

# Network Access & Connectivity Product Line Catalog

**PATTON**  
Electronics Co.



- End-to-End DSL Solutions
- Fiber Transmission
- Network Termination
- Multi-Service Access
- Remote Access
- Cross Connect Switches
- Interface and Media Conversion
- Baluns and Interface Adapters
- Line Drivers
- Multiplexers
- cPCI Systems

## New Categories

- Copper Ethernet Extenders
- Fiber Ethernet Extenders
- G.SHDSL Modems and Routers
- G.SHDSL TDM Concentrators
- G.SHDSL Access Servers
- aDSL Modems and Routers
- vDSL Modems, Routers and Concentrators
- Media Converters

## Extending, Converting & Converging Networks

"Thank everyone at Patton, You guys are the greatest!  
...once again you guys proved that your product is superior.  
I am very happy, and so are my clients."

—Craig Hulbert  
Dayton Digital Networks

Catalog #20R

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- **BABT Approved Manufacturing Facility**

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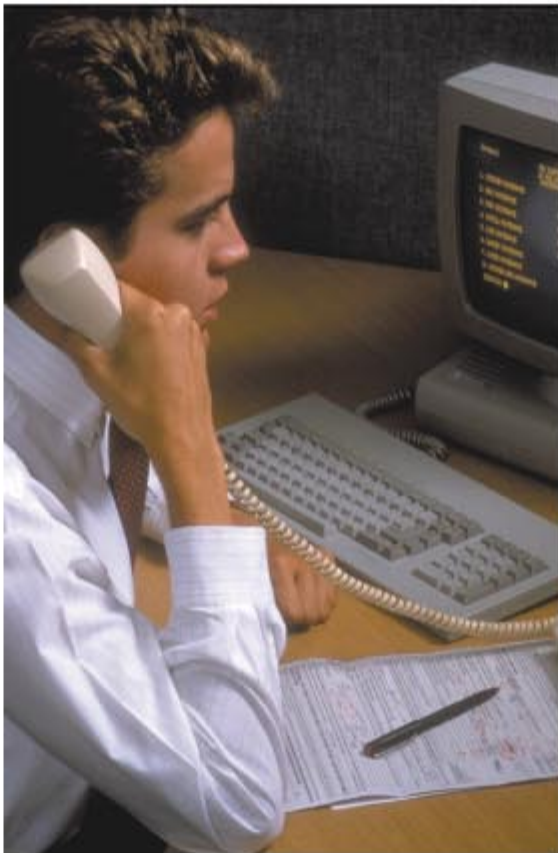


## Customer Service

- **Our unique direct-call answering system gets your question answered now**
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Our customer service agents provide fast and friendly sales coordination and account management services. They make sure your orders are processed quickly and accurately and shipped promptly.

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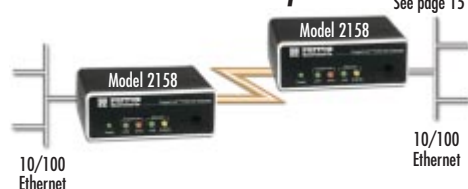
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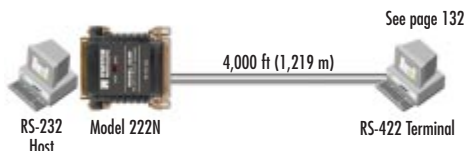
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# NETWORK ACCESS

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## cPCI SYSTEMS FOR OEMs

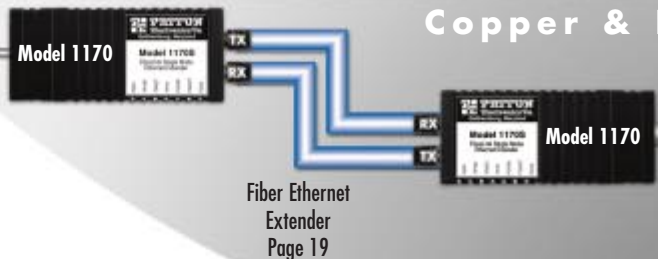
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<b>Configured cPCI Systems</b> . . . . .	<b>196-198</b>	<b>cPCI Components</b> . . . . .	<b>199-202</b>	cPCI Mid-Planes . . . . .	<b>200</b>
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# NETWORK ACCESS SOLUTIONS

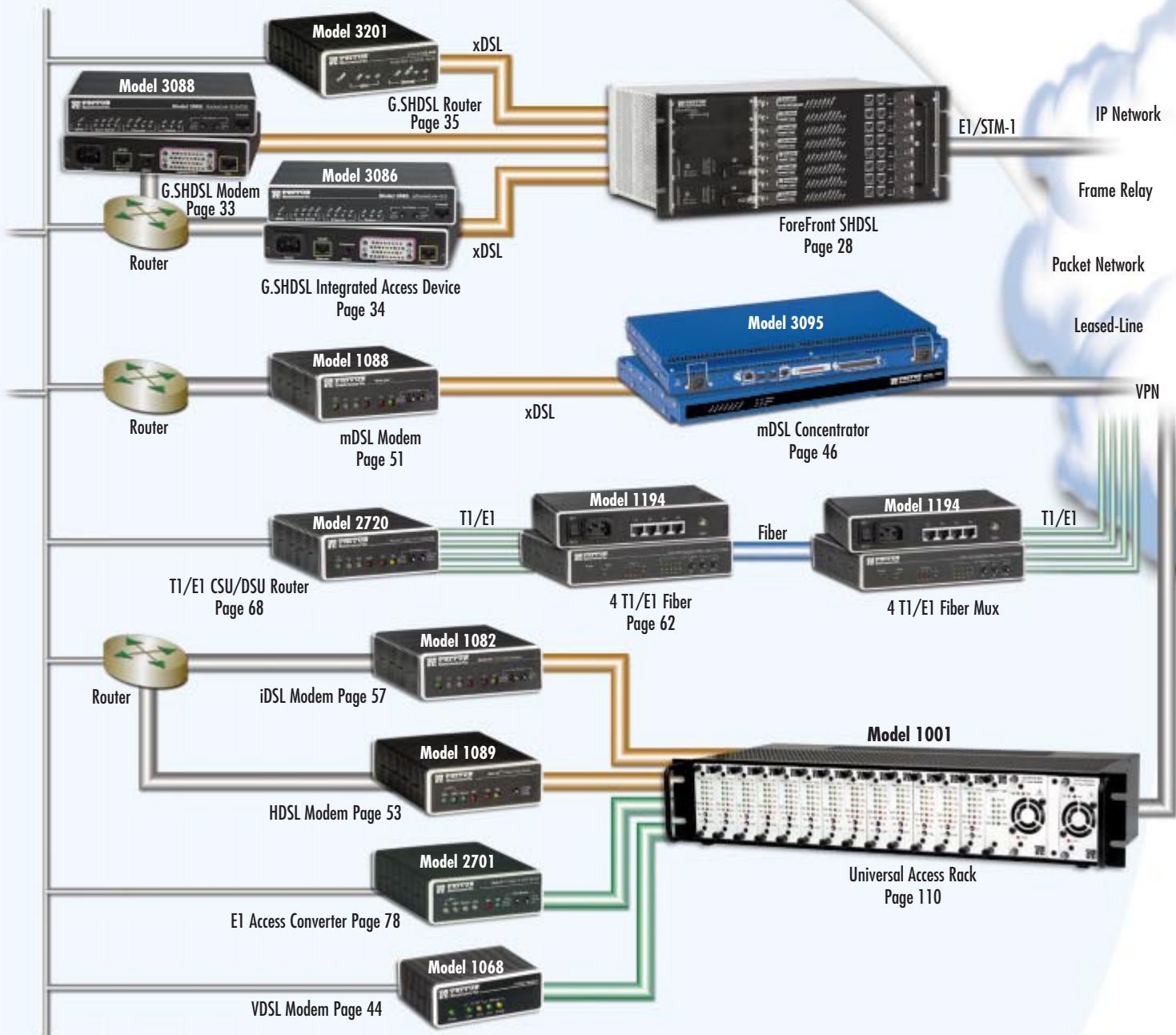
## WIDE AREA

Copper & Fiber



## TRANSMISSION

DSL, Fiber, & T1/E1 Access





# Extending, Converting, & Converging

## ETHERNET

### Ethernet Extension



Copper Ethernet Extender  
16.67 Mbps  
Page 14



Ethernet



## MULTI-SERVICE

### Dial-up RAS, Muxing, & Cross-Connect Switches

ATM

IP Network

TDM Network

Private Network

PSTN Network

The Internet



4 x T1/E1 DACS  
Page 102



ForeFront DACS  
Page 100



ForeFront RAS  
Page 86



120 Port RAS  
Carrier Access RAS  
Page 94



T1/E1 Router  
Page 70



T1 CSU/DSU



60/96 Port RAS  
Page 90



24/30/48/60 Port Server  
Model 2977/PCI Digital Domain RAS  
Page 97



Dial-Up Modem  
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4 BRI PCI  
Model 2977/B4 or S/T PCI Server  
Digital Domain RAS  
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PSTN  
LATA

# WIDE AREA ETHERNET

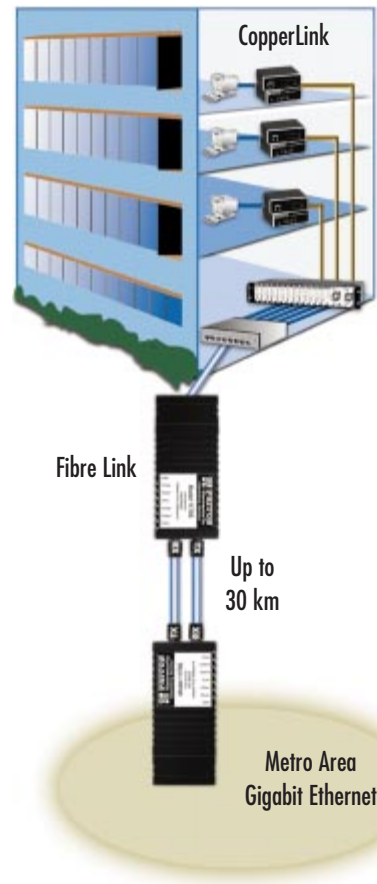
## COPPER & FIBER ETHERNET EXTENSION

### COPPER LINK

#### Copper Ethernet Extension

Model	Max Distance	Max Line Rate	Interface	Rack	Photo	Pg
2168	1.2 km <small>1.8 km in asymmetric mode</small>	16.67 Mbps	10/100 BTX			14
2158	1.2 km	12.5 Mbps	10/100 BTX			15
2157	3.0 km	4.6 Mbps	10/100 BTX			16
2156	5 km	2.3 Mbps	10 BT			17
2155	8 km	128 Kbps	10 BT			18

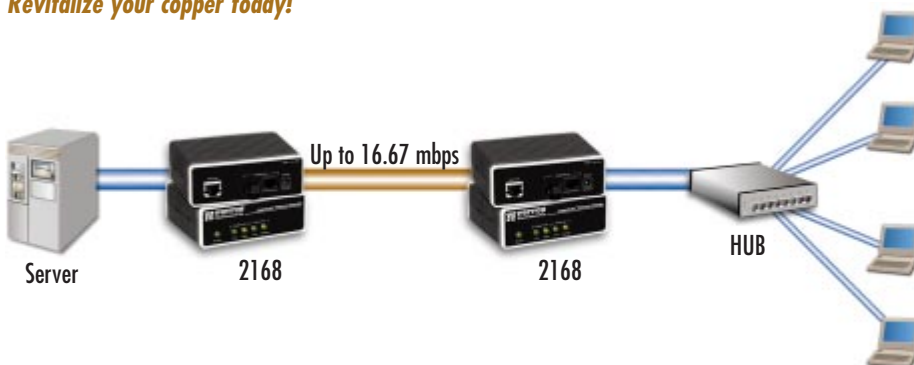
#### Broadband IP Services for the Vertical Campus



#### Our Full Range of CopperLink Ethernet Extenders

Extend your Ethernet connectivity over existing copper infrastructures with Patton's CopperLink Ethernet Extenders. Whether your requirement is sending Ethernet data over long distances or at high speeds, there is a Patton CopperLink Ethernet Extender for you. Use the table above to select the best model for you.

