



# Software Product Description

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**PRODUCT NAME: RouteAbout Access ES Software, Version 3.0      SPD 56.42.01**

## Description

The RouteAbout Access ES Distributed Routing Software, Version 3.0, provides IP routing plus wide area capability. The RouteAbout Access ES has one local area Ethernet port and one T1/E1 serial interface. It supports PPP, asynchronous PPP, RIP, Frame Relay, and V.25 bis for dialback support.

## TCP/IP Routing

The RouteAbout Access ES supports TCP/IP. The IP implementation routes data in accordance with TCP/IP standards. Routing table entries may be static, in which case the user configures them from the console, or they can be dynamically created by routing protocols.

## Routing Information Protocol Version 2

Support for Routing Information Protocol (RIP) Version 2 functionality as specified in RFC 1723 and RFC 1724 is included. RIP Version 2 addresses the shortcomings of Version 1, yet maintains the simplicity of RIP. An important feature is the ability to carry subnet mask information along with the destination IP address. This is used to distinguish between subnet and host routes. This also allows the usage of variable length subnet masks in the RIP domain and supports route aggregation. This implementation supports simple password authentication and is compatible with RIP Version 1 networks.

## Triggered RIP

Triggered RIP proposes modification to distance-vector based routing protocols, such as RIP, to cut down on the bandwidth these protocols require through their frequent broadcasting of routing information. Since RIP broadcasts routing tables every few seconds, it can consume a lot of bandwidth and interfere with the normal flow of traffic. It is particularly hard on dialed circuits because it can force a situation whereby the link is almost always up due to the dialing on demand of the routers to exchange routing information. Triggered RIP overcomes

this situation by limiting the exchange of incremental routing updates upon the occurrence of any change in the routing information. For instance, RIP normally broadcasts "I have routes A, B, and C at my disposal" every few seconds. With Triggered RIP, the router initially hears from its neighbors "I have routes A, B, and C at my disposal" and then nothing else until something changes. If router 3 goes down or the line disconnects for some reason, router 2 then sends an update (and only then) to router 1 saying "I now have routes B and C at my disposal."

## Subnetting

Subnetting support is fully compliant with RFC 950. Any number of IP networks can be subnetted. When RIP is used, subnet masks are specified on a per-network basis. In this case, a given IP network may have only one subnet mask.

## TCP/IP Access Control

Access control lists can be applied separately to each interface for either incoming or outgoing traffic. Packets can be filtered based on the source or destination address, IP protocol number, or TCP/UDP port number.

## Network Address Translation

Network Address Translation (NAT) support is compliant with RFC 1631, which allows multiple computers on your LAN to share a type of Internet connection that is otherwise limited to a single computer. It hides the addresses of all computers on your LAN from the Internet. All data from your LAN appears to come from the address of your WAN interface.

Based upon the concept of address reuse by private networks, it operates by mapping the local IP addresses of the edge devices to the globally unique ones required for communication with hosts on other networks. You can use your existing private IP network address scheme or preferably the scheme recommended in RFC 1918.

The router acts as a remapper, exchanging the Local Domain IP addresses from the external Domain (for example, the Internet service provider).

### Fragmentation

As referenced in RFC 791, if the destination network does not support packets as large as those to be sent, the router fragments the packets before transmission.

### TCP/IP Static Filters

IP filters start by blocking all traffic. You then create a Profile or collection of filters, to allow traffic based on your organization's security policy. You can allow access to specific internal network resources, and you can allow internal clients to access services outside your corporate network. Once you set up your filters, you can test and troubleshoot them by using Event Logging System (ELS) messages.

