

# 2800 Remote Access Server

## Product Overview



# Internet

Internet Access



# Table of Contents

---

Introduction. . . . .	1
Applications . . . . .	2-7
System Overview. . . . .	8-9
System Services . . . . .	10-15
Network Management . . . . .	16-17
Specifications . . . . .	18-19
Company Profile . . . . .	20
Benefits Summary. . . . .	21

Internet  
Internet Access



## Why Develop a Remote Access Server?

More and more companies are using the Internet as a vital channel for communicating with customers, employees and business partners. In fact, traffic on the Internet is doubling every 3 months. Much of this traffic is being generated by small-to-medium size companies, as well as a growing number of small ISPs (Internet Service Providers) springing up to provide access to the “e-hungry” masses on the Superhighway.

As this new wave of small-to-medium size corporate Internet users and ISPs comes online, it is clear that the First Wave of expensive big-box access tools cannot provide the cost-effective remote access solution they need.

The Patton 2800 RAS (Remote Access Server) is designed to provide a Second Wave access solution: a compact, software upgradeable platform that allows dial-up access to Internet and intranet services, and has the flexibility to operate cost-effectively as a stand-alone or networked device.

The Patton 2800 RAS uses 100% digital modem technology, developed by Patton Electronics specifically for this platform.

## Advantages of Patton's Digital Modem Technology

- **Efficient & Consistent Performance** - because no signal information is lost, performance is repeatable (no “fudge factor”)
- **Migration Path** - Easily accommodated by software upgrade only!
- **Manageable** - On-the-fly programmability; real-time diagnostics
- **Low Power Consumption and Heat Dissipation** - High density packaging with minimal heat generation
- **Inherent Fault Tolerance** - DSP chips are dynamically allocated; no switching fabric
- **Distributed Processing** - Data processing is performed inside each DSP
- **Low Cost** - Minimal number of components = increased reliability



# 2800 RAS Applications

## 2800 RAS Product Positioning

The 2800 RAS provides the ISP with a start-up platform or enhances an existing service offering by allowing cost-effective expansion. The 2800 provides the corporate user with single-platform network access, plus the ability to connect to the Internet, the corporate intranet, and/or the corporate PABX.

## Where to use the 2800 RAS

The 2800 RAS provides dial-up access for digital (ISDN BRI) and analog (V.34+, V.90) calls, local and central site user authentication, call accounting and statistics, drop and insert functionality, and IP routing. With this feature set, the 2800 can assume a critical role in a variety of applications.

## Preview Of Applications

### #1 **ISP Access**

The 2800 RAS gives start-up ISPs a single-platform access solution that is compact, affordable and expandable.

### #2 **ISP Expansion**

For the ISP expanding service to other calling areas, the 2800 RAS provides a cost-effective remote Point-of-Presence.

### #3 **Corporate Network Access**

The 2800 RAS puts the corporate network just a phone call away, with Email, LAN and Web access available through a single box.

### #4 **Dial Access for Wide Area Networks**

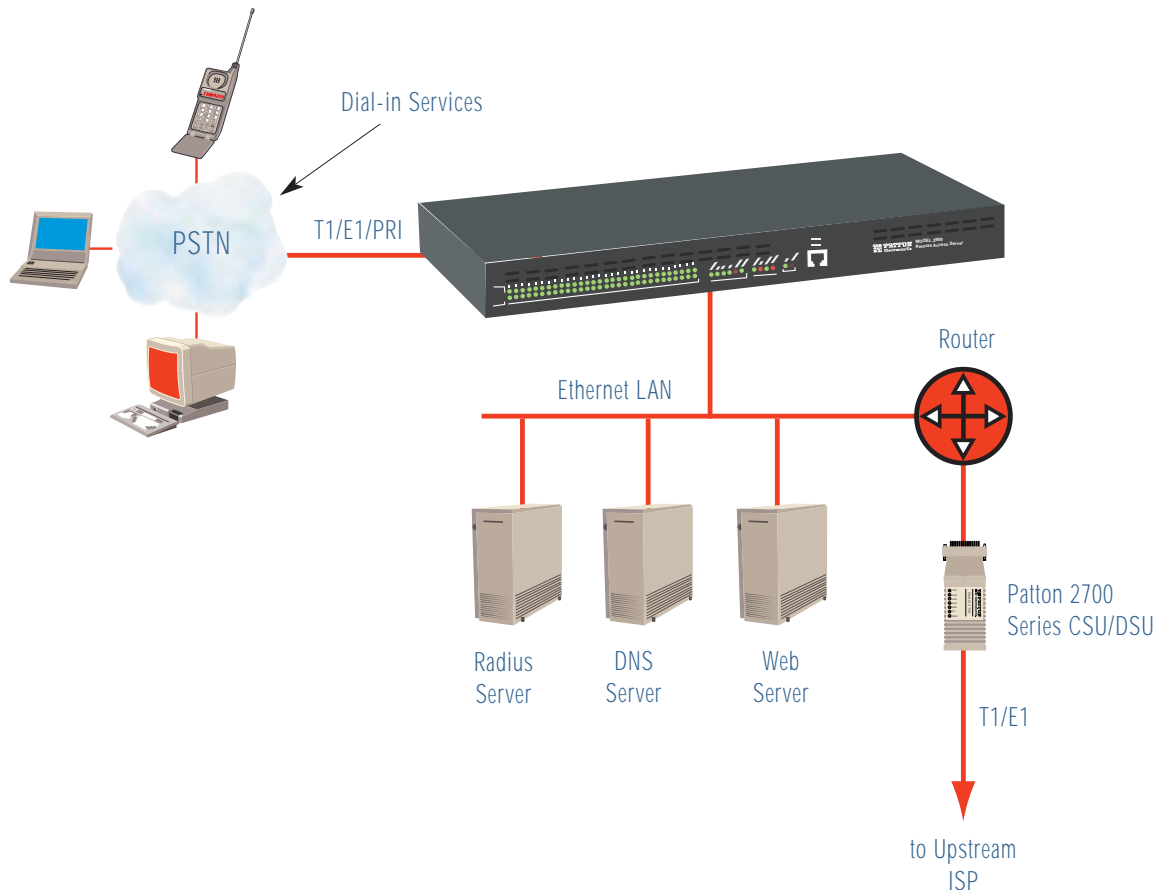
When dial-up network users cover a large region, several 2800s can be deployed in local calling areas and linked through Frame Relay.

### #5 **Corporate Voice/Data Integration**

The 2800 RAS offers a drop and insert connection to the corporate PABX, allowing voice and data access through a single T1/E1 line.



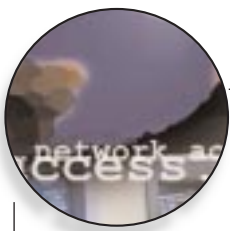
## #1 ISP Access



**M**ost Internet Service Providers (ISPs) begin operations by offering service to smaller communities of individuals in a distinct geographical area. The 2800 Remote Access Server is ideal for this start-up situation. In the configuration above, the 2800 RAS provides dial-up analog and digital modem services for up to 24 users on a T1/PRI (or 30 users on an E1/PRI) port.

