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Compaq Computer Corporation

Compaq Remote Insight Board/PCI Product Overview

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EXECUTIVE SUMMARY

In today's business environment, more companies are distributing their computing resources throughout the enterprise. In addition, businesses must continually find ways to work more efficiently. These trends have resulted in an increased need for effective remote server management tools. This paper discusses Compaq's third generation solution to effective remote server management, the Compaq Remote Insight Board/PCI. Key features, including network connectivity, PC Card slot, remote reset, graphical remote console, web browser access, alerting capabilities, and full integration with Compaq Insight Manager are identified and described.

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Compaq Remote Insight Board/PCI Product Overview
First Edition (July 1998)

BUSINESS CRITICAL SYSTEMS

Business critical nature of applications on today's networks demand higher reliability and optimal performance.

Today's networked systems are some of the most complex computing environments ever constructed, with network resources distributed across many locations. Environments keep getting bigger, more sophisticated, and harder to manage. Businesses are relying ever more on the applications running on these systems.

Customers rely on these applications for running their businesses. This business-critical nature of these applications puts higher pressure on the networks for predictable, optimal performance.

The focal points for computing, namely servers, are located at both end-user sites and within data centers. An administrator is required to manage many servers instead of just one. In the distributed enterprise the administrator must travel to each site for system management purposes. This could be the server in the room next door, or two floors above in the same building, or in another building within the same complex, or in another city, or possibly in another country. In a data center environment, where racks and racks of servers are placed together, several management consoles are required.

NETWORK MANAGER'S PROBLEM

Administrators are constantly challenged to maximize network up-time, availability and user access. At the same time, administration budgets are often shrinking, leaving administrators with less support staff to perform more work. They are constantly under pressure to mange service level commitments to end users. When a problem occurs on the network, they need to isolate the causes and resolve the problem quickly.

Network administrators need tools that improve manageability and increase server availability across the enterprise. They do not have the time or resources to physically go to each server, whether the server is half a world away or in next room; whether it is in a distributed environment or in a data center. Network administrators need tools using which they can remotely manage their servers; tools that can deliver alerts when something is amiss with the system and help them diagnose, isolate, and rectify the problem.

REMOTE MANAGEMENT SOLUTION FROM COMPAQ

Compaq Remote Insight Board/PCI is Compaq's third generation solution for remote server management.

Compaq is committed to creating management tools that offer the best predictive analysis and agile control and operation of a networked IT system. One result of this continued commitment is the Remote Insight Board/PCI. A highly-intelligent management board, the Remote Insight Board/PCI provides continuous in-band and out-of-band communication and alert delivery for monitoring of critical servers. Remote Insight Board/PCI represents the best in remote management for Compaq servers. IT incorporates all of the following elements that are considered necessary for effective remote server management.

- Seamless remote access and control at all times, regardless of server location, server condition, or administrator location.
- Information capture and storage that provide vital troubleshooting information to an administrator.
- Immediate alerting capabilities, independent of server hardware or operating system, to support mission-critical environments.
- Network connection to deploy inexpensive in-band management leading to lower cost of ownership of the system
- Out-of-band communication in the event of a network failure.

- Security features that provide flexibility for the administrator and protection of mission-critical data and applications.

Compaq Remote Insight Board/PCI is Compaq's third generation remote management solution following the Compaq Remote Insight (EISA version) and the Server Manager/R. The PCI solution satisfies the demand for Remote Management solutions to support a new generation of servers from Compaq. It is independent of the host server operating system (OS), server hardware, or network connection, allowing complete access and control.

The Remote Insight Board/PCI is also fully integrated with Compaq Insight Manager, the comprehensive system management tool that monitors the operation of Compaq servers, workstations and clients. Together, Remote Insight and Insight Manager software provide a comprehensive solution to remote server management needs.

KEY FEATURES

Hardware Independence

Remote Insight is an expansion board with its own microprocessor, memory, battery, keyboard port, and video controller to provide complete hardware independence from the server in which it is installed. It also carries an embedded network connection, an on-board modem, and a serial port, It is essentially a "computer within a computer," capable of monitoring the managed server 24 hours a day. The hardware independence enables three primary functions that can be performed by the Remote Insight Board regardless of the state of the server. These are Remote Console, Remote Reset, and Alerts. Remote Insight brings an unprecedented level of control and management with the availability of these functions.