*Revitalize your copper today!*



#### Other Ethernet Extension Applications

- ✓ Campus LAN Connectivity
- ✓ Secure IP Networks (Dark Fiber)
- ✓ Fiber to the Desktop
- ✓ Metropolitan IP Networks
- ✓ Mission-Critical IP Links
- ✓ City LANS
- ✓ Multi-Dwelling, Multi-Tenant IP Services

# Breaking the Boundaries of Ethernet

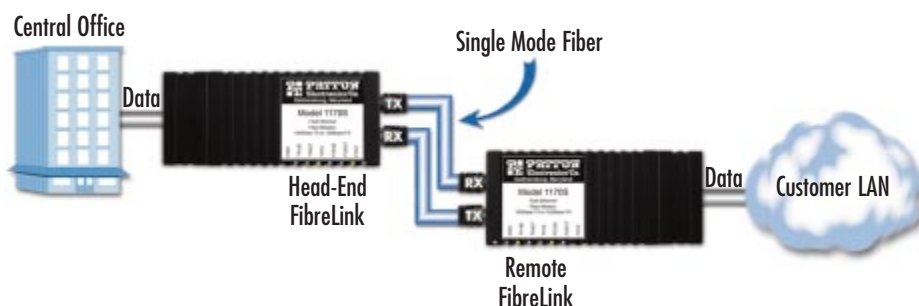
## FIBRE LINK

### Fiber Ethernet Extension

Pg	Photo	Model	Fiber (nm)	Interface/Speed	Distance
19		1171M	MM 850	10 BT 10 Mbps	2 km
		1170M	MM 1300	100 BT 100 Mbps	
		1172M	MM 1300	10/100 BTX Auto-Neg 10/100	
20		1171S/15K	SM 1310	10 BT 10 Mbps	15 km
		1170S/15K	SM 1310	100 BT 100 Mbps	
		1172S/15K	SM 1310	10/100 BTX Auto-Neg 10/100	
20		1171S/30K	SM 1310	10 BT 10 Mbps	30 km
		1170S/30K	SM 1310	100 BT 100 Mbps	
		1172S/30K	SM 1310	10/100 BTX Auto-Neg 10/100	

### FibreLink

Patton's FibreLink modems extend the distance of high speed data links well beyond the limitations of Ethernet or other copper transport modes. Fiber's high immunity to interference and its ability to handle future bandwidth requirements make it the ideal choice for critical network connections in remote offices, campus buildings, or offsite data storage facilities.



### In This Section...

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Ethernet Extender, 12.5 Mbps, Full-duplex	15
LAN Extender, 4.6 Mbps, with Auto-Rate Adaptation	16
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Ethernet Extender, 1.24 miles (2 km), Multimode	19
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<b>Bridges &amp; Terminal Server Solutions</b>	<b>21</b>
Ethernet MicroBridges, Serial to 10Base-T	21
Single Port Terminal Server	23

## For Voice and Data Ethernet Extension Visit VDSL

Patton's VDSL modems allow for asymmetric or symmetric transmission at line rates up to 16 Mbps! Best of all, VDSL delivers this incredible bandwidth with POTS/ISDN services over a single twisted-pair copper line.



## Today's Lesson Plan



Model 2120  
Terminal Server

- TCP
- UDP
- ICMP
- Telnet
- ARP
- DHCP
- FTP
- SLIP
- PPP
- IP NAT
- WINS
- DNS
- PAP

**RS232 + 2120 = Ethernet**

**PPP + IP = Internet Access**

# ***Give your serial device an advanced degree in Ethernet***

- ✓ Control and monitor any RS-232 terminal or device over any IP/Ethernet LAN
- ✓ 802.3 Ethernet interface connects to any hub or switch
- ✓ RS-232 over IP
- ✓ Single-port RAS with any modem
- ✓ User-selectable data rates up to 115.2 kbps
- ✓ Access your private network address through the Internet



**Single-Port Terminal Server**

**Model 2120**

The versatile Patton Model 2120 brings RS-232 serial devices and control ports onto the LAN and also functions as a single-port remote access server.

Patton's Model 2120 Single-Port Terminal Server provides a quick, simple, and cost-effective solution for connecting traditional RS-232 terminals and devices to a local area network. The Model 2120 can be used just about anywhere, including the office, retail outlets, equipment rooms, and on the factory floor. When used with a dial-up modem and connected to a LAN, the Model 2120 also functions as an inexpensive single-port remote access server. The versatile and feature-rich Model 2120 can literally be used in thousands of different applications and environments.

The Model 2120 brings serial RS-232 devices onto the network by encapsulating RS-232 data into IP packets for transport over the LAN. Using Raw TCP or TELNET, the Model 2120 can connect to any user-defined IP address and port. Once connected to the remote host, data is passed transparently end-to-end. The built-in DHCP Client allows the Model 2120 to dynamically obtain an IP address and a subnet mask from a master server. Using dial-up modems and SLIP and PPP connections, remote users can access the network as if they were locally connected.



The Patton Model 2120 Single-Port Terminal Server easily and cost-effectively brings serial RS-232 equipment together with other systems on one local area network!

**FEATURES & BENEFITS**

- ✓ Enables control of any RS-232 asynchronous serial device over a LAN or via the Internet
- ✓ Asynchronous data rates up to 115.2 kbps
- ✓ DTE/DCE-selectable serial port
- ✓ RS-232 status indicators
- ✓ 802.3 10Base-T LAN connection via RJ-45 for network connection
- ✓ Ethernet link and status indicators
- ✓ User-configurable session options
- ✓ Supports standard TCP/IP protocols (TCP, UDP, IP, ICMP, TELNET, ARP, DHCP, FTP, TFTP, SLIP, PPP, PAP, DNS, and WINS)
- ✓ Comes with 1 Mbyte RAM and 512 kbytes FLASH
- ✓ Small package attaches directly to terminal equipment
- ✓ AC or DC power options
- ✓ Download new software via FTP into FLASH memory
- ✓ 64-user database for enhanced security

**ORDERING INFORMATION**

<b>2120/AM/UI</b>	Single Port RS-232 Terminal Server, Asynchronous, DB-25 Male, UI Power Supply
<b>2120/AM/48</b>	Single Port RS-232 Terminal Server, Asynchronous, DB-25 Male, -48 VDC Power Supply
<b>2120/AF/UI</b>	Single Port RS-232 Terminal Server, Asynchronous, DB-25 Female, UI Power Supply
<b>2120/AF/48</b>	Single Port RS-232 Terminal Server, Asynchronous, DB-25 Female, -48 VDC Power Supply
<b>2120/A9M/UI</b>	Single Port RS-232 Terminal Server, Asynchronous, DB-9 Male, UI Power Supply
<b>2120/A9M/48</b>	Single Port RS-232 Terminal Server, Asynchronous, DB-9 Male, -48 VDC Power Supply
<b>2120/A9F/UI</b>	Single Port RS-232 Terminal Server, Asynchronous, DB-9 Female, UI Power Supply
<b>2120/A9F/48</b>	Single Port RS-232 Terminal Server, Asynchronous, DB-9 Female, -48 VDC Power Supply

**LAN-to-LAN Bridging**



The Patton Single-Port RS-232 Terminal Server provides the ability to bring virtually any RS-232 device onto the LAN. Using industry-based TCP/IP protocol enables Patton's Single-

Port Terminal Server to provide a standard Ethernet communication link to any type of host. Above is an example of the Model 2120's role in an industrial environment.

**SPECIFICATIONS**

**Serial Interface:** DB-25 male or female; DB-9 male or female  
**Serial Transmission:** RS-232 Asynchronous, 0 to 115.2 kbps, configured via serial port or TELNET session  
**DCE/DTE:** Configured via serial port or TELNET session  
**RS-232 Status Indicators:** TXD, RXD, DTR, RTS, CTS, DCD, and Power

**Ethernet Interface:** RJ-45 female  
**Ethernet Standard:** 10Base-T (IEEE 802.3)  
**Ethernet Status Indicators:** Ethernet link and status  
**Protocols Supported:** TCP, UDP, IP, ICMP, TELNET, ARP, DHCP, FTP, TFTP, SLIP, PPP, PAP, DNS, and WINS

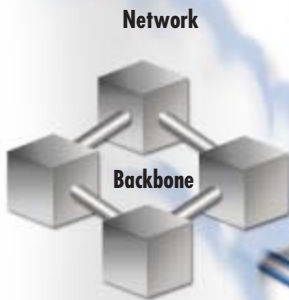
**Management Services:** Monitoring, control, and diagnostics via serial port or TELNET session  
**Memory:** 1 Mbyte RAM; 512 kbytes FLASH  
**Power Supply Options:** External, universal AC (100–240 VAC) or -48 VDC  
**Temperature:** 32–122°F (0–50°C)

**Humidity:** Up to 95% non-condensing  
**Dimensions:** 3.5L X 2.1W X 0.78H in. (9.0L X 5.3W X 1.9H cm)  
**Weight:** 0.2 lbs (0.09 kg)

# TRANSMISSION

## NETWORK EXTENSION

### Copper Solutions for Network Extension



### Fiber Solutions for Network Extension

DSL Flavor	VDSL	ADSL	SHDSL (High speed)	HDSL	mDSL	G.SHDSL	iDSL	Services
Line Rates	16 Mbps	8 Mbps 800 kbps	4.6 Mbps	1.1 Mbps	2.3 Mbps	2.3 Mbps	144 kbps	ATM
Distance	1 mile (1.6 km)	1.9 miles (3.05 km)	1.9 miles (3.05 km)	2.9 miles (4.6 km)	3.0 miles (4.9 km)	3.0 miles (4.9 km)	5 miles (8.1 km)	FR
Edge Solutions	3324	coming	3224 ForeFront	ForeFront	3095	3224 ForeFront	3092 3192	IP
CPE Solutions	1058 & 1068	3101	3201, 3086 & 3088	1094 & 1089	1095 & 1088	3201, 3086 & 3088	1092 & 1082	Leased Line
See Page	40–47	38	28–38	52–53	46–50	28–38	54–57	Voice
<b>Copper</b>								
<b>Fiber</b>								
Media Type	Multi-Mode	Multi-Mode	Multi-Mode	Multi-Mode		Single Mode	Single Mode	Single Mode
Rates	100 Mbps	10 Mbps	Up to 2 Mbps	Up to 2 Mbps		100 Mbps	10 Mbps	Up to 2 Mbps
Distances	1.2 miles (2 km)	1.2 miles (2 km)	1.6 miles (2.5 km)	1.6 miles (2.5 km)		18.6 miles (30 km)	18.6 miles (30 km)	31 miles (50 km)
Models	1170 1171, & 1172	1170 1171, & 1172	1186	1186		1170 1171, & 1172	1170 1171, & 1172	1193 & 1194
See Page	19	19	120	120		19	19	60 & 62
T1								
E1								
ISDN								
Ethernet								

**NETLINK DSL** Choose from sDSL, mDSL, HDSL, and iDSL—along with T1/E1 NTUs—and get the right user interface for your network. The NetLink system provides a variety of CPE options—from compact CPE with fixed interfaces to flexible *QuikConnect™* interfaces. Central office solutions range from 1U high rack-mount TDM concentration units to 2U one-card-per-subscriber rack solutions with flexible front and rear card swappability. It's so easy you will wonder how you ever managed without Patton's NetLink system.



