network Architecture (SNA), X.25, and others. PVS makes observations and suggestions for circuit maintenance or repair and performs intrusive testing when required.

PM Integrator™

PM Integrator automatically collects circuit performance data from network elements and allows the technician to view, manipulate, and analyze the data. PM Integrator measures the quality of network services and helps anticipate when service quality levels will fall out of tolerance. These functions enhance surveillance of DS1, DS3, and Synchronous Optical Network (SONET) services.

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Features for the System Administrator

REACT 2001 provides the administrator with effective tools for maintaining the REACT 2001 databases and ensuring system security.

Database Maintenance

- Database types include:
 - Authorized users
 - Circuits and access
 - Acceptance tests
 - Test results
 - Benchmark test results
 - System security log
 - Alarm notification
- Administrator can add comments to an existing database
- Import data functions available for database contents
- Additional database functions include management of test resources and related devices:
 - Communications ports
 - Remote test unit
 - Super concentrators
 - Monitor matrix rooms

Security Features

- Administrator assigns passwords for users and database files
- User privileges can be assigned to limit user access by circuit type, test type, accounts, etc.

- Callback feature verifies identity of remote logins

User Interface and Help

- GUI and character-based interfaces offer the same convenience provided for test technicians
- Online help explains administrative features and options

REACT 2001 System Architecture

REACT 2001 is built upon a distributed computing architecture that supports configurations of one centralized database or multiple regional databases (see illustration). Test engines and network element interfaces can be dispersed to regional locations to optimize operations and communications. User interface software can reside at the user's desktop, in local servers, or on a central processor. This high level of flexibility supports the concept of placing processing power where it is needed.

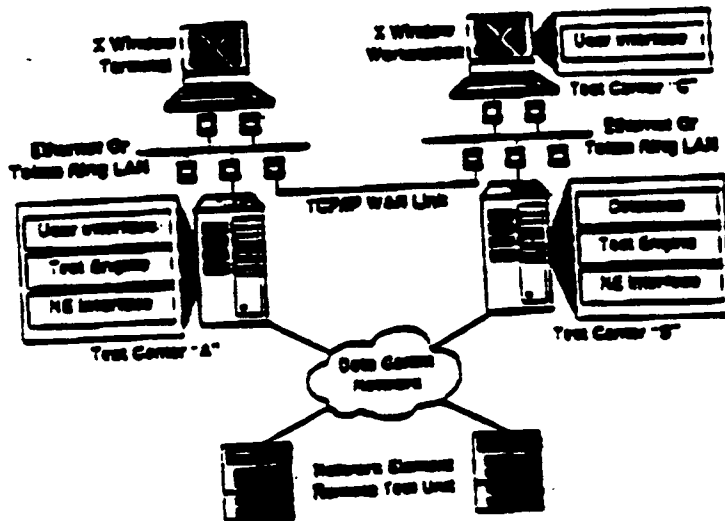
Software Architecture

REACT 2001 uses layered software modules which perform specific tasks and can be installed to meet specific customer requirements. The software modules can be grouped into several major functions: testing engines, network element interfaces, user interfaces, external programmer interfaces, and administrative services (see illustration on next page).

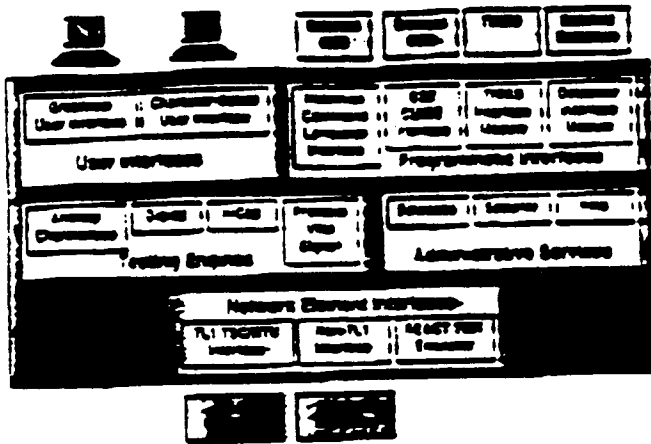
External System Interfaces:

REACT 2001 provides machine-to-machine (program-made) interfaces to other operations support systems and databases:

- Helixian Command Language Interface allows other systems to control the full testing functionality of REACT 2001
- OS/CMIS interface allow access by systems such as WPA and MSCB
- Helixian's TRKS Interface Module populates circuit database from TRKS Work Order Record and Details (WORD) documents
- The Helixian Database Download Module retrieves circuit information from non-TRKS databases



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REACT 2001 Software Architecture

feature will be made available in mainframe

Customer Interface

Third-party users can access and test their own circuits using the REACT Customer Interface Module. This module gives the third-party user access to a high-quality user interface and a wide range of testing services.

Computer Platform

The REACT 2001 system is available on a high-performance computer platform, the IBM RISC System/6000. This platform incorporates Reduced Instruction Set Computer (RISC) technology and runs AIX, IBM's version of the UNIX operating system. The RISC System/6000 provides reliability, scalable architecture, and excellent price-performance characteristics. A high availability configuration also is available. Helixman is prepared to port the REACT 2001 application to other UNIX platforms to meet specific customer requirements.

System Capacity

REACT 2001 software is capable of supporting hundreds of users and several million circuits and facilities. The actual number is dependent upon the computer platform and disk systems installed and the distribution of client/server elements within the configuration.