LAN Connectivity

Network connectivity is provided through an embedded, auto-sensing, 10/100 Base-T Ethernet NIC on the board. Network connectivity is a requirement of customers who are extending their remote management solution from a single remote server to data center server installations. Using the LAN connection of the Remote Insight Board, network administrators can now deploy an inexpensive, in-band management network connection rather than communicating over a telephone line. Remote Insight provides in-band notification in case of server problems at the central site's management station on a real-time basis, without needing to maintain separate telephone connections or modem sharing devices.

Out-of-Band Connection

If the server has network difficulties or if the network fails, the modem can be used to provide the same critical access to the server Being able to do this without physically travelling to the server in question reduces the administration costs. Servers can be restarted remotely, or failed components can be identified before a person is dispatched to the site. Skilled on-site administrators are not required to perform routine maintenance tasks. These activities can be now be accomplished by trained personnel at the central site.

Remote Insight has resident PPP capability. PPP is an internetworking protocol that allows the remote server and management PC to communicate using network protocols and standards over an out-of-band connection. An out-of-band connection refers to a connection that is established through a telephone line or direct serial connection, rather than through a standard network medium, such as twisted pair 10Base-T. The out-of-band connection is also referred to as an asynchronous connection.

By dialing in through the modem and establishing an asynchronous connection, the administrator has total access to the server. For instance, if the server is running but the OS fails, the administrator, through the asynchronous connection, can still access the server and issue commands to regain control of the server OS.

Browser Accessible

Remote Insight features can be accessed using a familiar browser interface.

All of the capabilities of the Remote Insight Board are available using Internet Explorer version 4.0x or Netscape Navigator version 4.05 browser software. This allows easy access to Remote Insight board features to perform remote management tasks using a familiar user interface. The browser allows you to view event log and status information, replay the reset and failure sequences, reset the server, remotely control the server, and modify user login and alerting configuration.

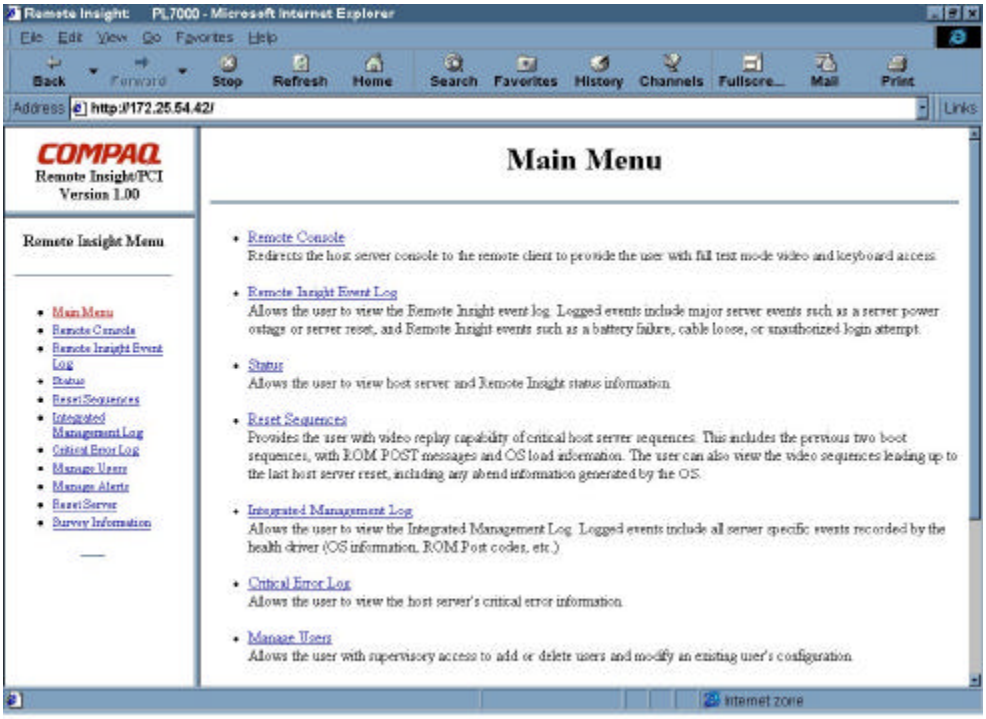


Figure1 : Remote Insight Board/PCI Main Menu

Remote Insight Console

The administrator can reset the server and bring the OS back up remotely, without depending on OS functionality and without losing the remote connection to the server.