NetLink DSL Products  
Page 46–57

**FOREFRONT DSL** Patton's ForeFront™ Access Infrastructure Solutions provide DSL solutions in a scalable carrier-class access platform. With a variety of card styles to provide TDM or IP concentration options and their ability to be mixed and matched in any of the cPCI chassis available, the ForeFront DSL platform gives users a solution to answer their DSL needs now and into the future. Harness the explosive growth of DSL with a tightly integrated, cost-effective solution to aggregate high speed traffic while gaining flexibility and protecting your investment.



ForeFront DSL, Page 28–36

**VDSL** The low cost solution for truly high bandwidth demands. Patton's VDSL offers the fastest technology available today over copper twisted-pair. With symmetric data rates up to 16 Mbps, Patton's VDSL solutions address the bandwidth needs for video-on-demand, broadcast TV, high speed data exchange, and voice services. Available in many versions, the Patton product line includes multi-rate asymmetrical/symmetrical standalone and rack card modems, fixed-rate standalone and rack card modems, and a VDSL access concentrator.



VDSL  
Page 40–44

**UNI-FIBER MODEMS** With just a single strand of optical fiber and Patton's uni-fiber modems, you can connect remote equipment located up to 31 miles (50 km) apart. Available in standalone or rack card versions, and using single-mode or multimode transmission, Patton's uni-fiber modems make delivering your high speed data to remote locations fast and easy. Options are available to transport single T1 or E1 data, or up to four T1s or E1s.

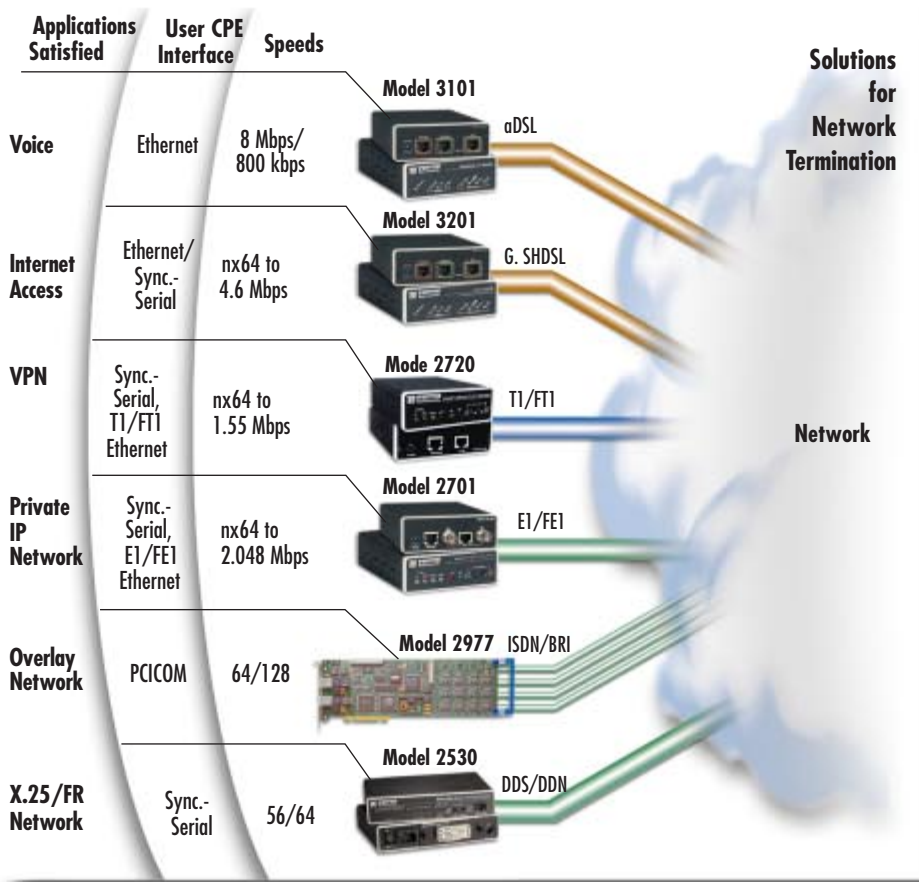


Fiber Modems  
Page 59–65



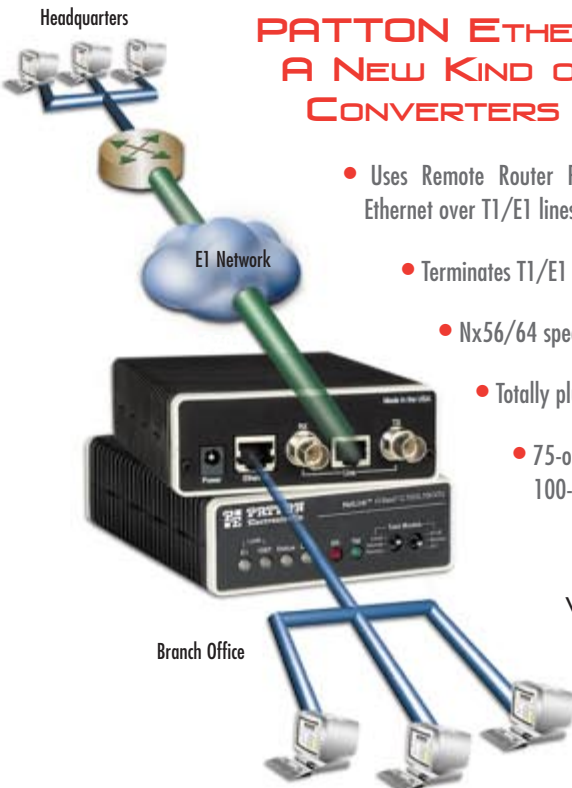
# Your First Choice for the Last Mile

## NETWORK TERMINATION



## In This Section...

<b>DSL Solutions—Everything Over DSL</b>	<b>26</b>
ForeFront G.SHDSL .....	28–36
VDSL Products .....	40–44
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<b>Network Termination</b>	<b>66</b>
Domestic Series—T1 Based Solutions ..	68
International Series—E1 Based Solutions ..	78



## PATTON ETHERROCKETS A NEW KIND OF T1 AND E1 CONVERTERS

- Uses Remote Router Porting™ to transparently extend Ethernet over T1/E1 lines
- Terminates T1/E1 Services
- Nx56/64 speeds to 1.554 Mbps and 2.048 Mbps
- Totally plug-and-play
- 75-ohm and 120-ohm (E1), 100-ohm (T1) connections

Call today to get your free whitepaper on Remote Router Porting and learn how you can save on your next T1 or E1 deployment

## MUX 4-T1's or E1's over a Single Fiber

Patton's new Fiber Optic Mux lets you transmit any combination of four T1/FT1 or E1/FE1 over a single strand of fiber. Save money on fiber by only using one strand . . . save money on multiplexers by using Patton.



# DSL SOLUTIONS

## TDM CONCENTRATION

Standalone Functionality					Central Site Systems				
DSL Transport	Sync. Serial	T1/E1	Bridged Ethernet	Routed Ethernet	Access Rack	TDM Concentration	IP Concentration	Models	Page
iDSL	Yes	64K G.703 Only	Yes		Yes	Yes	Yes	1082 Standalone	57
								1092 Standalone	56
								1092 Rack Cards	56
								3092 iDSL-DACS	54
								3192 iDSL IP Concentrator	55
mDSL & sDSL	Yes	Yes	Yes		Yes	Yes		1088 Standalone	50
								1095 Standalone	49
								3095 DSL DACS	47
								ForeFront Access System	28-37
HDSL	Yes	Yes	Yes	Yes	Yes	Yes		1089 Standalone	53
								1094 Standalone	52
								3095 DSL DACS	47
G.SHDSL	Yes	Yes	Yes	Yes		Yes	Yes	3201 G.SHDSL Router	35
								3086 G.SHDSL	34
								3224 G.SHDSL Access Server	36
								ForeFront DSL Access System	28
aDSL			Yes	Yes	Yes		Yes	3101 Standalone	38
vDSL			Yes				Yes	1058 Standalone	42
								3324 Access Concentrator	40

### STAND ALONE FUNCTIONALITY

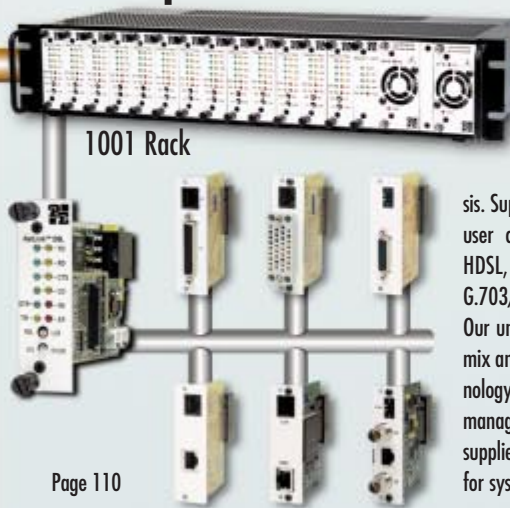
#### QuikConnect/Fixed-Interface CPE



Patton provides the complete end-to-end solution—with a variety of CPE to choose from, customers can always find what they need. Choose the method of transport and interface type. Then decide whether you want a fixed interface or if you want the flexibility of Patton's QuikConnect plug-in interfaces.

### ACCESS RACK

#### One Card per Subscriber



### IP CONCENTRATION

The model 1001 rack system gives users port-by-port flexibility in a 2U-high 19-in. rack-mount chassis. Supporting up to 16 cards per chassis, the user can choose from iDSL, mDSL, sDSL, HDSL, VDSL, T1/FT1, E1/FE1, Fiber, G.703/G.704, or Baseband modem cards. Our unique midplane design enables users to mix and match not only the transmission technology, but also the interfaces used. Add in management cards, AC/DC redundant power supplies and you have a truly flexible solution for systematically expanding your network.



# Everything Over DSL

## In This Section...

### DSL Solutions—Everything Over DSL 26

#### ForeFront G.SHDSL System . . . . .26–34

G.SHDSL DSL Platform . . . . .26

G.SHDSL Router . . . . .30

G.SHDSL Modem and Router . . . . .32

G.SHDSL Access Server . . . . .34

G.SHDSL Router . . . . .36

#### VDSL Products . . . . .38–44

VDSL Access Concentrator/Switch . . . . .38

VDSL Modem, 12.5 Mbps . . . . .40

VDSL Modem, Variable Rate . . . . .42

#### NetLink DSL . . . . .44–56

mDSL DACS, 16-mDSL Ports & WAN Uplink Modules . . .44

mDSL Modem, 2.3 Mbps, 2 Wire, QuikConnect . . . . .46

mDSL Modem, 2.3 Mbps, 2 Wire, Rack Card . . . . .47

mDSL Modem, 2.3 Mbps, 2 Wire, Fixed Interfaces . . . . .48

HDSL Modem, 1.152 Mbps, 2 Wire, QuikConnect . . . . .50

HDSL Modem, 1.152 Mbps, 2 Wire, Fixed Interfaces . . . . .51

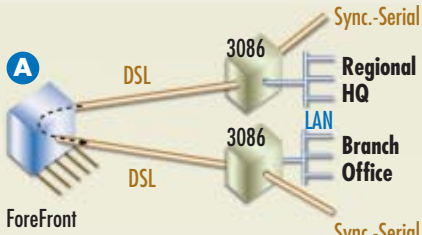
iDSL DACS, Quad T1/E1 & 24 iDSL Ports . . . . .52

iDSL Packet DSLAM . . . . .53

iDSL Modem, Serial or 10Base-T Ethernet Interfaces . . . . .54

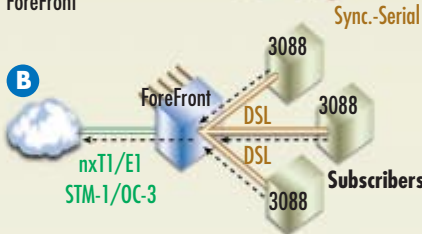
iDSL Modem, 2B1Q Encoding, 2 or 4 Wire . . . . .55

iDSL Rack Card . . . . .56



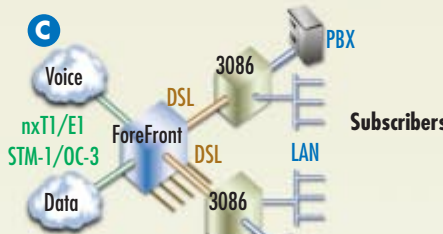
#### A Metro Area Leased Line

Connect two local sites by mapping DSOs (cross-connect) of one G.SHDSL port to another G.SHDSL port at the ForeFront chassis.