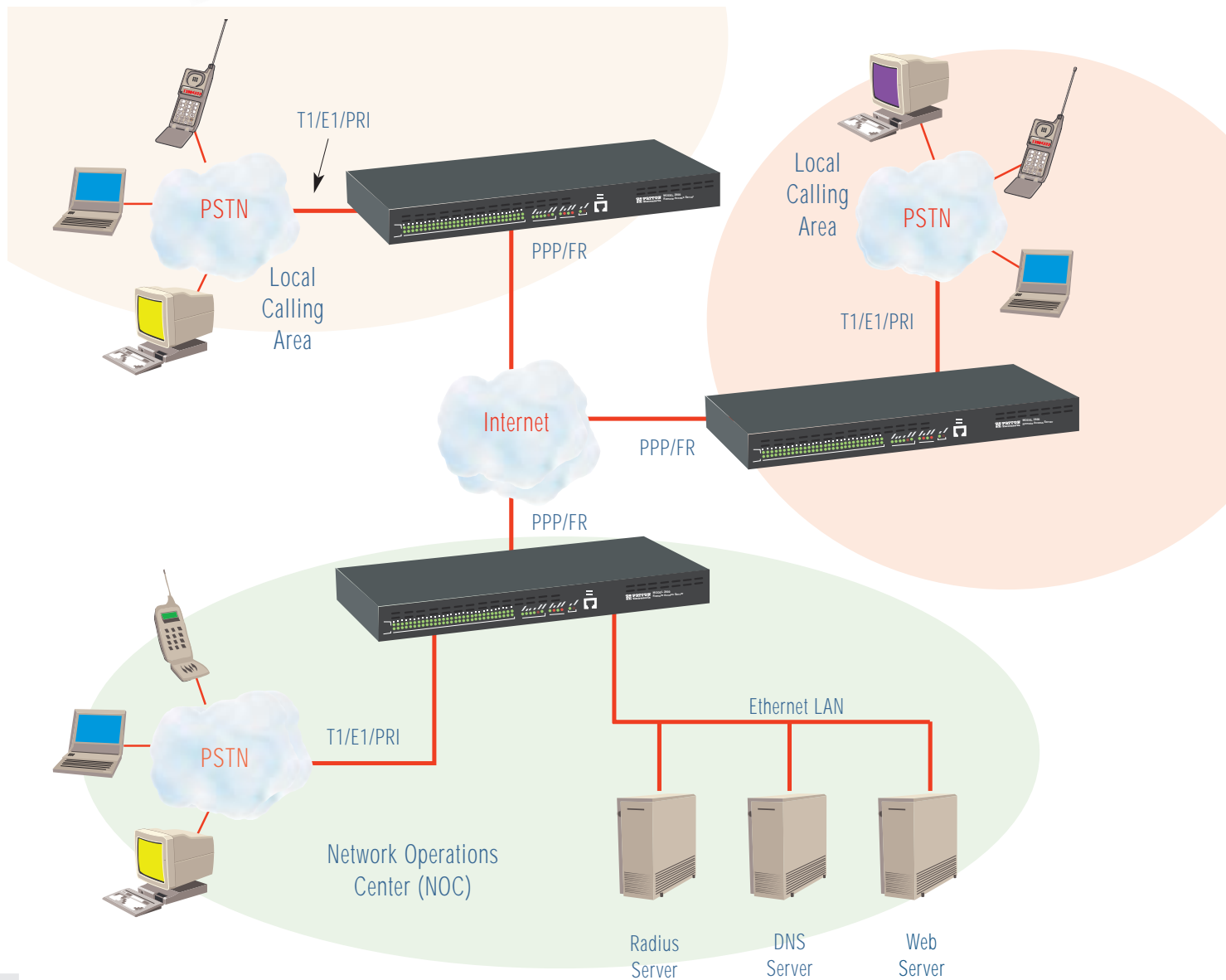
The 2800 RAS connects directly to the Public Switched Telephone Network (PSTN) through a T1/E1 or PRI port. With its built-in 10Mbps Ethernet port, the 2800 RAS also communicates directly to local servers through a low-cost Ethernet Hub. As users dial in to the 2800, modem calls are answered by one of the processors on the board. IP addresses are provided and users are authenticated.

The 2800 RAS provides an additional T1/E1 port for a direct up-link to an external Router or Frame Relay device by using PPP or Frame Relay, respectively. All required functionality--analog and digital modems, IP routing and WAN forwarding--is available in one compact rack-mountable package. Now, new ISPs are not forced to purchase high-end solutions to provide advanced Internet services to their customers!



# 2800 RAS Applications

## #2 ISP Expansion



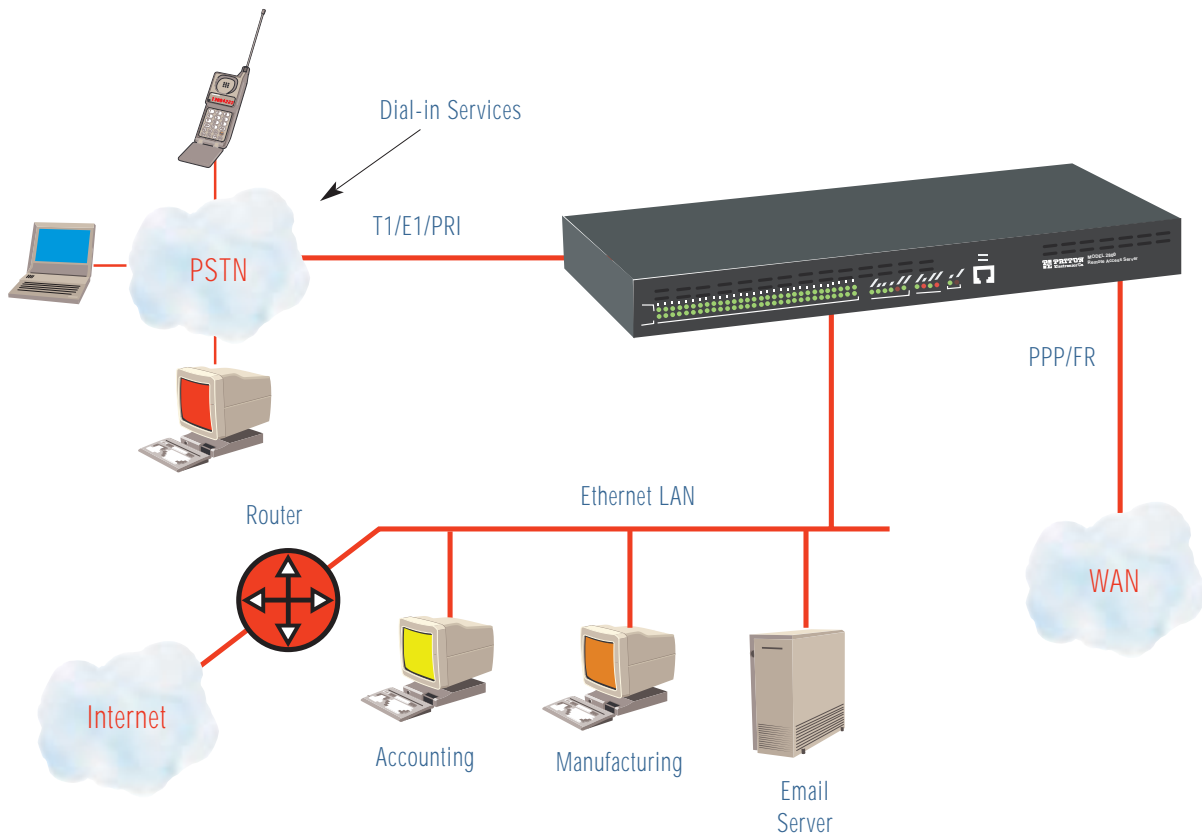
**A**fter providing service in a particular location, ISPs will typically expand their regional coverage by establishing a point of presence in another calling area--often through a local phone number in that new area.

In the new calling area, the 2800 RAS provides dial-up analog and digital modem services for up to 24 or 30 users over a T1/E1 or PRI port. For connection to the network operations center, the 2800 backhauls traffic through its second T1/E1 port using PPP or Frame Relay protocols.

To minimize service costs and potential disruptions, ISPs generally prefer to maintain their Web, authentication and email servers at a central site. The 2800 RAS allows ISPs to maintain a central NOC while expanding service into new calling areas. ISPs can aggressively expand service coverage while maintaining a low-cost operating profile.



## #3 Corporate Network Access



**W**ith the growth of work-at-home, remote offices, flexible work hours and email as a business communication tool, many businesses have selected Internet based technologies for their new corporate information networks (intranets). As these intranets have formed, employees need to use the corporate LAN for email, online information and Internet access. The 2800 RAS provides these vital corporate services.

Through a regular phone call to the 2800 RAS, up to 30 simultaneous users can access the corporate intranet with digital or analog modems. The 2800 answers these modem calls through its T1/E1 or PRI connection to the Public Switched Telephone Network (PSTN).