Remote Insight Console provides a remote connection to managed servers, allowing a remote PC to display all phases of server activity (including POST sequences and OS load) without loss of connection. Seamless remote console allows operation of the remote server as if the administrator were standing in front of it; to administer users and manage applications. The administrator can view server's video text and control the server keyboard during the server boot process and all other instances when the server video operates in text mode

NT Graphical Remote Control

Remote Insight provides Remote Graphical Console capabilities for Microsoft Windows NT servers, utilizing a standard graphics based terminal emulation software. When the NT server switches to its graphical user interface, remote console support continues on the same remote connection using Compaq Carbon Copy or Symantec pcANYWHERE providing remote control of NT's graphical user interface.

Remote Insight provides the ability to view previous reset and failure sequences

Remote Reboot

Remote Reboot is one of the most important options that the administrator has through the Remote Insight Console Application. If the OS is not functioning, the administrator can issue a command for the Remote Insight hardware to reset the server, circumventing the OS. Once the server is reset, the administrator can observe the videotext of the startup (reset) process, from memory count through the OS load. Compaq Remote Insight provides a significant advantage over strictly software-based solutions that do not allow viewing of any startup sequences before the OS load. The startup sequences, as described in a following section, can reveal important clues to the health of the server.

Because remote control is fully active during the startup process, the remote administrator may invoke the server's system partition utilities by pressing the F10 key. These utilities are used remotely to perform system diagnostics or system configuration.

The high level of integration between Remote Insight and Compaq Insight Manager creates a framework within which a wealth of server data and functions can be accessed.

Full Integration with Compaq Insight Manager

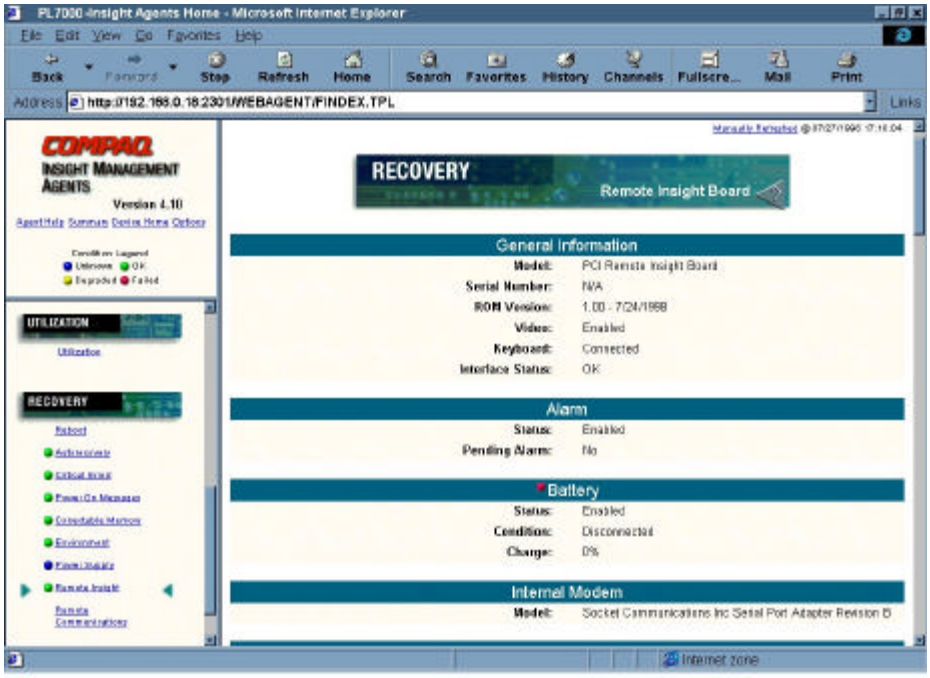


Figure 2: Insight Manager GUI

The high level of integration between Remote Insight and Compaq Insight Manager creates a framework within which a wealth of server data and functions can be accessed. Compaq Insight Manager allows intelligent monitoring and data collection from all hardware subsystems in the server, such as environmental systems, disk storage, and system memory. While Compaq Insight

Manager can provide this data and functionality as a stand-alone server management software package, it can also function as the software component of the Remote Insight hardware. Insight Manager provides data collection and reporting tools. These tools include SNMP alarm forwarding to an Insight Manager console or a pager.