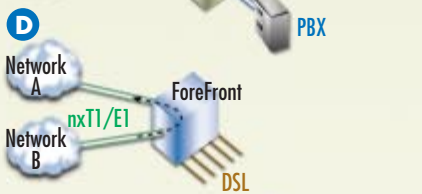
#### B DSL Concentration

Concentrate data from many DSL links into a few cost-effective uplinks by mapping the DSOs from multiple G.SHDSL ports into the DSOs of the WAN uplink ports.



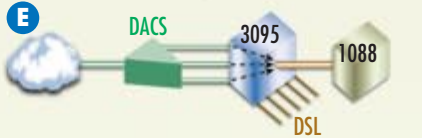
#### C Voice/Data DSO Segmentation

To separate or *segment* different types of data (to separate voice from data transmission, for example), map DSOs of specific data types to specific WAN.



#### D DSL plus T1/E1 DACS

In addition to DSL, map any of the WAN timeslots back to any other WAN timeslot for flexible T1/E1 cross-connecting.



#### E DACS Pass-Thru

Effectively by-pass the cross-connect feature and directly map a single DSL port to a T1/E1 WAN port on a one-to-one basis.



ForeFront

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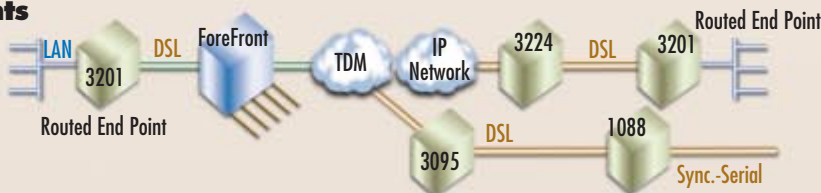
ForeFront

### DSL Concentrator with Routed End-Points for IP Overlay Networks

Patton's ForeFront system provides high level DSL concentration of IP traffic across SDH, SONET, or ATM networks. Providing routed end-points and high speed nxT1/E1 and/or STM-1/OC-3 egress.

#### Routed End-Points

Models 3201 & 3086 provide integrated IP routing. The 3086, with its FlexIP software, provides IP routing and sync.-serial interfaces on the same unit.



### DSL Access Servers for IP Backbones

Patton makes IP concentration easy with high density 1U-high integrated chassis solutions. They provide everything you need in 1U—modems, uplink, router engine, redundant power supplies, management, and advanced routing features.

### ForeFront Solutions for DSL

#### Patton's Half-Pipe, Full-Pipe, and Xtreme delivery platforms for DSL

The ForeFront AIS brings next-generation access to your DSL network.

Patton's ForeFront Access Solutions for DSL address the new point-of-presence requirements demanded by today's providers. Using a modular approach, the ForeFront AIS includes all system components needed to provide DSL

access. With multiple chassis options, card configurations and the CPE to go with it, the ForeFront AIS is the solution of choice for your next network expansion!

### FEATURES & BENEFITS

- ✓ Up to 208 G.SHDSL ports per chassis
- ✓ T1/E1, STM-1/OC-3 WAN egress options
- ✓ The ForeFront Full-Pipe—configured with 3096RC T-DACs—provides up to 128 G.SHDSL links in a 4U chassis. E1 or STM-1 interface options make data network integration a snap. Combined with Patton's 3086 CPE, it provides the complete solution.
- ✓ Redundant AC or DC

### Major Components

#### A cPCI Chassis

Flexible, standards-based, rugged design ensures that it will be a reliable, *viable* platform well into the future. It comes in 2U, 4U, and 6U platforms and all of its component are hot-swappable to eliminate system downtime. Add in its fully redundant power and integrated cooling and this lightweight chassis is ready to take your network wherever it needs to go—now and in the future.

#### B G.SHDSL Line Cards

Patton has combined G.SHDSL ports, DACs, and WAN functions in a single card. The Model 3096RC TDM-Digital Access Concentrator links 16 G.SHDSL circuits to multiple WAN uplink modules and offers completely flexible any-to-any grooming.

Each 4.6-Mbps port offers user-selectable nx64 data rates. With its built-in cross-connect, each data channel, or channel group, can be multiplexed onto any uplink or DSL port—even to ports on other 3096RC blades in the same chassis. With an integrated SNMP/HTTP-based NMS, the entire system is easily manageable.

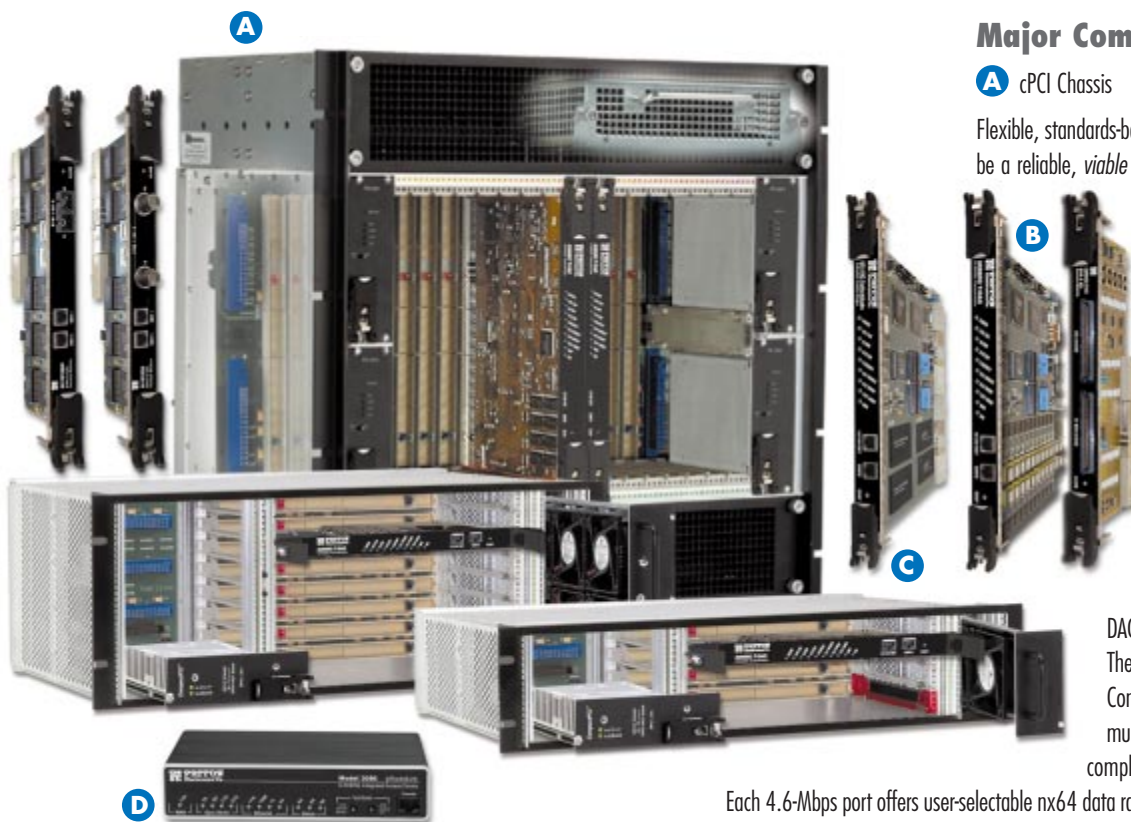
#### C 6511 Matrix Switch

The Patton Model 6511 Matrix Switch is an integrated multimedia switching engine complete with a digital access cross-connect, high speed STM-1/OC-3 trunk interface, wire-speed Ethernet packet switch, and GUI management system. The Model 6511's flexible channel switching fabric allows non-blocking switching from any input to any output. The channelized STM-1/OC-3 interface integrates into a SDH/SONET network, enabling users to channelize an STM-1/OC-3 down to 64 kbps timeslots. With full grooming capability the Model 6511 Matrix Switch allows any-to-any TDM mapping and can place any channel from any card onto any port.

#### D G.SHDSL IAD

Patton has several G.SHDSL CPE options to choose from to ensure customers the right match for their system. These devices are the next-generation standards-based DSL solutions optimized for the small to medium-sized businesses.

The Model 3086 is an Integrated Access Device that combines high speed data delivery (up to 4.6 Mbps) with IP routing and access via ATM/FR/PPP, along with serial TDM data access. The Model 3086 offers simultaneous connection to a 10/100Base-T Ethernet environment, and either a V.35/X.21 sync.-serial interface, or a T1/E1 port for connection to local T1/E1 device (PBX). The Model 3201 combines standards-based transmission with high speed IP routing.



## FOREFRONT SOLUTIONS CENTER

The ForeFront DSL solutions are made to specifically match the needs of your network. They are easily configurable to meet your uplink needs, your DSL needs and more. Take the example systems below, they provide a quick look at just a few of the limitless options available with the ForeFront DSL solutions.

### The Xtreme

This example comprises two independent STM-1 uplinks, 208 G.SHDSL modems with built-in SNMP management, power supplies, alarm cards, and cooling. The Xtreme uses its specially designed high speed backplane with integrated H.110 and 2.16 Ethernet buses, to allow mapping of any DSO timeslot to any other DSO timeslot, regardless of whether it is DSL, T1/E1, or STM-1. If this isn't enough, you can easily upgrade the Xtreme with two redundant STM-1 ports and up to a total of 208 T1/E1 WAN ports.



### The Full-Pipe STM-1

This high density solution gives users 96 G.SHDSL modems and an STM-1 uplink card, along with the integrated features that are standard in the ForeFront solutions, such as built-in DACS, SNMP management, power supplies, alarm cards, and cooling.

### The Full-Pipe T1/E1

For those who want a high density solution, but don't have access to an STM-1 uplink, the Full-Pipe also comes with T1/E1 uplinks. Choose how many you want—from 4 to as many as 96 T1/E1 uplinks can be used in the Full-Pipe. Plus, when you are ready for the STM-1, just add the card—the Full-Pipe is ready to go.



### The Half-Pipe

If you are ready to start deploying DSL and want to start slow but with a system that will grow as your needs grow, choose the Half-Pipe. This solution is small but powerful—it packs an impressive 64 G.SHDSL modems, DACS, management, supplies, cooling, and 16 T1/E1 WAN ports (upgradeable to 64) into a 2U-high chassis. In addition, as your needs grow and you move to a larger system, the cards will move right along with you to either the Full-Pipe or the Xtreme systems. Ensuring that your investment pays dividends well into the future.