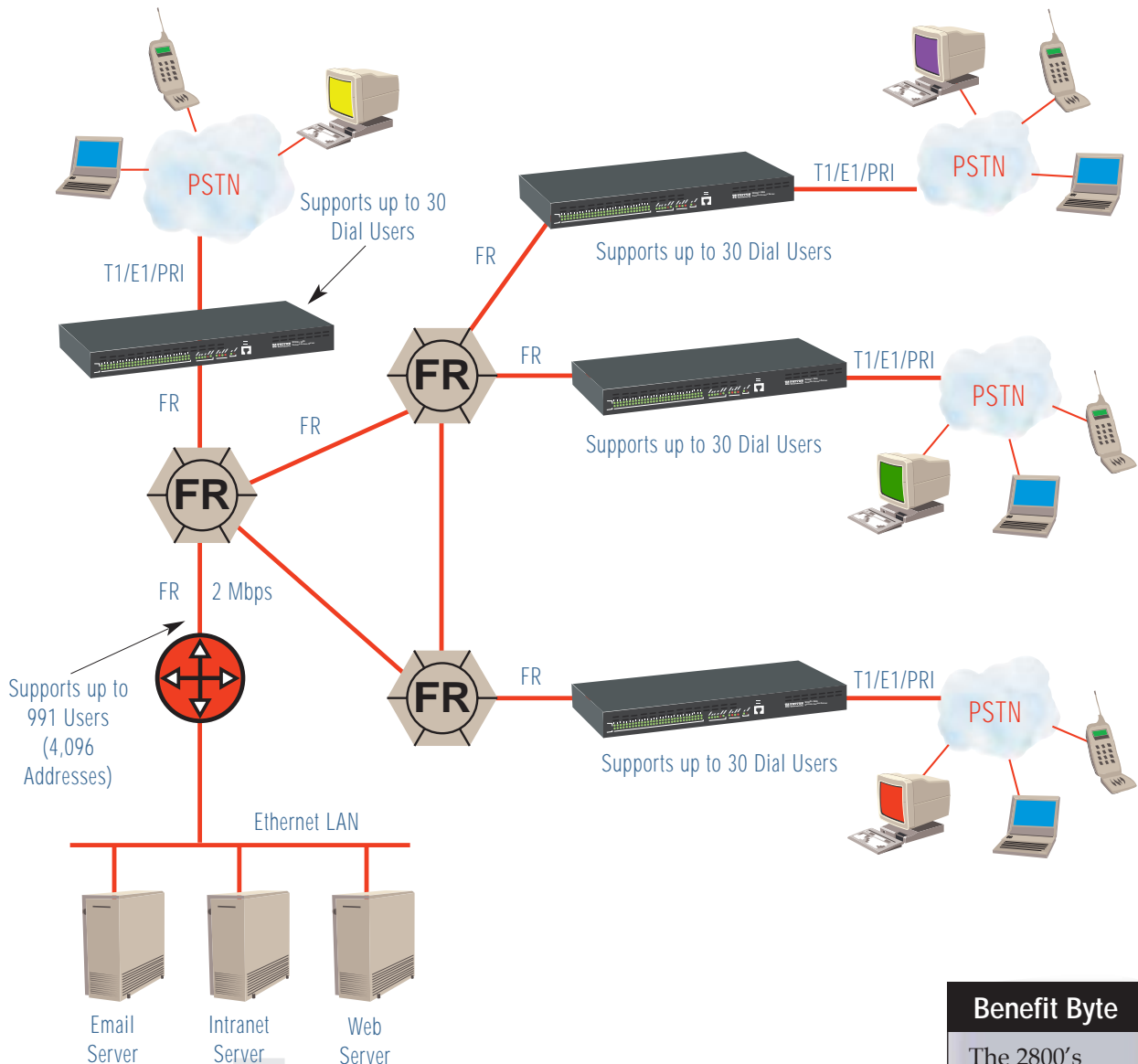
As users dial in to the 2800, modem calls are answered by one of the on-board processors. An integrated Ethernet port allows the 2800 to provide access to the corporate servers on the LAN. Authorization and authentication protect corporate information while accounting documents users of dial-in services. By connecting the 2<sup>nd</sup> T1/E1 port to a Frame Relay or a PPP link, 2800 RAS will also integrate a branch office into a larger corporate network or provide a link to Internet access.

Offering an easy to maintain, highly integrated network solution, local and remote employees will have access to vital business resources, 24-hours a day.



# 2800 RAS Applications

## #4 Dial Access for Wide Area Networks



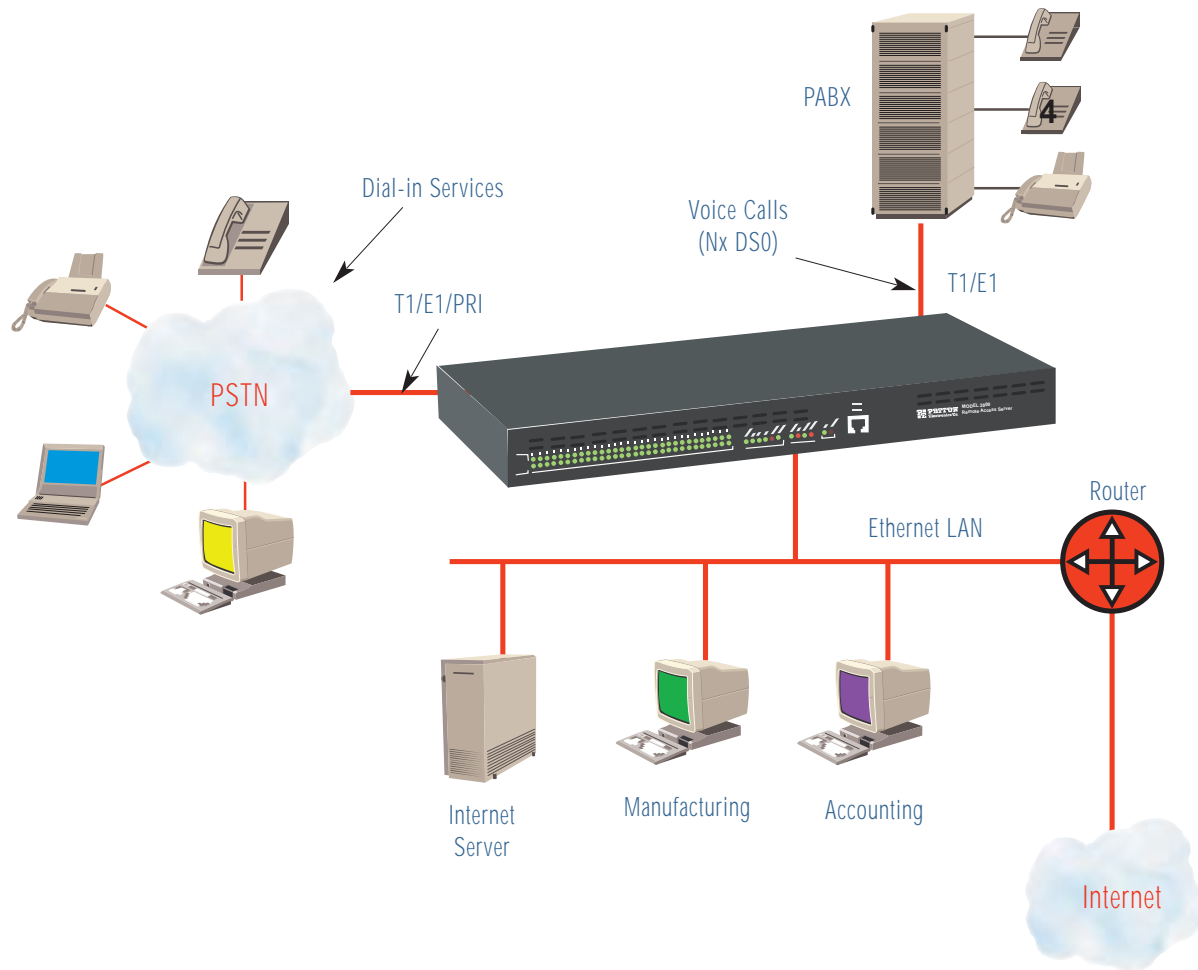
As corporations opt to outsource their dial-up connections for travelling salespersons, dealer networks and remote users, telecommunication service providers are deploying remote access servers in local calling areas. The 2800 RAS can answer up to 30 calls and place the IP packets on a Frame Relay port to a FR switch (or send PPP packets to a router). With the 2800 and Frame Relay, corporate network users remove the complexity and use a simple IP router to receive dial-in calls. They also increase the density of user sessions on a T1/E1 port from 24-30 to 991.