An example of the integration of Remote Insight and Compaq Insight Manager is the recovery feature. Figure 2 shows the Recovery sub-menu from Insight Manager. OS support is needed only for the integration of software management functions. Compaq Insight Manager agents support the following major network operating systems: Microsoft Windows NT 4.0 and 3.51, Novell NetWare/IntranetWare, SCO OpenServer, UnixWare, and IBM OS/2. Since Remote Insight is hardware-based and OS-independent, even servers that use unsupported operating systems will be able to access Remote Insight and its critical hardware functions, such as Remote Console, Remote Reset, Video Sequence Replay, and Alerting.

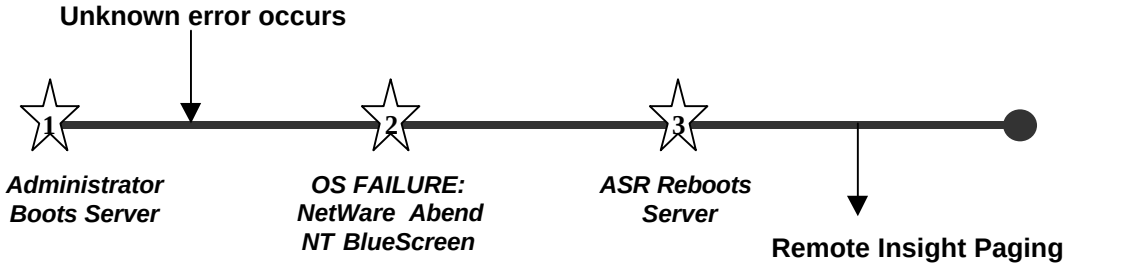
Remote Insight provides the ability to view previous reset and failure sequences

Reset and Failure Sequence Replay

Remote Insight provides the ability to view previous reset and failure sequences. The board automatically stores the startup and OS initialization sequences from the most recent reset sequence and the prior reset sequence, giving two generations of captured videotext.

In addition to the reset sequences, Remote Insight stores multiple screens of videotext prior to a server reset. One generation of failure sequence data is available for review. This information, such as NetWare ABEND information or Windows NT "blue screens," captures the state of the server leading up to the failure and server reset.

Figure 2 shows a timeline of typical reset events. The previous reset sequence (1), failure sequence (2), and current reset sequence (3) are stored in memory for replay as needed. The administrator can define viewing speed of the replayed sequences and can pause to allow viewing as slowly or as quickly as desired. The administrator can review these sequences to gain vital troubleshooting information, identify and resolve problems, and reduce server downtime.



1. **Previous Reset Sequence**
2. **Failure Sequence**
3. **Current Reset Sequence**

Figure 3: Timeline of Reset Sequences

Event Log

In the on-board memory, Remote Insight maintains a log of Remote Insight events. This log holds information such as Remote Insight login attempts, Automatic Server Recovery (ASR) resets, and server power losses. Up to 50 critical events such as server resets are stored in non-volatile random access memory (RAM). This information is available even when the server is in a down state (board still operational).

Critical Error Log and Integrated Management Log

Compaq servers feature a 16-entry Critical Error Log or Integrated Management Log. Each log records the most recent system errors and events for post-diagnosis review. The Remote Insight board has the most recent copy of these logs, so even if the server OS or hardware is down, the administrator can access the copy provided by Remote Insight.

Compaq Survey Utility's Server Configuration Log

The Compaq Survey Utility runs periodically to record snapshots of the current server configuration. When doing so, it updates a copy of the log maintained on the Remote Insight board. So, even if the server OS or hardware fails, the user can download the latest Survey file from Remote Insight by using a Web browser, then view, print, or save the configuration of the server as an aid to understanding how recent changes may influence the server's behavior.

Alerting

Remote Insight provides alerts by alphanumeric or numeric paging and through delivery of in-band or out-of-band SNMP traps to the management site PC.

To reduce downtime on mission-critical servers, a server management tool must be able to alert the administrator of faults. Remote Insight provides alerts by alphanumeric or numeric paging and through delivery of in-band or out-of-band SNMP traps to the management site PC.