HCL and Testing Dialogs

The Helixman Command Language (HCL) is a key element in REACT 2001's distributed architecture. HCL is used for communication between client/server user interfaces and other software modules, for user-programmed test sequences, and for external access to testing functions. HCL is the basis for a three-level structure used by REACT 2001 for control and communication:

- HCL provides command syntax and data formats for performing all basic functions in REACT 2001. HCL includes low-level functions for both testing and administration areas, along with conditional IF-THEN-ELSE constructs and other programming functions that provide decision making and control flow. REACT 2001 client/server software modules communicate by using HCL messages.

- Testing Dialogs use the basic HCL functions to build up complex tests and other high-level REACT 2001 functions. Each testing dialog is a defined sequence of HCL commands that can be saved and edited as a separate file. These commands are ideal for developing automated routines for flowthrough testing and can also be used for interactive tests. Users can record test sessions and save them into dialog files which can then be edited or fine-tuned and run later.
- ~~Helixman Command Language Interpreter (HCLI) allows an OSS or other external systems to communicate with and control REACT 2001. HCLI provides an application programming interface that enables the external systems to execute any individual HCL command or run a complete testing dialog.~~

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Specifications

Circuits Tested

Analogue Local Loops
Channels PCM Voice
DS1/T1 Data Facilities
Fractional T1 Data Facilities
DS3 Data Facilities
DDS Circuits including:
DS0A - Switched 56 kbps or 64 kbps data or subrates
DS0B - Subrate channels of 19.2 kbps, 9.6 kbps, 4.8 kbps, or 2.4 kbps

Protocols Tested

(Requires optional Model 6351 Protocol Vital Signa Test System)

PVS Mode detects and analyzes the following protocols:	SNA, Bisyne, X.25, Frame Relay, G-Tech Lottery, LTS-400
Analyzer Mode decodes the following protocols:	SNA, X.25, ISDN (Q.921/Q.923), QLLC, Frame Relay, SMDS

Remote Test Units

The following Helman RTU's are compatible with REACT 2001:

- Model 3219A Metallic Access Remote Test System
- Model 3270 Small Office Test System
- Model 3560 Digital Loop Carrier Remote Test Unit
- Model 6700 Digital Remote Test Unit
- Model 6301 DS1 Performance Unit
- Model 6302 DDS Test Unit
- Model 6305 DS3 Test Unit
- Model 6351 Protocol Vital Signa Test System

REACT 2001 also controls a wide variety of digital cross-connects, test access units, and remote test units that conform to Transaction Language 1 (TL1) per Bellcore TR-NWT-000834, Issue 4.

Computing Platform

Helman supplies the IBM RISC System/6000 computer platform for REACT 2001 in a variety of system configurations (desktop, desktop, rackmount) designed to site requirements.

Typical Configuration

IBM RISC System/6000 Computer	(with 8mm tape drive, appropriately sized RAM and disk drives)
Communication Interfaces	Asynchronous port cards as required, Ethernet, token ring, or X.25 interface cards
System Console	Graphics monitor
System Printers	Text-based for test results, color for graphics
Additional Equipment	Maintenance room, miscellaneous cables
User Licenses	ALX Operating System, Relational Database
Helman Site Engineering Support	Installation, software integrator, acceptance testing

Siting Requirements

Location	Connections available to LAN/WAN communications facilities and public voice/data networks.
Environment	Temperature controlled, from 16 to 32°C (60 to 90°F); Humidity controlled, from 20% to 80% (non-condensing).
AC Power	100 to 125 Vac at 60 Hz supplied by a dedicated circuit from an uninterruptible power source. (Current rating varies with system configuration.)

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Compatibility

The AIX operating system is compliant with the following standards:

POSIX 1.3, X/Open
Portability Guide (Issue 3),
OSF/Motif, X Window
System (X 11 Release 5),
Network File System

Graphics Terminals

The REACT 2001 GUI runs on the following terminals and workstations. Monitors should be 14-inch or larger with at least 1024 by 768 resolution:

X Terminals	X Terminal designed for graphical applications.
X Workstations	UNIX workstations with X Window System
PC Workstations	PC with 66-MHz 486 processor or higher. X Terminal emulation package.

REACT 2001 Software Modules

REACT 2001 Testing Module with Database
Includes Analog, Character, DDS, and DSI Testing.
Includes Database software.

Model Number	
7710-01	Up to 16 test sessions or 100 test resources
7710-03	Up to 64 test sessions or 300 test resources
7710-05	Up to 256 test sessions or 1000 test resources

Distributes Server Module (No Database)
Distributes User Server or Test Server functions to an additional site.

Model Number	
7711-01	Up to 16 test sessions or 100 test resources
7711-03	Up to 64 test sessions or 300 test resources
7711-05	Up to 256 test sessions or 1000 test resources
7711-09	Individual User Interface Module

Additional Modules

Model Number	
7712-01	REACT 2001 PVS-Digital (requires REACT 2001 Testing Module)
7712-11	REACT 2001 TRKS Interface Module
7712-12	Hekimion Database Download Module
7712-13	Automated Workflow Manager

Maintenance and support are available for each software module.

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Motif is a registered trademark of Open Software Foundation, Inc.
Posix is a registered trademark of IEEE.
PVS is a registered trademark of PVS Software Corporation.
TRKS is a registered trademark of Tektronix, Inc.
X Window System is a trademark of MIT.
UNIX is a registered trademark of AT&T Copyright, Ltd.

Modeling software for test to enhance applications of test and testing cases

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