### Benefit Byte

The 2800's uplink port lets you locate a second 2800 in a different calling area. Remote telecommuters avoid long distance calls!



## #5 Corporate Voice/Data Integration



**P**rudent business practices dictate maintaining low costs while maximizing equipment and facilities usage. The 2800 RAS achieves this through the integration of both corporate voice and remote access services. By using the 2<sup>nd</sup> T1/E1 and Drop-and-Insert functionality, the 2800 RAS supports both voice and data access on a single T1/E1 connection.

Connecting to the primary T1/E1, the 2800 RAS can be programmed to direct one or more channels (DS0s) of voice traffic onto a PABX. This allows the 2800 RAS to answer remote access calls and the PABX to handle corporate voice calls.

The 2800 RAS supports the flexible integration of voice service into the corporate data network, making better use of valuable corporate resources than ever before!

### Benefit Byte

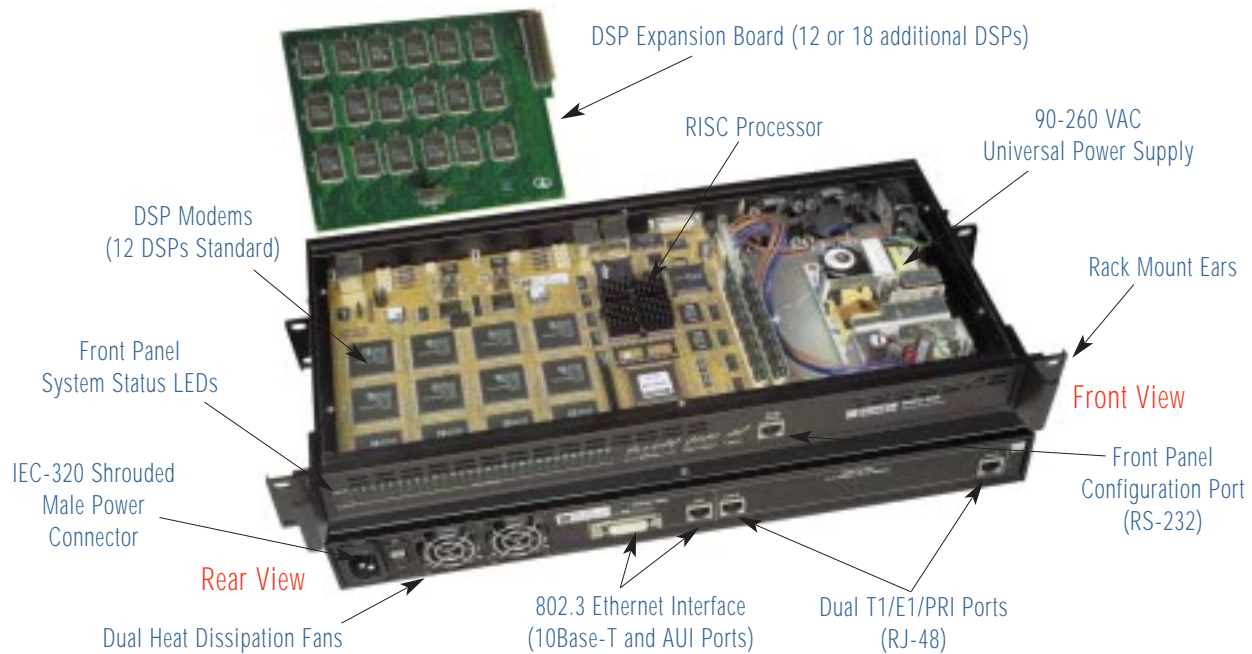
The 2800's drop & insert feature means you can handle voice calls, data access and Internet access with one T1/E1 or PRI line!



# System Overview

## The 2800 RAS

simultaneously consolidates analog modem and digital ISDN remote access connections (over PSTN digital trunks) using a completely digital approach. One or two T1/E1/PRI ports provide PSTN and/or PABX connectivity to terminate up to 30 analog modem and digital ISDN calls within a single chassis. The 2800 incorporates Channel Bank, Terminal Server, Router and Modem functionality in a self-contained, compact package.



## Chassis Architecture & Hardware At-a-Glance

- Single, compact 1U high chassis
- Dual T1/E1/PRI PSTN connections
- Redundant fans for cool operation
- Universal 90-260VAC power supply
- Console port for local management
- Up to 30 DSPs & 32 Meg of DRAM
- FLASH upgradeable through LAN or WAN ports
- 10Base-T and AUI Ethernet connections
- Front panel indicators for system monitoring

### Benefit Byte

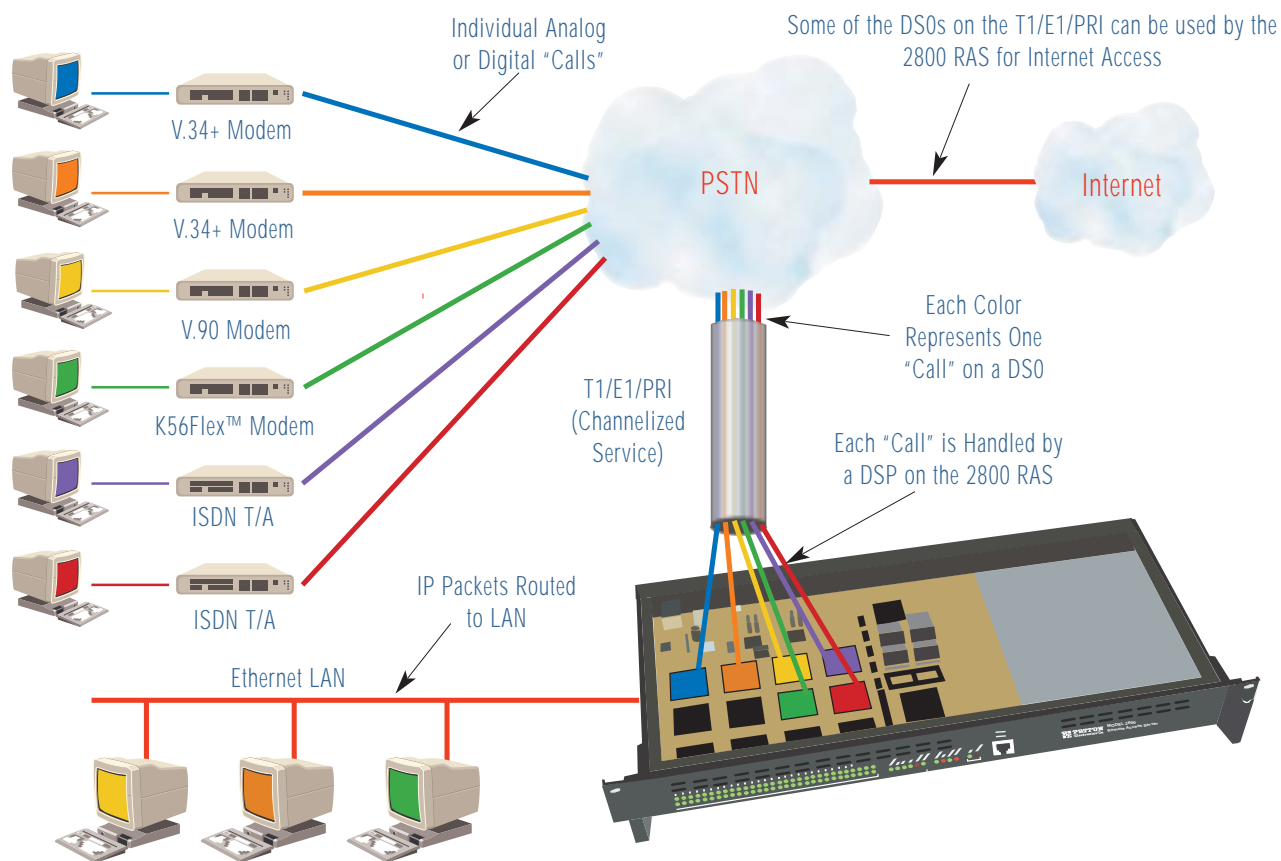
The 2800's front panel LEDs and control port give you on-the-spot feedback and local control when you need it most. Now.