Alphanumeric paging overcomes the restrictions of numeric-only support. It allows customized alerts to be sent. For example, in the following sample user alert, the first three digits describe the type of alert, the remaining digits are the server's ID, and YOUR_SERVER is the server name.

95242579 Server YOUR_SERVER: Server power outage

Asynchronous forwarding of SNMP traps allows the administrator to obtain information for in-band and out-of-band servers at one management PC using Compaq Insight Manager. The SNMP trap delivery feature is made possible by the true network communications between the remote server and a management PC. This connection can be made either through the network or by the resident PPP capability.

All alert messages are time-stamped and included in the event log. Remote Insight automatically alerts the administrator of events such as:

- Server power outage. The rechargeable battery on Remote Insight provides full power to the board for at least 30 minutes, enough time to alert pagers and management site PCs that the server is down, or to allow a remote administrator dialing in to review the various logs and replay the video capture sequences.
- Server resets, including those generated by ASR.
- Compaq Insight Manager-generated alarms. All SNMP traps generated by Compaq Insight Manager can be forwarded to the administrator by the Remote Insight hardware.

These alerts allow the administrator to react immediately to any fault notification, so that any service interruption for mission-critical server environments is reduced or eliminated. With network only access, the board cannot send paging alerts. Access is required either with the on-board modem or an external modem for the administrator to receive paging alerts.

SECURITY FEATURES

The security features of Remote Insight provide protection of mission-critical data and an extra measure of control for the administrator. Security features include user access rights, password protection and support for optional dial-back.

User Access Rights

Remote Insight offers the ability to define up to 12 separate users and vary the server access rights of each user. The administrator can customize access rights that vary according to the roles and responsibilities of each user. For example, a user could be denied access to the remote console, but still receive alerts on host failure conditions. Ability to access the Remote Insight board and the remote console, to control the server resets, or to receive alerts can be set in an individual user profile. As a security measure, supervisor-level rights are required to change any user rights.

Unauthorized User Detection

Two levels of protection are available to identify unauthorized users. First, Remote Insight uses password and username recognition to detect and reject access by any unauthorized user. Remote Insight will generate an alert to the administrator after several attempts at unauthorized access have occurred. The administrator can define the number of unauthorized attempts that occur before an automatic alert is generated.

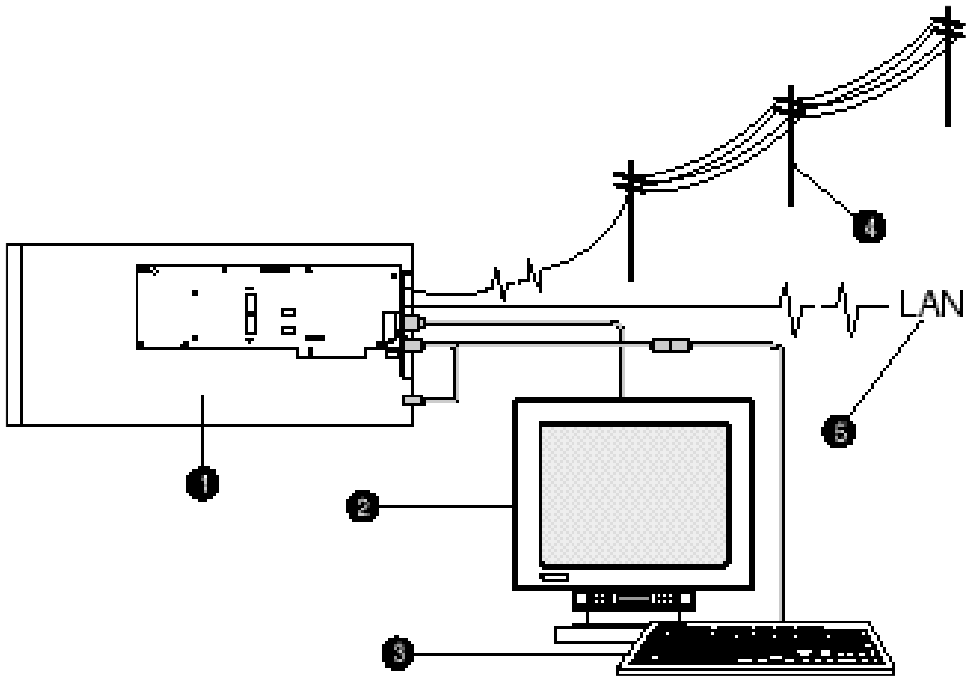
Second, to protect against an unauthorized user who somehow obtains a legal password and username, the administrator can activate an optional dial-back feature. With this option, pre-defined telephone numbers are configured into user profiles. When a user initiates contact, Remote Insight verifies the username and password, disconnects, then re-dials the user at the predetermined (actual user) telephone number. For an authorized user, remote access can proceed as usual; however, the unauthorized user will lose the connection to the server at this point. This feature can be enforced globally or on an individual user basis.