### ForeFront cPCI

#### Configured chassis systems for ForeFront

#### FEATURES & BENEFITS

- ✓ CompactPCI Open System—Flexible, standards-based, rugged design ensures that it will be a reliable viable platform well into the future.
- ✓ 2U, 4U, 6U Platforms—Get 4, 8, or 17 slots for any system card and scale your deployment.
- ✓ Universal AC or Telco DC power modules offer high power with full 1+1 or N+1 redundancy
- ✓ Integrated management module monitors fan tachometers, voltage, and temperature.

### ForeFront chassis solutions

For detailed chassis information, see page 194.



#### ORDERING INFORMATION

**ForeFront Chassis Systems:** The ForeFront models below are our most popular configurations. Each is loaded with redundant AC, DC, or mixed AC/DC power supplies, fan modules, and alarm cards. Just add your choice of STM-1 and/or DSL modules to complete your system.

#### Half-pipe 4-slot chassis with fan module, alarm card, redundant power supplies, & H.110 backplane

**6276/RUI** Universal AC supplies

**6276/R48** Universal DC supplies

**6276/U48** Universal AC/DC supplies

#### Full-pipe 8-slot chassis with fan module, alarm card, redundant power supplies, and 2.16 backplane

**6476/RUI** Universal AC supplies

**6476/R48** Universal DC supplies

**6476/U48** Universal AC/DC supplies

#### Xtreme 17-slot chassis with fan module, alarm card, redundant power supplies, and 2.16 backplane

**6676/RUI** Universal AC supplies

**6676/R48** Universal DC supplies

**6676/U48** Universal AC/DC supplies

**Note:** For additional options associated with these chassis refer to page 194.

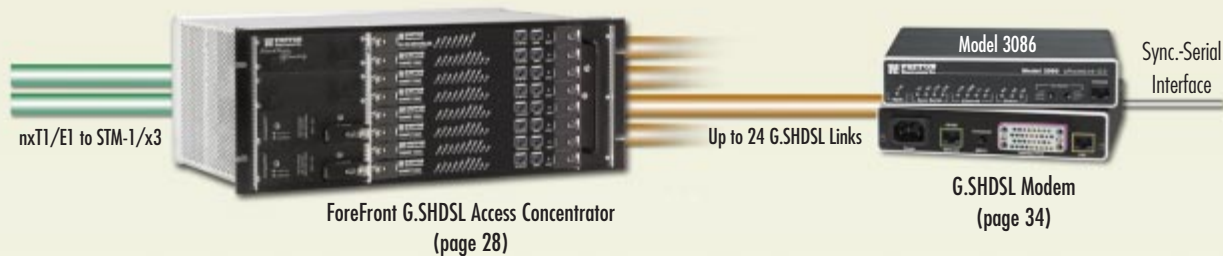
## G.SHDSL SOLUTIONS CENTER

### G.SHDSL for delivering IP Services



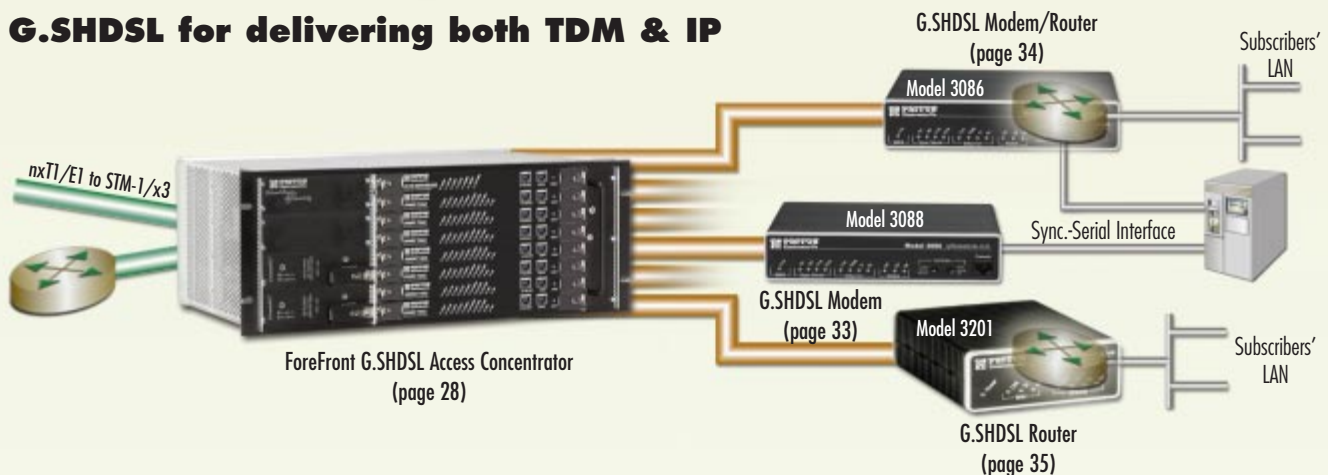
Using a combination of Patton's IPDSLAM/Access Server (Model 3224) and Patton's G.SHDSL Router (Model 3201), IP services can easily and efficiently be deployed in the local loop.

### G.SHDSL for delivering TDM/Leased Line Services



Patton's ForeFront system with G.SHDSL concentrator blades, in combination with Patton's G.SHDSL Modem (Model 3086), can be used to deliver T1/E1 or sync-serial leased-line services from SDH or SONET backbone networks.

### G.SHDSL for delivering both TDM & IP



A combination of leased-line and IP services can be delivered over G.SHDSL links using Patton's ForeFront system. A variety of CPE devices provide routed end-points (Model 3201), serial interfaces (Model 3088), or both IP routing and sync-serial (Model 3086).

## High Speed G.SHDSL Modem

### Model 3088

Use Patton's RocketLink G.SHDSL Modem for fast, dedicated, always-on access.



The Model 3088 RocketLink Modem drives profitability back into leased-line data services with standards-based G.SHDSL technology. The Model 3088 provides low cost, full-duplex network termination or extension at nx64 rates to 4.6 Mbps. The Model 3088 connects routers, switches, and other access devices, and is available in G.703/G.704, co-

directional G.703, T1/FT1, X.21, and V.35 interfaces. Plus, it is available in a rack card for the Model 1001 universal access rack.

For true flexibility, the Model 3088 is also compatible with any of Patton's G.SHDSL modems, including the Model 3201 router and ForeFront DSL solutions.

### FEATURES & BENEFITS

- ✓ Speeds to 4.6 Mbps over just a single twisted pair of wires
- ✓ Distances up to 32,800 feet (10 km)
- ✓ G.SHDSL ITU/ETSI interoperability with third-party DSLAMs and modems
- ✓ G.703/G.704, X.21, V.35, and co-directional interfaces available
- ✓ Built in testing and diagnostics for quick network turn-up and troubleshooting
- ✓ ForeFront plug-and-play operation
- ✓ WEB/SNMP manageable from anywhere in the world via the Internet



I'm Scott, Patton's Director of Product Management. I've put together this collection of resources for companies interested in DSL technology. There is much more information available online at [www.patton.com](http://www.patton.com)

### Resources Available

- |   |                          |
|---|--------------------------|
| ForeFront Product Line Overview                                 | xDSL Technology Overview |
| "Delivering IP Services From SDH Backbone Networks" White Paper | iDSL Product Overview    |
| xDSL Product Line Overview                                      | mDSL Product Overview    |
|   | G.SHDSL Product Overview |

### CPE for ForeFront



Using ForeFront with the Model 3088 allows deployment of hundreds of DSL circuits from a single low profile chassis. The Model 3088 can be used on the customer premise to deliver T1/E1 co-directional G.703, X.21, or V.35 interfaces.

### T1/E1 extension over copper wires



Use the Model 3088 units back-to-back to extend T1 or E1 channels across copper wires. These units are ideal for local loop, Campus, and multi-dwelling/multi-tenant applications.

### SPECIFICATIONS

**DSL:** G.991.2 ITU G.SHDSL Annex A and Annex B, G.994.1 G.hs. nx64 data rates over 2-wire full-duplex to 2.3/4.6 Mbps, symmetrical, TC-PAM encoding. Distance of 32,800 ft (10 km) at 192 kbps to 18,800 ft (5.75 km) at 2.312 Mbps.  
**DSL Connection:** Shielded RJ-45F isolation per IEC 950

**DTE Interface:** G.703/G.704, V.35, X.21/V.11, T1/FT1, G.703 Co-Directional  
**DTE Rates:** From 64 kbs to 2.3/4.6 mps in user definable increments  
**Diagnostics:** V.54 Loops (LLB, RDL); V.52 compliant BER pattern generator and detector (511/511E)

**Management:** EIA-561 RJ-45 RS-232, VT-100 CLI, TELNET, Embedded WEB/HTTP, SNMP  
**Power Supply:** External 230 VAC, Universal 90–260 VAC, or -48 VDC input

**Compliance:** FCC Part 15A, CE Mark, EMC Directive 89/336/EEC, Low-Voltage Directive 73/23/EEC  
**Op. Temp.:** 32–122°F (0–50°C)  
**Humidity:** 5–90%, non-condensing  
**Dimensions:** 4.17W x 1.52Hx5.0L in. (10.6W x 3.9H x 12.7L cm)

### ORDERING INFORMATION

<b>3088/C</b>	G.SHDSL RocketLink V.35 with M/34F interface
<b>3088/D</b>	G.SHDSL RocketLink X.21 with DB-15F interface
<b>3088/F</b>	G.SHDSL RocketLink G.703 CoDirectional with RJ-48 interface
<b>3088/K</b>	G.SHDSL RocketLink G.703/G.704 with dual BNC and/or RJ-48 Interface
<b>3088/T</b>	G.SHDSL RocketLink T1 with dual BNC and/or RJ-48 interface

Supply options: Each unit come with a 120 or 230 VAC power supply. Universal Power (90–260 VAC) or 48 VDC available at additional charge.

### High Speed G.SHDSL Concentrator for IP Traffic

#### Model 3224 IPDSLAM

The Model 3224 enables a wide variety of high speed dedicated access services by creating concentration points for routed IP traffic.

Patton's Model 3224 IPDSLAM is a cost-effective solution for dedicated Internet service delivery in situations where the business case does not support the separate deployment of high-density, chassis based solutions, service creation platforms, and routers. With support for 24 ports of up to 4.6 Mbps symmetric G.SHDSL links and numerous uplink options, the 3224's flexibility is unsurpassed.

The 3224 IPDSLAM routes IP traffic using numerous standard routing protocols while maintaining strict quality of service (QoS) by prioritizing operator configured traffic flows using standard ToS bits. VPN applications can be easily deployed with either L2TP or with IP-within-IP providing standards based tunneling of IP traffic. Assign traffic priorities to VPNs to guarantee QoS.

Extensive IP address and port filtering makes the 3224 an excellent multi-user firewall and service creation platform.

Either customize firewall services to the needs of the individual users or provide a standard global firewall service. Use the filters to segregate the traffic and wholesale service to other providers without losing control of your network or the level of service that is offered.

Well thought-out solutions to common networking issues include support for NAT & NAPT for avoiding IPv4 address depletion, DHCP for value added services to SOHOs, DNS caching for quick address look-ups, SNTP for time server synchronization of edge devices, and RADIUS accounting and authentication for validation, verification and accounting of user sessions.