# System Overview



## CHASSIS ARCHITECTURE OVERVIEW

The 2800 is a single device solution which resides in a 1U-high (1.75 in/4.45 cm), 19 inch (48.26 cm) wide rack mountable chassis. Its internal power supply allows a wide range of AC inputs from 90 – 260VAC. Low-power DSP technology, plus redundant cooling, ensures that the system can operate within specification in equipment rooms and non-cooled environments having a temperature range of 0 to 45°C. The 2800 is manufactured within Patton's ISO 9001 qualified facility and is fully compliant with IEC950, UL, CSA and CE Mark operational specifications.



## HARDWARE OVERVIEW

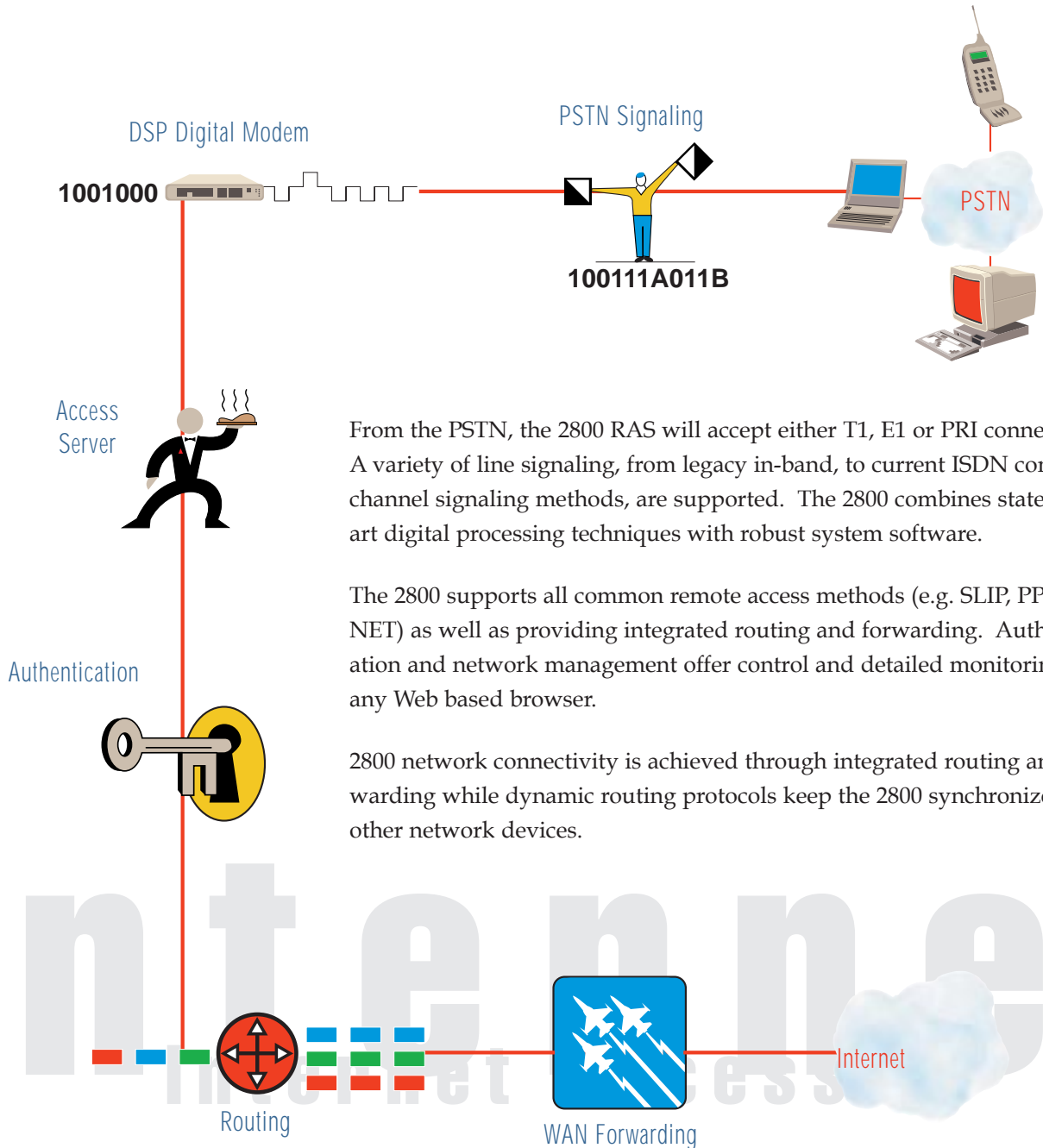
The 2800 contains two high-speed input/output ports which can be configured to support T1, E1 or PRI line interfaces. These ports are accessible from the rear of the unit via two (2) RJ-48C connectors. To process the input/output data traffic through the ports, up to 30 flexible digital signal processors (DSPs) are used. The base configuration contains 12 DSPs on the motherboard. A single expansion board, with an additional 12 or 18 DSPs, may be installed to fill a 24-channel T1 or 30-channel E1 circuit.

For LAN termination of data packets, the 2800 has one 10Mbps Ethernet port which provides both 10BaseT (RJ45) and AUI (DB-15S) interfaces. The processing engine of the 2800 is an Intel i960 RISC CPU, operating at 33MHz. Additionally, up to 32MB of DRAM is supported on the board. For local storage of system software and configuration data, 4MB of non-volatile Flash memory is provided. The front panel of the unit provides one RJ-45 console port for local PC/terminal management, four indicators for T1/E1/PRI line status, and 30 LEDs for call processing status.



# System Services

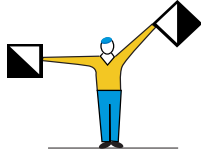
Legacy solutions using analog-to-digital conversion result in lower connection speeds. These same solutions also require separate analog modems and ISDN terminal adapters. The 2800's significant advantage is in the use of digital signal processors (DSPs) as dynamic communications processors. The 2800 DSPs terminate both analog and ISDN connections within the same hardware and using the same PSTN trunk--thus ensuring the highest possible connecting speeds.



From the PSTN, the 2800 RAS will accept either T1, E1 or PRI connections. A variety of line signaling, from legacy in-band, to current ISDN common channel signaling methods, are supported. The 2800 combines state-of-the-art digital processing techniques with robust system software.

The 2800 supports all common remote access methods (e.g. SLIP, PPP, TELNET) as well as providing integrated routing and forwarding. Authentication and network management offer control and detailed monitoring from any Web based browser.

2800 network connectivity is achieved through integrated routing and forwarding while dynamic routing protocols keep the 2800 synchronized with other network devices.



## PSTN SIGNALLING 100111A011B

The PSTN trunk connections are terminated by the 2800 through one or two T1/E1 or PRI network line interfaces, according to ITU-T G.703/G.704 and ANSI T1.403 specifications. The 2800 provides two RJ-48C ports for the PSTN network connections and incorporates receive and transmit circuitry for T1/E1 long haul applications. Adaptively controlled receive equalization adjusts the incoming receive line for attenuation and crosstalk. The PSTN communicates call processing information to the 2800 using two basic signaling methods: Channel Associated Signaling (CAS) and Common Channel Signaling (CCS).

### Channel Associated Signaling (CAS)

CAS is a method of signaling whereby call processing information is imbedded within the call. In T1 operation CAS is accomplished using Robbed-Bit signaling. This type of in-band signaling steals each DS0's least significant bit every six frames. This allows the indication of the signaling state and is the method used to relay call information such as off-hook, busy, and ringing.

Switching Equipment Compatibility			
Line Interface	T1 Robbed-Bit	E1 – MFR2	T1/E1 PRI
Signaling	Robbed-Bit	MFR2	Q.931
Australia: AUSTEL TS014			
Europe: Euro ISDN (CTR 4)			
Japan: INS-1500			
North America: National ISDN-1, AT&T 5ESS, Northern Telecom DMS-10			

In E1 environments, CAS is accomplished using MFR2 signalling. MFR2 is an international signaling system which uses six tones to provide end-to-end signaling of address (phone numbers) and call information. Time-slot 16 is used to convey signaling status such as answer, seizure and acknowledge. As R2 implementations within international regions can vary, the 2800 is designed to allow extensive user level configuration of R2 line and interregister signaling parameters. As an added feature, specific country profiles are preset in the 2800 to provided quick configuration on a country-by-country basis.