### Supported TCP/IP Standards

RFC	Description
RFC 768	User Datagram Protocol
RFC 791	Internet Protocol
RFC 792	Internet Control Message Protocol
RFC 793	Transmission Control Protocol
RFC 826	IP Datagrams Over Public Data Networks
RFC 854	Telnet
RFC 894	Transmission of IP Datagrams Over Ethernet
RFC 925	Multi-LAN Address Resolution
RFC 950	Internet Standard Subnetting Procedure
RFC 951	BOOTP
RFC 1157	SNMP
RFC 1293	Inverse ARP
RFC 1332	IPCP Internet Protocol Control Protocol
RFC 1334	PAP/CHAP
RFC 1350	TFTP
RFC 1490	Multiprotocol Interconnect over Frame Relay Networks

RFC	Description
RFC 1570	LCP Extension (partial magic number only)
RFC 1661	PPP Data Link for TCP/IP
RFC 1723	RIP V2
RFC 1724	RIP V2

### Dynamic IP Address Assignment

The RouteAbout Access ES supports the Dynamic IP Address Assignment feature. This feature allows IP addresses to be assigned to the router's WAN port. Dynamic IP Address Assignment operates with Point-to-Point Protocol (PPP) circuits, using the IPCP send IP address facility.

### IP Antispoofing

IP Antispoofing is supported in the RouteAbout Access ES. This feature provides a mechanism to stop unauthorized remote users from masquerading as authorized users. Hackers may attempt to break into a network by "spoofing" (using a forged IP source address to circumvent a firewall). The packet appears to have come from inside the protected network, and therefore can be eligible for forwarding through the network. With the antispoofing feature, the router identifies the remote user as a user coming in over the WAN serial port—one that cannot have the same IP address as the internal LAN. Having identified the act of intrusion, the router does not allow the packet through.

### Secure Password

From an administrative standpoint, this feature protects the router by enabling the router to ask for a password at login.

### PAP and CHAP Support

The authenticator and peer negotiate an authentication protocol during the link establishment phase of PPP. To do so, the authenticator requests the peer to use either the Password Authentication Protocol (PAP) or the Challenge Handshake Authentication Protocol (CHAP). If the peer replies that it can support that protocol, the two systems perform the authentication process.

The RouteAbout Access ES supports PAP. The router initiates the authentication process by sending a PAP request packet. PAP uses a two-way handshake and does not encrypt the password that identifies the peer to the authenticator. This implementation complies with RFC 1334, PPP Authentication Protocols.

The RouteAbout Access ES supports CHAP. CHAP uses a three-way handshake to verify the identity of the peer. CHAP uses the RSA Data Security, Inc., MD5 Message-Digest Algorithm, copyright 1990. This implementation complies with RFC 1334, PPP Authentication Protocols.

### **RADIUS Compatibility**

The RouteAbout Access ES is Remote Authentication Dial In User Service (RADIUS) compatible. RADIUS compatibility allows users on a remote LAN to connect through a remote access server and authenticate themselves against the RADIUS server; the router will then pass the appropriate packets through. The router itself is not authenticated.

### **Frame Relay Networks**

Frame Relay provides extended LAN services over a wide area network in a point-to-point or point to multipoint manner. The Frame Relay interface gives access to Frame Relay services based on the Core Aspects of the LAPD data link layer protocol, ANSI T1.618-1991. The Frame Relay interface provides network addressing, congestion control, and network synchronization for permanent virtual circuit (PVC) connections. TCP/IP is supported according to Frame Relay RFC 1490 (MPI).

Physical access is through the serial port, via the network side of the CSU/DSU. Frame Relay can run up to T1/E1 speeds.

The Frame Relay implementation is based on the following specifications:

- CCITT Q.933 Annex D—DSS1 Signaling Specification for Frame Mode Basic Call Control
- ANSI T1.617—DSS1 Signaling Specification for Frame Relay Bearer Service
- ANSI T1.617 Annex D—Additional Procedures for Permanent Virtual Connections (PVCs) Using Unnumbered Information Frames

The RouteAbout Access ES supports routing of IP traffic over Frame Relay networks as specified in RFC 1490. The router interface also supports IP traffic over PPP via an encapsulation technique. ARP correctly resolves MAC addresses and inverse ARP maps the MAC address to the IP address, as defined in RFC 1293.

### **Asynchronous Dialup**

The RouteAbout Access ES Dialup Serial Interface (DSI) feature supports asynchronous and synchronous RS-232 communication, including V.25 bis communication through the general switched telephone network. This allows the router to work with a modem and provide connectivity back to other dialup routers or remote access servers. Although there is only a single physical serial interface, the router supports multiple virtual dial circuits, each acting as a normal serial network running asynchronous PPP.