Optional up-link ports provide the flexibility of selecting the up-stream interface that is right for your network deployment needs. Co-locate with a DLC or use it in a building's wiring closet. Redundant, load sharing, removable power

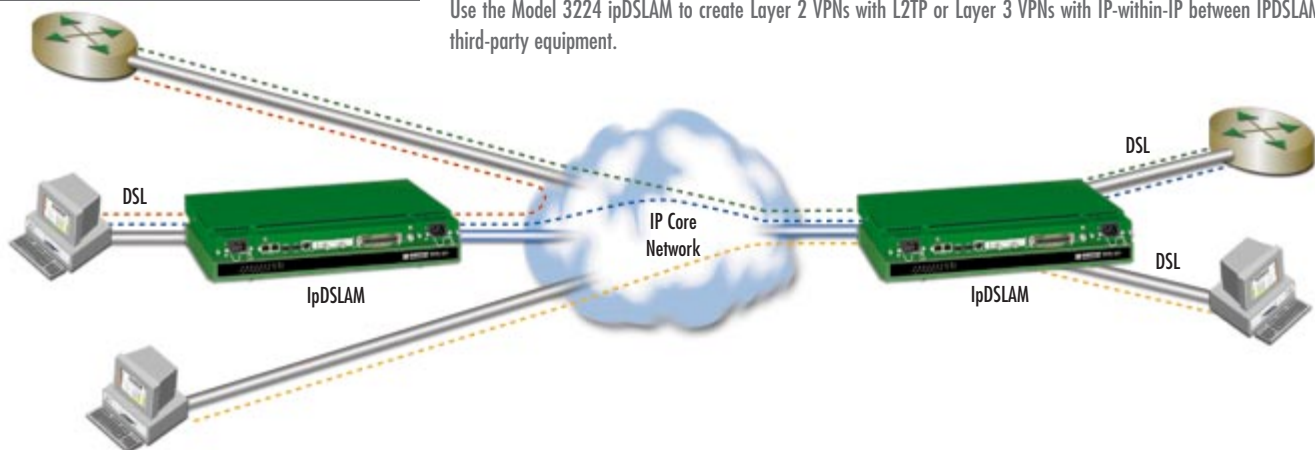
#### FEATURES & BENEFITS

- ✓ NAT & NAPT—Avoid address depletion
- ✓ DiffServ/ToS—QoS for all traffic flows
- ✓ IP address & port filtering—Create your own firewall
- ✓ DNS caching—Faster address lookups
- ✓ DHCP—Manage IP addressing for user LANs
- ✓ L2TP & PPPoE—Create Layer 2 tunnels
- ✓ IP-within IP—Create Layer 3 VPNs
- ✓ SNTP—Synchronize edge devices to time source
- ✓ RIP, OSPF & BGP—Routing flexibility
- ✓ RADIUS Accounting & Authentication—Authenticate & track users with standard tools
- ✓ Expansion modules—Adapt IPDSLAM to your network needs
- ✓ BITS & alarm ports—Deploy in traditional CO environments
- ✓ 24 G.SHDSL Ports—Symmetric service to 4.6 Mbps
- ✓ Redundant, removable power supplies—Non-stop operation

supplies provide maximum power protection. External BITS and alarm ports facilitate the deployment of the 3224 IPDSLAM in traditional central office environments.

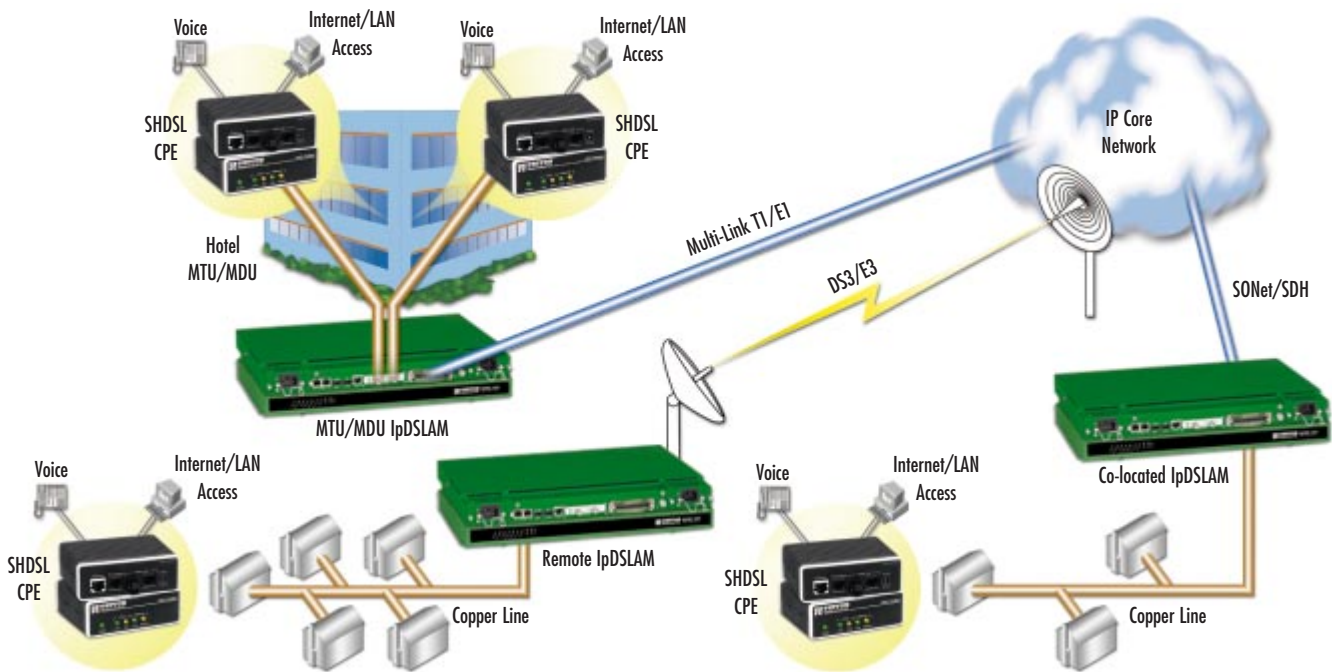
Whether you are an ISP, ASP, or Carrier, the IPDSLAM will improve the quality and variety of your service offering while reducing your investment in value added service platforms.

#### Layer 2 and layer 3 VPNs



Use the Model 3224 ipDSLAM to create Layer 2 VPNs with L2TP or Layer 3 VPNs with IP-within-IP between IPDSLAMs or other third-party equipment.

Deployment options



G.SHDSL for IP networks can be deployed in a variety of different ways: 1. In a multi-dwelling unit (MDU) or multi-tenant unit (MTU) utilizing in-building voice-grade wires; 2. In a remote POP connected to residential or community users; 3. In a co-location facility for last-mile access.

**G.SHDSL DiamondLink™ Router**

For your most valuable end-point connections, use Patton's DiamondLink Router. Supporting auto-sensing 10/100 Ethernet with MDI-X switching and web-based management, *it's a real gem!*



See page 35

**SPECIFICATIONS**

**G.SHDSL ports:** 24 ports presented on an RJ-21X 50-pin connector, each supporting data rates of Nx64 (up to 4.6 Mbps)  
**Egress Modules:** Up-link modules include: 4 or 8 T1/E1 ports; Single unchannelized DS3/E3; DS3/E3 ATM; Single OC-3/STM-1; Single OC-3/STM-1 ATM (Refer to individual modules for specifications)  
**Ethernet Ports:** Dual 10/100Base-T (RJ-45 connector)

**WAN clocking:** Internal, network receive recover (from WAN port), external BITS via 3-pin terminal block  
**Front Panel Indicators:** LEDs for power, CPU, system, Ethernet, External clock, test mode, DSL, and Up-link Egress module  
**Power Supplies:** Hot swap, dual-redundant universal AC/DC; AC power: 90-264 VAC (50/60 Hz); DC power: -36 to -72 VDC

**Management Service:** HTTP, SNMP, Telnet Ethernet, RS-232 Console Port, SYSLOG Client, Software upgrade via FTP  
**Alarm Reporting:** Configurable alarms; Remote SNMP Traps; Front Panel LEDs; 3-Contact Relay (3-pin terminal block)  
**Compliance:** Safety—UL/CSA per UL1950 (METS) Canadian cMET and CS-03. EMC Directive 89/336/EEC, Low-Voltage Directive 73/23/EEC

(EN60950), FCC Part 15, CE Mark, CTR12, CTR13, FCC Part 68  
**Op. Temp.:** 32–104°F (0–40°C)  
**Humidity:** 5–90% non-condensing  
**Dimensions:** 19.00W x 12.60D x 1.75H in. (48.25W x 32.00D x 4.44H cm) 1U high by 19 in. wide

**ORDERING INFORMATION**

<b>24 SHDSL; 2 10/100 Ethernet</b> <b>3224/G/RUI</b>	No up-link; redundant AC power; Forest Green
<b>3224/G/R48</b>	No up-link; redundant DC power; Forest Green
<b>3224/G/TE1-4/RUI</b>	4 T1/E1 up-link; redundant AC power; Forest Green
<b>3224/G/TE1-8/RUI</b>	8 T1/E1 up-link; redundant AC power; Forest Green
<b>3224/G/TE3-U/RUI</b>	1 T3/E3 up-link; redundant AC power; Forest Green
<b>3224/G/TE1-4/R48</b>	4 T1/E1 up-link; redundant DC power; Forest Green
<b>3224/G/TE1-8/R48</b>	8 T1/E1 up-link; redundant DC power; Forest Green
<b>3224/G/TE3-U/R48</b>	1 T3/E3 up-link; redundant DC power; Forest Green

**Variable-Rate VDSL Modem**

**Model 1068**

The Model 1068 provides variable-rate high speed connectivity of voice and data signals over a single voice-grade twisted pair.



The Patton Model 1068 VDSL Modem provides up to 16 Mbps of high speed Ethernet and voice services between LANs or other network enabled devices over a single twisted-pair. The Model 1068 is the only variable-rate asymmetrical/symmetrical standalone modem solution available today. The ability to select various asymmetrical and symmetrical rates allows the Model 1068 to satisfy a broad range of applications. Popular applications for the Model 1068 in symmetrical mode include video conferencing, interactive video, and telecommuting. The primary use for the Model 1068 in asymmetrical mode is delivering Internet service to residential customers.

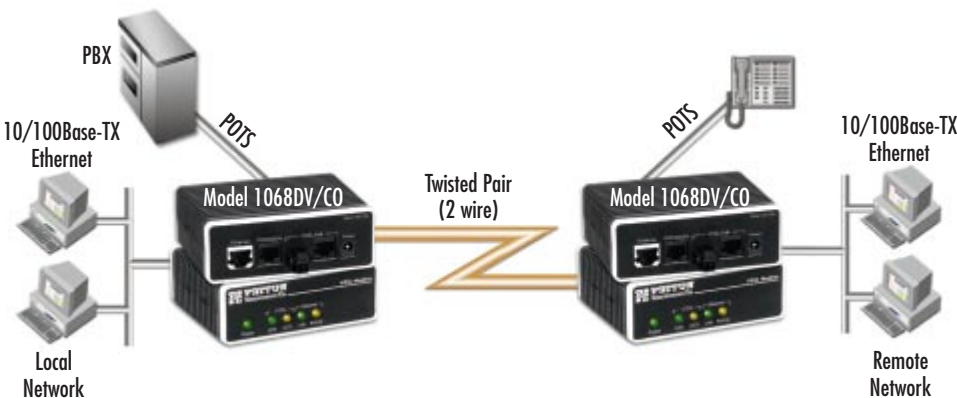
The 1068DV features a built-in POTS/ISDN splitter and line sharing capabilities that allow for simultaneous use of voice and data services. This means that end-users can download

files from the Internet, surf the WWW, and answer e-mail messages while talking on the phone or faxing documents.

The Model 1068s are sold in pairs and require one unit for the local site, or *central office*, and one unit for the remote site (*customer premise*) for proper operation. Model 1068 standalone units are ideal for low density point-to-point applications. For high density applications, the standalone units can be used with the Model 1068 rack cards and Patton's 1001 Rack System to provide a concentrated VDSL solution. If you want to take your network and voice connections farther and faster over existing copper and eliminate the expense of fiber, Patton's Variable Rate VDSL modems are the products for you!