### Common Channel Signaling (CCS)

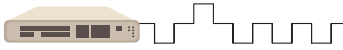
CCS provides a separate data channel for call processing and is used in ISDN PRI service. The 2800 supports ISDN PRI for either T1 or E1 connections. In both T1 and E1 PRI service, a separate 64 kbps signaling channel is used by the PSTN to convey call processing information. Such information includes basic call control such as setup, maintenance and procedure messages and is independent of the path used for telephone call. The signaling also tells the 2800, at the time a call is placed, whether the call is an analog voice/modem or digital ISDN call. The 2800 is capable of supporting both types of calls on the same hardware by loading the appropriate firmware into the DSP on a per-call basis.

The ISDN Network Layer is specified by the ITU Q-series documents Q.930 through Q.939. This standard specifies how terminal equipment communicates with the central office switch through the call setup dialogue, although different switching equipment may require different dialogues. For Q.931 operation, the 2800 RAS supports CTR-4, NET5, TS014, INS1500, NI1, AT&T/Lucent and DMS switching equipment.



## DSP DIGITAL MODEM

1001000



The 2800 T1/E1/PRI line termination connects to the DSPs via an internal PCM highway. The 2800's DSPs process the PCM channel information directly from the PSTN and are TDM time-slot aware--specifically designed to interface with T1/E1/PRI connections. Organized as a resource pool, the DSPs process PCM data from the PSTN without analog to digital conversion. The DSP resource pool contains up to thirty DSPs: each with over 40 MIPS of processing power, and each dynamically assigned to process a specific time-slot at call setup. Functioning as full-duplex digital communications processors, the DSPs are not committed to performing a specific task. The same hardware can function as an analog V.34+ modem on one call, and process a digital ISDN call on the next. Being software driven, DSP processing provides an inherent migration path to future technologies.

### Processing V.34+ Calls

At the time a modem call arrives, a DSP will be placed into service to process the call. The DSP will be assigned to respond to the PCM channel information for that time-slot. (PCM is simply the digital encoding of an analog waveform.) In a V.34+ or similar analog modem call, the DSPs will take this digital encoding and process the call as a V.34+ modem. The 2800 allows for configuration on how the DSP modems will negotiate an incoming call. The user can select maximum and minimum speeds, as well as which modulations should be allowed. Operational characteristics--such as transmit power, carrier loss duration, and V.42/V.42bis error correction and compression--can be user configured to permit flexibility.

### Processing ISDN Calls

Integrated Services Digital Network (ISDN) provides a high-speed digital connection to the telephone company network. The B channel, which is a circuit switched connection, is a 64 kbps clear channel pipe. The complete bandwidth is available for data, as call setup and other signaling is done through the D channel. The 2800 RAS can support synchronous PPP to connect remote ISDN Terminal Adapters (TA) over B channels. Using Multilink PPP (MP), multiple 64kbps channels can be "glued" together to permit larger bandwidth connections as well as bandwidth on demand.

### Processing 56K Calls

In an effort to bring faster connections to users, new standardized modem technology has been deployed. In the modernized all-digital infrastructure of the PSTN, most telephone calls now go through a single analog-to-digital conversion and thus remain in the digital domain. New modem standards, such as K56Flex™ and V.90, leverage this modern infrastructure to allow high-speed downstream data transfer. The 2800's DSPs negotiate these new modulations by loading V.8bis for call processing. The 2800, being a software-driven device, easily adapts to new modem standards as they develop--only a FLASH software upgrade is required.

#### Benefit Byte

Software upgradeable DSPs let the 2800 RAS keep up with new technologies. You'll avoid costly hardware replacement!



The 2800's DSPs do more than process analog or digital modem calls; Layer 2 processing, data buffering, PPP escaping and V.42 flow control are also performed within the DSPs. This distributed processing model allows each individual DSP to process and buffer data without requiring the attention of the host processor for every bit received or transmitted.



## ACCESS SERVER

After successfully negotiating a modem link, the 2800 allows the user to connect to protocol related services. Two types of connection to these services are available from the 2800: unframed and framed.

### Unframed Connections

Unframed connections, or connections without any underlying protocol, will receive a login prompt. After the 2800 has received the login information, it will authenticate the user. The user may be authenticated against the internal user static database or through RADIUS. Upon successful authentication, the user will be granted service based on either preconfigured defaults or through specified configuration parameters.

### Framed Connections

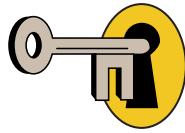
Serial Line IP (SLIP) provides an easy means to transmit IP packets from one computer to another over a serial line. In creating a SLIP connection, a login name and password are obtained and the 2800 will then authenticate the user. Upon authentication, the user will see a login "success" banner. This success banner is typically used to tell the caller what his IP address is, and to signify the start of the framed session. The 2800's success banner is user customizable to guarantee interoperability with older SLIP clients.

The Point-to-Point Protocol (PPP) is implemented to provide a datalink connection that can establish, authenticate and manage a framed link. The 2800 RAS will automatically detect 7E flags and begin a PPP session. In the link establishment phase, the 2800 and the caller (also known as the *peer*) will negotiate network specific options.

Multilink PPP (MP) is similar to PPP in that it allows the aggregation of multiple smaller connections to create a single large bandwidth connection. (Basic Rate ISDN, supported by the 2800, offers users the possibility of opening these multiple simultaneous channels between systems. This gives users additional bandwidth on demand.) Multilink is based on an the initial LCP negotiation where each side indicates that it is capable of combining multiple physical links into a "bundle".

### Custom Configuration

The 2800 allows custom configuration of various connection parameters. For example, the 2800 can be configured to auto-detect a framed PPP connection or to initiate a specific (default) service for all callers. Other parameters, such as maximum session time, maximum idle time and login time, are also user-configurable.



## AUTHENTICATION

Each time a communications server permits access, the network becomes more vulnerable to security breaches. For user access control, the 2800 RAS provides two flexible authentication options: 1) local authentication by the 2800, and 2) centrally managed authentication using RADIUS.

### Local Authentication

For local authentication, the 2800 RAS incorporates an internal database supporting over 100 users. Once the user connects, the 2800 will obtain the username and password of the calling party. This may be via a login prompt or as part of the PPP negotiation process. PPP authentication is processed using either the Password Authentication Protocol (PAP) or the Challenge Handshake Authentication Protocol (CHAP). In either case, the 2800 RAS will obtain the user information for processing by the 2800 authentication manager.

### RADIUS Authentication

The 2800 RAS will also function as a Remote Authentication Dial-In User Service (RADIUS) client.

As a RADIUS client, the 2800 is used to authenticate and authorize users via a RADIUS server. The RADIUS server is responsible for receiving user connection requests, performing authentication, and returning all configuration information needed by the client to deliver service to the user. All transactions between the client and server are authenticated through a shared secret. Additionally, any user passwords sent between the client and the RADIUS server in encrypted format.

The 2800 supports primary and secondary RADIUS servers for authentication and accounting. Both servers offer, user-configurable timeout, retries and port selection. The 2800 supports RADIUS accounting by reporting connection initiations and terminations to the accounting server. This in turn generates reports for billing or auditing purposes.

**Patton Electronics Home Page**

**2800 CONFIGURATION MENU**

- [HOME](#)
- [ALL VALUES](#)
- [Authentication](#)
- [Dial In](#)
- [Dial Out](#)
- [Drop and Insert](#)
- [DSP](#)
- [Ethernet](#)
- [Frame Relay](#)
- [ICMP](#)
- [Interfaces](#)
- [IP](#)
- [MFR Version 2](#)
- [RIP Version 2](#)
- [SNMP](#)
- [System](#)
- [System Log](#)
- [T1/E1 Link](#)
- [TCP](#)
- [UDP](#)
- [About 2800](#)

**AUTHENTICATION** Model 2800

**Validation**

Validation:

Host Address:

Secondary Host Address:

Host Port:

Timeout:

Retries:

Secret:

NAS Identifier:

Accounting Address:

Secondary Accounting Address:

Accounting Port:

Accounting Enable:

#### Benefit Byte

Your choice of internal or RADIUS authentication means the 2800 can stand on its own or work with other systems.