HARDWARE SUMMARY

HARDWARE DETAILS	
Processor	Intel 960RP embedded processor
Upgradability	Board firmware upgradable via flash ROM
Video Support	On-board VGA, 640 x 480 (256 to 16.7M), 800 x 600 (256 to 16.7M colors), 1024 x 768 (256 to 65K colors), 1280 x 1024 (256 colors)
Standard Interfaces	One keyboard input/output, one video output, one Ethernet network connection (10BaseT/100BaseTX)
Modem	33.6 Kbps PC Card with localized Data Access Arrangement, v.42bis, MNP5, blacklist support
Serial Port	RS-232 Serial port connection is available using a PC Card serial communications adapter.
Memory	2 MB flash ROM, 8 MB RAM, 2 MB video RAM
Battery System	Rechargeable NiMH, user replaceable, 1.5 - 2 year useful life typical

Connection and Configuration

Remote Insight Board/PCI is compatible with the Compaq ProLiant and Compaq ProSignia family of servers that contain a PCI slot. When Remote Insight is installed in the managed server, the server keyboard and monitor cables are directly connected to the Remote Insight Board. The network administrator has access to the board via the embedded Ethernet 10/100 NIC, via the on-board PC card modem and a localized Data Access Arrangement (DAA), or through an external modem connected to the serial port. Figure 4 illustrates the hardware connections.



❶ Remote Insight Board installed in server

❷ Monitor connected to Remote Insight Board

❸ Keyboard connected to Remote Insight Board and server using Y-cable

❹ Telephone system connected through modem/serial connection to Remote Insight Board

❺ LAN connected through NIC on Remote Insight Board

Figure 4: Remote Insight Connections

CONCLUSION

The Compaq Remote Insight board provides a cost-effective solution to the problem of managing servers in mission-critical environments and in remote locations. Remote Insight is essentially an independent computer, providing continuous in-band and out-of-band communication and alert delivery for monitoring of business-critical servers. The hardware independence and autonomy from the host server OS enables access to and remote control over the managed server. It captures critical information needed for troubleshooting, sends SNMP alerts to the management console, pages the system/network administrator, and provides security and flexibility.

Features incorporated into this server management board include Windows NT graphical remote control, viewing reset/failure sequences, enhanced user administration/security features, alphanumeric paging support, and full integration with Compaq Insight Manager. The features of Remote Insight combined with the capabilities of Compaq Insight Manager provide the ability to manage a remote server at any time and any place, regardless of the state of server OS, server hardware, or network connection.

MODELS

Remote Insight Board/PCI

294013-001	Remote Insight Board/PCI with LAN Attachment and North American Modem (Country Support: USA, Canada, Hong Kong, Brazil, Columbia, Costa Rica, Ecuador, Uruguay, Venezuela, Argentina, Chile, Peru)
294013-B31	Remote Insight Board/PCI with LAN attachment and PANEURO Modem (Country Support: Australia, Denmark, Finland, France, Germany, Ireland, Netherlands, Switzerland, United Kingdom)
294013-B22	Remote Insight Board/PCI with LAN attachment and Serial Port (all countries except Japan)
294013-B23	Remote Insight Board/PCI with LAN attachment only (all countries except Japan)
294013-291	Remote Insight Board/PCI with LAN attachment and Modem for Japan
294013-292	Remote Insight Board/PCI with LAN attachment and Serial Card for Japan

OPTIONS

Upgrade modems

LAN-connection-only versions are customer upgradable to LAN + Modem or LAN + Serial versions with the purchase one of the following option kits:

294031-001	North America Modem Conversion Upgrade
294031-B31	PANEURO Modem Conversion Upgrade
294031-B22	Serial Card Upgrade