Just plug it in, power it on, and play!

**Typical application**



**FEATURES & BENEFITS**

- ✓ Low cost plug-and-play solution for campus-wide network extension and delivery of last-mile ISP services over Ethernet
- ✓ Extends Ethernet distances up to 1 mile (1.61 km) over 2-wire 24-AWG unconditioned lines
- ✓ Switch selectable asymmetrical or symmetrical line rates up to 16.67 Mbps
- ✓ Auto-sensing 10Base-T or 100Base-TX
- ✓ Supports full- or half-duplex Ethernet
- ✓ Transparent LAN bridging (Passes 802.1Q (VLAN) packets)
- ✓ Automatic learning, aging, and filtering source address table
- ✓ Standalone and rack mounted versions
- ✓ CP units are compatible with Model 3324 VDSL Access Concentrator/Switch (see page 40)

**Symmetric or asymmetrical variable-rate VDSL**

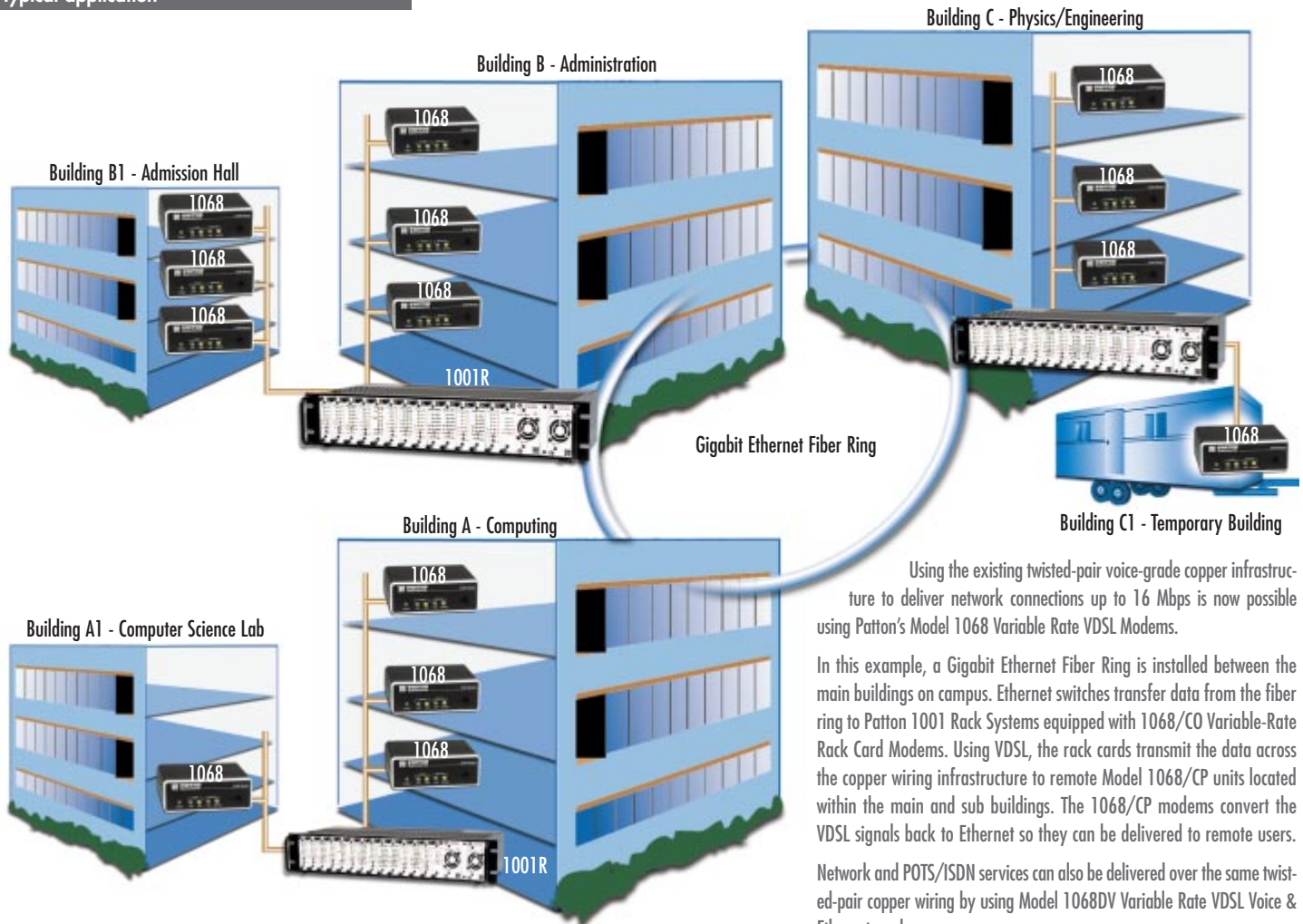
Line rates can be altered on the standalones and rack cards to differentiate services and to increase the distance of the individual links.

Asymmetric		
Line Rates		Distance in ft (m)
Upstream (Mbps)	Downstream (Mbps)	
1.56	4.17	6,000 (1,829)
1.56	9.38	5,500 (1,676)
2.34	16.67	5,000 (1,524)

Symmetric		
Line Rates		Distance in ft (m)
Upstream (Mbps)	Downstream (Mbps)	
6.25	6.25	4,500 (1,372)
9.38	9.38	4,150 (1,265)
12.50	12.50	4,000 (1,220)
16.67	16.67	3,300 (1,006)



**Typical application**



Using the existing twisted-pair voice-grade copper infrastructure to deliver network connections up to 16 Mbps is now possible using Patton's Model 1068 Variable Rate VDSL Modems.

In this example, a Gigabit Ethernet Fiber Ring is installed between the main buildings on campus. Ethernet switches transfer data from the fiber ring to Patton 1001 Rack Systems equipped with 1068/CO Variable-Rate Rack Card Modems. Using VDSL, the rack cards transmit the data across the copper wiring infrastructure to remote Model 1068/CP units located within the main and sub buildings. The 1068/CP modems convert the VDSL signals back to Ethernet so they can be delivered to remote users.

Network and POTS/ISDN services can also be delivered over the same twisted-pair copper wiring by using Model 1068DV Variable Rate VDSL Voice & Ethernet modems.

**SPECIFICATIONS**

**VDSL Line Interface:** RJ-45 or terminal block  
**Ethernet Interface:** Shielded RJ-45  
**POTS-ISDN Interface:** RJ-45 (pin 4 = ring, pin 5 = tip)  
**Modulation:** QAM (Quadrature Amplitude Modulation)  
**Frequency Range:** VDSL: 1–8 MHz  
 POTS/ISDN: 0–120 kHz  
**Transmission:** Switch selectable asymmetric and symmetric line rates up to 16.67 Mbps

**Surge suppression:** VDSL 20kA (8/20 $\mu$ s) gas tube  
**Power Supply:** External AC: UI (100–240); DC: -48, -24, and -12 VDC (DC optional)  
**Dimensions:** 1.5H x 4.13W x 3.75D in. (3.81H x 10.5W x 9.53D cm)  
**Weight:** 0.4 lbs (0.18 kg) without power supply

**ORDERING INFORMATION**

Standalone VDSL Modem	
<b>1068D/CO/120</b>	RJ-45F & TB; 120 VAC
<b>1068D/CP/120</b>	RJ-45F & TB; 120 VAC
<b>1068D/CO/UI</b>	RJ-45F & TB; 100–240VAC
<b>1068D/CP/UI</b>	RJ-45F & TB; 100–240VAC
<b>1068DV/CO/120</b>	RJ-45F & TB; 120 VAC
<b>1068DV/CP/120</b>	RJ-45F & TB; 120 VAC
<b>1068DV/CO/UI</b>	RJ-45F & TB; 100–240 VAC
<b>1068DV/CP/UI</b>	RJ-45F & TB; 100–240 VAC

**Standalone VDSL Modem Set (Customer Premise & Central Office Units)**

<b>1058D-2PK/120</b>	120 VAC power supply
<b>1058D-2PK/UI</b>	100–240 VAC power supply
<b>1058DV-2PK/120</b>	120 VAC power supply
<b>1058DV-2PK/UI</b>	100–240 VAC power supply

**Rack card**

<b>1068DRC/CO</b>	RJ-45F & Terminal Block (TB)
<b>1068DRC/CP</b>	RJ-45F & TB
<b>1068DVRC/CP</b>	RJ-45F & Terminal Block (TB)
<b>1068DVRC/CO</b>	RJ-45F & TB

The Model 1068 rack cards plug into the Model 1001 rack system (see page 110)

## Four port T1/E1 CSU/DSU with IP routing, PPP, and Frame Relay

### Model 2688 Integrated Access Unit

Combine your voice, data, fax, and Internet links onto a single multi-service access device.



The Model 2688 Integrated Access Device is the answer for multi-point branch to headquarters networking. Supporting broadband IP service delivery with hassle free operation and convenient end-to-end setup, the 2688 introduces an integrated and high value solution for enterprise and ISP providers that wish to concentrate FR/PPP/IP services over multiple T1/E1 lines with business class routing and security facilities.

The 2688 IAD is ideal in small and medium size business deployments, providing users with four high speed T1/E1 connections for e-mail, FTP, multimedia, and other internet-working applications. A complete set of configurable FR/PPP/IP protocols allows enterprise customers a wide range of choices when connecting branches to common WAN services.

Local and remote web-based management ensures easy setup and continuous trouble free operation. With built-in management and troubleshooting features, service providers and resellers can cost effectively deploy and manage the Model 2688 IAD at the customer premises.

The Model 2688 features an RS-232 and a 10/100 Base-T port configuration. The RS-232 port provides access to VT-100 configuration menus, while the 10/100 Base-T port routes data from and to the LAN and any of the E1/T1 link. In addition, the 2688 10/100 base-T allows remote configuration and monitoring via Internet connection from any

location in the world. For remote configuration the Model 2688 comes with a built-in web server, which provides intuitive drop down menus for simple configuration testing and monitoring. For complete flexibility, The Model 2608 can also be managed using any standard SNMP software tool.

The 2688's four E1/T1 links are complete CSU/DSUs, connecting to telco line via RJ-48C connectors at standard distance of 6000 feet (1.6km) over 0.5mm twisted pair cables. The T1/E1 CSU/DSUs can be configured for full or fractional service, AMI/B8ZS (T1) or AMI/HDB3 (E1) line coding. The 2688 CSU/DSUs respond to CO loop up and loop down codes, and can initiate V.54 compliant local and remote loops.

The Model 2608 comes in a slick 1U-high, 19" chassis for convenient installation on standard telco racks. RJ-48C connectors provide standard E1 and T1 interfaces to network and local lines. Dual redundant powers supplies, with choices of DC or AC inputs, assure uninterrupted operation and service. Front panel LEDs provide at-a-glance status of system and network signals, while a comprehensive set of diagnostics features and alarms enable network personnel to quickly isolate failures and minimize down time.