## ROUTING/FORWARDING

The 2800 IP routing mechanism is responsible for directing IP packets to their final destination by sending the packet to the “next hop.” This list of next hops is called the *routing table*. This table also holds additional routing information such as the destination, mask, and physical interface. When the 2800 receives a packet, it will scan the table for the best route. If no route is found by the 2800, the packet will be sent to the default gateway. The user can then configure static routes with the 2800, using either a gateway, host or interface route. To automatically locate the next hop for a packet, when that is possible, the 2800 RAS makes use of ARP and RIP routing protocols.

### ARP

The Address Resolution Protocol (ARP) is the means by which IP addresses are associated with physical Ethernet address and is one of the two methods used by the 2800 for locating the next hop. The 2800 will respond to ARP requests for its own dialup addresses, with its IP address as the responsible router for delivering the packet. This functions even if the LAN and dialup IP addresses are on different IP networks.

### RIP

To automatically update the routing table, adjacent routers must communicate using a dynamic routing protocol. The dynamic routing protocols supported by the 2800 are Routing Information Protocol (RIP) version 1 and version 2. These protocols identify which networks each router is currently connected to, and assist the 2800—along with ARP—in automatically locating the next hop for a particular IP packet.

#### Benefit Byte

The 2800's routing options give you more solutions to choose from. More ways to get your critical data to the “next hop.”

## Forwarding

Additional network connectivity can be achieved using the 2800's second T1/E1 connection as a Frame Relay uplink. User bandwidth can be configured on a time-slot basis. Using RFC 1490 encapsulation and the 2800's sub-interface architecture, each Data Link Connection Identifier (DLCI) is specified as its own point-to-point connection. The 2800 will then add entries in the routing table to forward packets to and from each DLCI.

# ACCESS

Internet Access



# Network Management

## NETWORK MANAGEMENT OVERVIEW

Standard network management demands nodes which can seamlessly integrate into existing network management topologies. Providing both system and user level management, the 2800 fits nicely within this model by simultaneously functioning as both a *managed node* and a *management application*.

### The 2800 as a Managed Node (SNMP)

As a managed node, the 2800 RAS allows complete configuration and control using the Simple Network Management Protocol (SNMP) over the UDP protocol. SNMP defines the rules for management and the collection of management information. This model views a managed system as containing the following: managed nodes, management stations, the management protocol, and the management information. The 2800 RAS functions as a managed node using the SNMP version 1 management protocol and is compatible with management systems such as HPOpenView™ and Sun Solstice Enterprise Manager™.

The 2800 also supports industry standard Management Information Bases (MIBs), which are databases of information that a network management system can view or modify. (All object Identifiers fall under the iso.org.dod.internet tree structure.) Specifically, the 2800 supports MIB II and is able to access SNMP configuration and statistics information through standard SNMP MIBs. The 2800 also offers extended management functionality through the Patton Enterprise MIB.

The 2800 supports two SNMP community names: one permits read-only access and the other permits read-and-write access. These community names also serve as the passwords for the Web based and control port interfaces.

### The 2800 as a Management Application (HTTP)

The World Wide Web has given the computing world a graphical interface that is common and easy-to-use. Using a web browser, management and configuration information can be presented in an intuitive fashion while alleviating the need for dedicated management workstations.

As a management application, the 2800 RAS runs its own built-in HTTP (version 1.0) Web server. This allows systems equipped with standard browsers (e.g. Netscape® or Internet Explorer®) to become management stations without having to purchase expensive SNMP network management systems. They can thereby display relevant operating facts about the 2800 in an intuitive, graphical manner (see the sample screen below). Navigation using this management system is as simple as following a link or pressing "submit." The 2800 main menu displays twenty-two separate configuration links. These links allow complete system configuration, as well as displaying all 2800

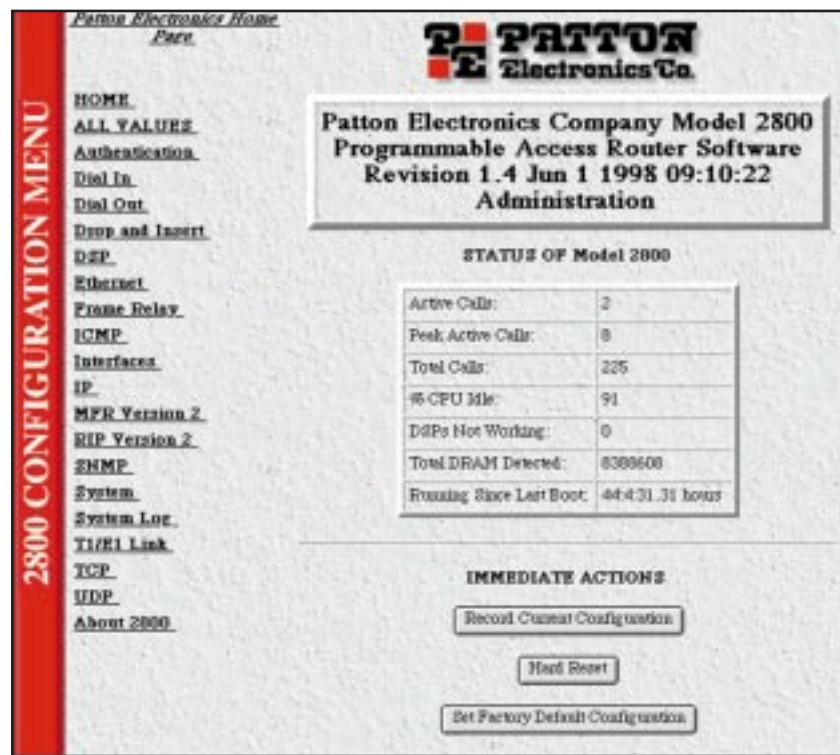
#### Benefit Byte

A built-in HTTP server lets you manage the 2800 RAS from any PC, laptop or workstation with a standard Web browser. Anywhere.



operating variables. Most variables that are configurable have drop down boxes for option selection. When the desired option is selected, it is simply submitted to the 2800 for immediate change.

Two levels of security are provided to allow controlled access to the 2800's built-in management system. A monitor level password allows viewing of all variables (except passwords). A super-user password allows complete access to all variables as well as allowing the manager to change 2800 configuration parameters.



## User Level Management

Every time a communications server permits access from the public, the network becomes more vulnerable to security breaches. Network managers need tools to guard against intrusion while simplifying user management. As network access expands, administration of users' access and privileges creates the need for a centralized access database. For user level management, the 2800 RAS provides two options: 1) an internal database of 125 users; 2) a Remote Authentication Dial-In User Service (RADIUS) client.

Depending on site size and requirements, users can be locally authenticated or the 2800 RAS can be connected to a larger, centrally located, server that multiple 2800s may use.



# Specifications

## Hardware:

### Architecture

- 1,023 MIPS (Million Instructions per Second) maximum sustained performance via integrated RISC CPU
- Multiple DSPs (Digital Signal Processors)
- 4 Mbytes Flash
- 8 Mbytes DRAM, expandable to 32 Mbytes
- Serial Connection: one RS-232 (RJ-45) configuration port
- System monitoring with “watchdog” automatic reset
- POST diagnostics of all sub-systems

### PSTN T1/E1/PRI

- Supports up to 24 (T1  $\mu$ -law PCM) or 30 (E1 A-law PCM) dial-in connections
- Framing formats: T1 - ESF and D4; E1-double frame, CRC4 and multiframe
- Line encoding: T1 - AMI, B8ZS; E1 - AMI, HBD3
- Signalling: T1 - Robbed Bit (Ground start or Loop start) or Q.931 (PRI); E1 - ITU-T MFR2 or Q.931 (PRI)
- T1/E1 Drop-and-Insert time slot passthrough (T1-to-T1 or E1/R2-to-E1/R2)
- AIS (Alarm Indication Signal) and Yellow alarm detection and dynamic generation
- Error monitoring of frame bit error, BPV and CRC error
- Error monitoring of Lost Carrier, CRC error, Short Frame and others
- Network loop diagnostics