### **Dial-on-Demand**

The RouteAbout Access ES initiates and accepts switched circuit connections. Switched circuit support requires use of a V.25 bis compliant synchronous modem, or CSU/DSU. The data rate is limited by the DCE device and the carrier service used for the serial line.

### **Callback Support with PPP**

The Callback feature is supported in the RouteAbout Access ES. When enabled, this feature causes the RouteAbout Access ES to make or accept callback requests to and from the remote router. The RouteAbout Access ES uses the LCP Callback option defined in RFC 1570 to control callback processing; it must be supported by the remote router to the degree necessary to successfully execute in the mode specified. PPP authentication is then used to determine the identity of the calling router.

### **Compression**

STAC LZS5, Version 5.0, technology is supported in the RouteAbout Access ES. STAC LZS, Version 5.0, provides compression on PPP data links.

### **Bandwidth Reservation**

Bandwidth Reservation is supported in the RouteAbout Access ES. Bandwidth Reservation guarantees outgoing bandwidth on serial lines, Frame Relay interfaces, and V.25 bis switched circuits. This system reserves percentages of the total bandwidth for specified classes of traffic. These percentages are a guaranteed minimum for the class when the line is fully loaded. A class can exceed its guaranteed minimum on a line with light traffic, using up to 100 percent of the line bandwidth. The system dynamically adapts to changes in line speed, applying the same percentage to the new line speed.

### **Event Logging System**

The Event Logging System (ELS) is a monitoring system that manages messages generated by system components within the router. Messages are caused by system activity, status changes, service requests, data transmission and reception, and data and internal errors. User configuration determines the types of messages to be collected. The messages can be displayed on the console terminal screen or accessed through SNMP.

### **Interface Utilization Measurement**

Interface Utilization Measurement provides for the monitoring and configuration of interface activity. You can configure a utilization level (expressed as a percentage) for interfaces and generate ELS messages and/or SNMP traps to notify operators of the interface utilization level.

### **INSTALLATION**

The RouteAbout Access ES Version 3.0 software is factory installed in the Flash memory of the router. Software upgrades are performed with the TFTP protocol either locally or remotely over any supported interface.

For reloads when there is no valid software image in the Flash memory of the router, loading is supported by BOOTP/TFTP code in the router's programmable read-only memory (PROM). The load host can be either local or remote.

### **CONFIGURATION AND MANAGEMENT**

The RouteAbout Access ES can be configured by using the RouteAbout Access Configuration Tool, which is a Microsoft Windows based graphical configurator shipped with the RouteAbout ES. The tool runs under Windows NT Version 4.0 and Windows 95 and allows for fast configuration of the router interface and protocols.

### **SOFTWARE PRODUCT SERVICES**

A variety of service options are available from DIGITAL. For more information, contact your local DIGITAL office.

### **SOFTWARE LICENSING**

A separate license is required for each Router hardware unit on which the software product is to be used. This license is included in the price of the Router hardware. A license letter is shipped with the hardware unit along with the invoice; both of these serve as proof of license.

The licensing provisions of the DIGITAL Standard Terms and Conditions specify that the software and any part thereof (but excluding those parts specific to the load hosts) may be used only on the single Router hardware unit on which the software is operated, but may be copied in whole or in part (with proper inclusion of the DIGITAL copyright notice and any proprietary notices on the software) between multiple load hosts on the same LAN.

This software is furnished under the licensing provisions of the DIGITAL Standard Terms and Conditions. For more information about DIGITAL licensing terms and policies, contact your local DIGITAL office.

## HARDWARE REQUIREMENTS

The RouteAbout Access ES Version 3.0 Software requires the following hardware: a RouteAbout Access ES module and a console terminal for local configuration of the router.

Description	Order Number
RouteAbout Access ES (U.S. and Canada)	DEX1S-FA
RouteAbout Access ES (Europe and Asia Pacific)	DEX1R-F* <sup>1</sup>

<sup>1</sup>The asterisk (\*) denotes the country kit variant.

Interface	Adapter Cable Order Number
V.35 DTE	BN37D-02
RS232 DTE	BN37E-02
X.21 DTE	BN37F-02
V.35 DCE	BN37G-02
RS232 DCE	BN37H-02
X.21 DCE	BN37J-02

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