### LAN Connection

- 802.3 AU1 and 10Base-T Ethernet Port with high speed 32-bit LAN coprocessor
- Auto-Polarity Correction

### Physicals

Front panel: RJ-45 connector for control port; LED indicators monitor T1/E1 channel status, T1/E1 line status and errors, Ethernet Status and errors

Rear panel: Dual T1/E1/PRI network interface connections; one DB-15F and one RJ-45 802.3 Ethernet connection; one IEC-320 shrouded male power connector, dual independent cooling fans

Dimensions: 17” wide x 8” deep x 1.75” High (432 mm x 203 mm x 44 mm)

Weight: 4.5# (2.0 kg)

Environmental: 32-104F (0-40C); 0-15000’ (0-4572 M); Operating Humidity 5-90% non-condensing

Power Supply: Internal Universal Input 90-260 VAC, 50/60/400 Hz, 35 Watts, IEC-320 shrouded male connector

Compliance: FCC Part 15, Class A; FCC Part 68; UL1950, Canadian cMET, Canadian CS-03, EMC Directive 89/336/EEC; Low Voltage Directive 73/23/EEC (EN60950); CTR-4; Year 2000 Compliant



## Software:

### Analog and Digital Modem Services

Supports up to 30 concurrent dial-up connections, either analog (V.34+) or digital (K56flex™/V.90/ISDN)  
Modem modulations: K56Flex, V.34 Annex 12, V.34, V.8, V.32bis, V.32, V.22, V.22bis, V.23, V.21, Bell 212A, Bell 103, Bell 202, EIA PN-2330  
Software sync/async receiver/transmitter for V.14  
V.42/V.42bis error correction and compression

### Protocol Services

TCP/IP Suite with extensive protocol statistics  
ICMP/TFTP/FTP  
Ethernet ARP, Proxy ARP and RARP protocols  
Point-to-point protocol (PPP)  
SLIP protocol  
Van Jacobson TCP header compression  
PPP address and protocol compression  
RADIUS Authentication and Accounting with support for primary and secondary servers  
Internal Call History/Progress and Statistics  
RIP & RIPv2 dynamic route distribution  
User configurable static routes  
TCP clear connection

### Management Services

Out-of-Band RS-232 configuration port for management and control  
Remote software upgrade via TFTP or FTP to internal FLASH memory  
SNMP version 1 configuration management  
Support for MIB-II (RFC-1213), DS1 MIB (RFC-1406), RIPv2 MIB (RFC 1389), Ethernet MIB (RFC-1643) and Patton's enterprise MIB  
System logging to configuration port, non-volatile FLASH, volatile RAM, SYSLOG Daemon, and SNMP trap  
RADIUS Accounting  
Dial-in dynamic IP address pool management  
User configurable login prompts and banners  
Status reporting of all Model 2800 parameters  
Built in HTTP server for complete configuration and control using a standard Web browser

### Security

Internal database of over 100 static users  
RADIUS Client supporting dual Authorization and Accounting servers  
Framed connections: PPP PAP & CHAP  
Unframed connections: User name login and password  
Dual SNMP/HTTP passwords for monitor and superuser access levels



# Company Profile



**W**hen it comes to data communications, few companies define "excellence" as well as Patton Electronics Co. A privately held and family operated corporation, Patton Electronics was founded in 1984 by two brothers fresh out of college. It quickly became clear that high technology was Patton's niche, and it still is. Patton's US factory is a cutting edge engineering and manufacturing facility, employing the latest in automated surface mount fabrication techniques.

Patton Electronics is an **ISO-9001 qualified** and **BABT** approved facility, and all of Patton's products are **CE** marked for sale in EEC member countries. Patton products are available through a network of Authorized Distributors, on the Internet (<http://www.patton.com>) and in Patton's own **DatacomDirect** catalog.

For racks, backplanes, power supplies, alarms and thermal management units suitable to a wide range of commercial, telecommunications, government and military applications, contact **ITenclosures** (<http://www.itenclosures.com>).



## Patton Products are Available Worldwide:

**North America** • Canada, USA • **Latin America** • Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Panama, Paraguay, Peru, Trinidad, Uruguay, Venezuela • **Western Europe** • Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom • **Central/Eastern Europe** • Armenia, Belarus, Bosnia Hertzegovina, Bulgaria, Czech Republic, Estonia, Hungary, Kazakhstan, Latvia, Lithuania, Moldova, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Ukraine, Uzbekistan, Yugoslavia • **Middle East/Africa** • Egypt, Israel, Jordan, Lebanon, Morocco, Nigeria, Saudi Arabia, South Africa, Turkey, United Arab Emirates • **Asia/Pacific** • Australia, China, Hong Kong, India, Indonesia, Korea, Malaysia, New Zeland, Pakistan, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, Vietnam

# Benefits Summary



## ● **Answers K56Flex™/V.90, ISDN & V.34+ Calls on One Line**

The 2800 RAS answers up to 30 K56Flex™/V.90, ISDN and V.34+ calls from the same T1/E1/PRI line. No analog-to-digital conversion takes place, and no hardware upgrades are ever required. Instead, new modem technologies are available through software upgrade, allowing you to continue providing optimum, cost-effective service--today and tomorrow!

## ● **Network Management using a Standard Web Browser**

For familiar and easy-to-use configuration, the 2800 RAS has a built-in HTTP server. This server allows any standard WWW browser to configure and monitor the 2800 RAS. Obtaining information is as simple as clicking on a link. Changes are as effortless as submitting a request. All 2800 subsystems (e.g. Authentication, IP, T1/E1 link) are presented in an intuitive manner, permitting quick access to important information. For existing network management topologies, the 2800 can also be configured, controlled and managed using SNMP.

## ● **Frame Relay or PPP Uplink allows Network Expansion**

Service providers with existing router or Frame Relay backbones can provide dial-up service at a remote PoP (Point-of-Presence). Simply connect the 2800 to a router using PPP--or to a switch using Frame Relay--and begin offering service! This capability allows the ISP to generate increased revenue by providing local service to customers, giving them substantial savings over the alternative of long-distance telecommuting.

## ● **Drop & Insert Function Integrates Voice & Data**

A typical remote office has three requirements: dial-in data access, dial-out Internet access and two-way voice communication. With our drop & insert feature, all three requirements can be met by one 2800 RAS. And what's more, the 2800 can meet all three requirements through a single T1/E1 line--resulting in potentially significant savings in telco service charges!

## ● **Routing Options Provide Flexibility**

The 2800 RAS automatically routes IP (call) packets to the "next hop" through the local Ethernet port or through the 2800's second T1/E1 port. Routes can be statically or dynamically configured using RIP (Routing Information Protocol) or RIP version 2. Less constraints. Greater flexibility.

## ● **Choice of Internal or RADIUS Authentication**

The 2800 RAS provides two convenient authentication options: an internal user database and connection to a RADIUS server. Once the 2800 obtains the username and password of a caller, it will process the access request by either comparing the user to its own internal database or querying a RADIUS server. The 2800 either stands on its own or integrates with high-end systems.

## ● **Front Panel Facilitates Local Configuration and Monitoring**

Numerous front panel LED indicators present 2800 status information at a glance: call status (e.g. ringing, on-line, available), T1/E1/PRI status and Ethernet status are all monitored in plain view. In addition, an out-of-band RS-232 control port allows convenient configuration from a laptop, PC or local terminal.

# Internet



**US Headquarters** • Patton Electronics Company • 7622 Rickenbacker Drive • Gaithersburg, MD 20879  
Tel: (+301) 975-1000 • Fax: (+301) 869-9293 • Email: [sales@patton.com](mailto:sales@patton.com) • Web: <http://www.patton.com>

**Western Europe Office** • Tel: (+44) 1256-381840 • Fax: (+44) 1256-381885

**Asia/Pacific Office** • Tel: (+852) 2332-0646 • Fax: (+852) 2574-7803

**Middle East/North Africa Office** • Tel: (+961 3) 397197 • Fax: (+961 3) 397218

**Latin America/Caribbean Office** • Tel: (+301) 975-1000 • Fax: (+301) 869-9293

*"All brand and product names are registered trademarks or trademarks of their respective holders."*