### FEATURES & BENEFITS

- ✓ Four software-selectable T1/E1 ports
- ✓ Integrated CSU/DSU
- ✓ 10/100Base-T Ethernet port
- ✓ Integrated IP routing
- ✓ OSPF/RIP/RIPv2 routing protocol support
- ✓ Route between the Ethernet LAN and any Frame Relay or PPP link
- ✓ Create data VPNs via PPP or Frame Relay ports
- ✓ Manage unit using integrated HTTP, SNMP, VT-100, Telnet
- ✓ SNMP MIB-II support
- ✓ Software upgradeable via FTP downloads
- ✓ Compact 1U chassis with dual redundant power (standard)

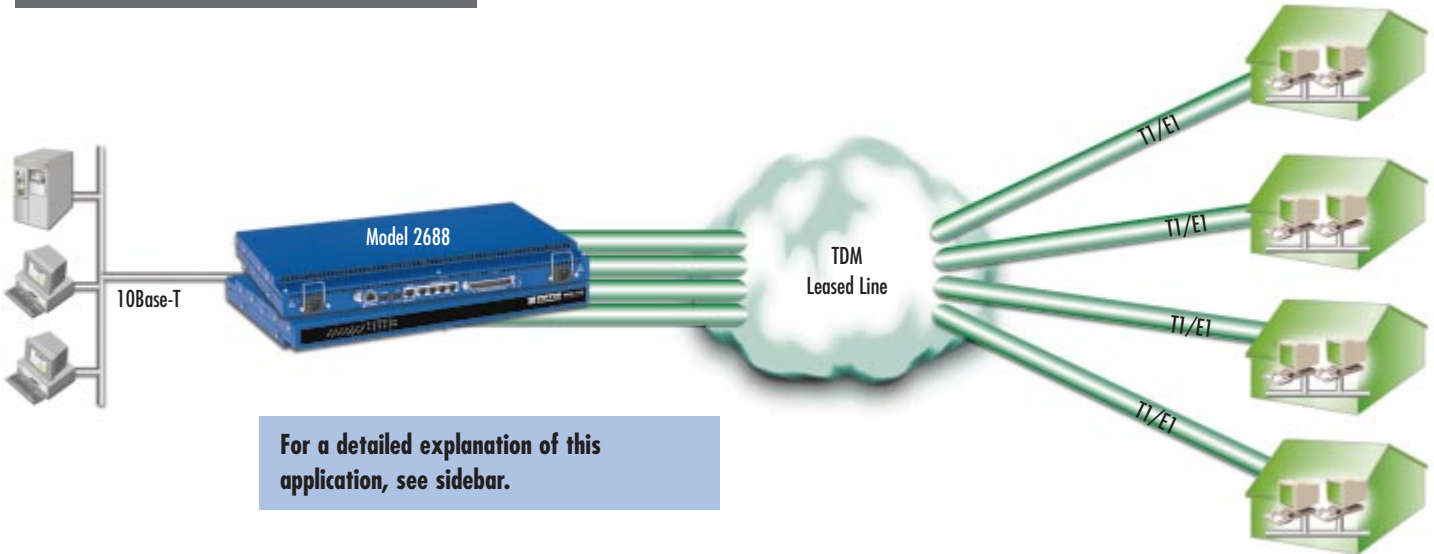
### The Multi-Branch-Office application explained...

The Model 2688 enables central LAN access of up to four remote branch offices linked via E1/T1 leased lines or Frame Relay service. In leased-line environments, the Model 2688 connects directly to up to 4 T1/E1 lines at full or fractional speeds. At the branch office customers can deploy Patton's E1/T1 bridges Models 2701, 2707, or 2720 to connect directly to T1/E1 lines and to a 10Base-T LAN, no routers are required at the branch office to connect to headquarters. In a bridging configuration, the Model 2788 negotiates a PPP/BCP link with each bridge located at the remote office. Packets originating at any of the remote offices and containing MAC addresses located at headquarters LAN are forwarded by the local bridge over the T1/E1 lines. The routing core in the Model 2688 will direct incoming traffic to a 10/100Base-T port for access to selected resources at the headquarters LAN.

If more control is required over the remote end connections, customers can use Patton's Model 2620, a T1/E1 router offering a complete set of routing, security and WAN protocols.

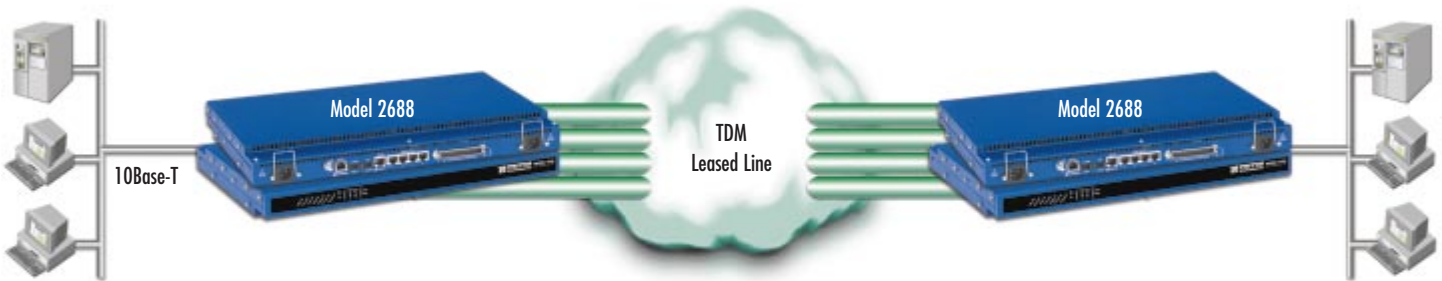
In Frame relay environments, the Model 2688 connects to up to four local loop E1/T1 lines to access a Frame Relay network. At the remote offices, a Patton Model 2620 connects directly to local loop E1/T1 lines and to a 10/100Base-T Ethernet LAN. The Model 2620 is equipped with a complete set of FR, security and routing features for seamless connection to headquarters. All user traffic is securely transported over frame relay packets and Virtual Private Networks (VPNs).

Multi-Branch-Office connections



For a detailed explanation of this application, see sidebar.

Enterprise connections at 8 Mbps



As enterprises grow the need for more bandwidth to connect their networks to Internet and branch Offices increases. The Model 2688 offers a growth path for these businesses. Start with one or two E1/T1 connections and expand to four without buying additional equipment. Furthermore, for enterprise sites running high bandwidth applications over point-to-point leased lines, the model 2688 will bond all four T1/E1 lines to create a single, high speed data pipe with an effective data rate of up to 8Mbps. Connect two locations in point-to-point arrangements or link to your ISP at higher speeds.

SPECIFICATIONS

**WAN ports:** 4 WAN ports: E1 (HDB3/AMI line coding), T1 (AMI/BBZS line coding); connects to FR/TDM/IP backbone networks

**Ethernet Port:** 1 10/100Base-T (RJ-45 connector)

**WAN Clocking:** Internal, Network (from E1/T1 WAN port), External BITS (Building Integrated Timing Supply) Clock Source via 3-pin terminal block

**Front Panel Indicators:** LEDs for power, CPU, system, Ethernet, External clock, test mode, and WAN ports frame and error status

**Power Supplies:** Dual-redundant universal AC/DC (fixed); AC

power:100–240 VAC (50/60 Hz); DC power: -40 to -72 VDC

**Alarm Reporting:** Configurable alarms; SNMP Traps; Front Panel LEDs; 3-Contact Relay (3-pin terminal block); Syslog Client

**Compliance:** Safety: UL/CSA per UL1950 (METS) Canadian cMET and CS-03. EMC Directive 89/336/EEC, Low-Voltage Environment Directive 73/23/EEC (EN 60950), FCC Part 15, CE Mark, CTR12, CTR13 FCC Part 68

**WAN Protocols:** PPP • Multilink PPP • LCP • IPCP with MS extensions • Frame Relay RFC 1490 IP Encapsulation • User configurable PVCs • User-selectable 2-, 3-, or 4-

byte DLCI address field formats • Congestion recognition and management • Individual DLCI statistics • Current throughput indication (10-second average) • Online help

**LAN Protocols:** 802.3 Ethernet, ARP, RARP, IP over Ethernet

**IP Services:** TCP/IP suite with extensive protocol statistics • ICMP with redirect enable/disable • TFTP • FTP • RLOGIN • TELNET • Proxy ARP • IP over Point-to-Point Protocol • IP over Ethernet • Van Jacobson TCP Header Compression • PPP address and protocol compression • RIP and RIPv2 dynamic route distribution with support for Multiple RIP

interfaces • User configurable static routes with gateway/host/interface routes • TCP clear connection (TCPRAW) • Dial-in NetBIOS UDP broadcast enable/disable

**Management Services:** HTTP, SNMP, TELNET Ethernet, RS-232 Console Port, SYSLOGClient, Remote Software Upgrade via FTP

**Dimensions:** 48.25 W x 32.00 D x 4.44 H cm (19.00 W x 12.60 D x 1.75 H in.)

**Op. temp.:** 0–40°C (32–104°F)

**Humidity:** 5–90% non-condensing

ORDERING INFORMATION

<b>2688/U/RUI</b>	<i>Cobalt Blue</i> , Dual AC Supplies
<b>2688/B/RUI</b>	<i>Black Ice</i> , Dual AC Supplies
<b>2688/W/RUI</b>	<i>Cool White</i> , Dual AC Supplies
<b>2688/R/RUI</b>	<i>Ultra Red</i> , Dual AC Supplies
<b>2688/U/R48</b>	<i>Cobalt Blue</i> , Dual DC Supplies
<b>2688/B/R48</b>	<i>Black Ice</i> , Dual DC Supplies
<b>2688/W/R48</b>	<i>Cool White</i> , Dual DC Supplies
<b>2688/R/R48</b>	<i>Ultra Red</i> , Dual DC Supplies

# MULTI-SERVICE ACCESS

## Dial-up RAS Servers & Digital Cross Connect (DACS) Solutions

### CARRIER CLASS RAS



**“Big Red”  
Remote Access Server**

- ✓ Card-based solution scales from **96 to 2,040** V.92/V.90/V.34/ISDN modem calls
- ✓ Fully redundant, hot-swappable power, cooling, and alarm systems
- ✓ Three different chassis sizes accept all power and function cards interchangeably
- ✓ Each function card is an autonomous access system able to be configured, maintained, managed, and swapped independent of other cards
- ✓ Embedded SNMP/HTTP management system

See pages 88–89

### ISP RAS



**“Red RAS”  
Remote Access Server**

- ✓ Answers from **12 to 120** V.92/V.90/V.34/ISDN modem calls
- ✓ Three different 1U-high “pizza-box” platforms.
- ✓ Redundant AC/DC power options standard
- ✓ Integrated Ethernet, T1, E1, and uplink ports support any network architecture
- ✓ SNMP and Web-based/HTTP management systems

See pages 90–95

### MULTI-SERVICE CROSS-CONNECT

- ✓ Scalable chassis system and 1U-high cross-connect platforms
- ✓ Any-port-to-any-port DSO-level cross-connect functionality
- ✓ Redundant AC and DC power options
- ✓ SNMP and Web-based/HTTP management system with a full suite of end-to-end local and remote diagnostics and alarm facilities

#### ForeFront DACS



#### Miniature Access Node DACS



T1/E1 Ports	16–271	4–16
DS3	Coming	Coming
STS-1	2 + 2	—
STM-1	2 + 2	—
OC-3	2 + 2	—
Models	2616RC	2604, 2608, 2616

See pages 100–109

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96 or 120-Port, V.92/V.90/ISDN, Dial-up RAS .....92

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4-Port DACS .....102

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High Density Rack System for Universal Access .....110

## ENTERPRISE RAS



### “DialFire RAS” Remote Access Server

- ✓ Answers up to **60** V.90/V.34/ISDN modem calls and G3 fax
- ✓ Choose from ISDN BRI or PRI interfaces
- ✓ Works in standard PCI 2.1 (5.0 or 3.3 volt) slot
- ✓ SNMP and Web-based/HTTP management systems
- ✓ A wide range of OS and third-party application support

See pages 96–97

## MICRO RAS



### “Tiny RAS” Remote Access Server

- ✓ Answers **1** analog modem call
- ✓ Converts any dial-up modem into a single-port remote access server
- ✓ Supports full DHCP and private IP address assignment
- ✓ AC or DC power options

See page 98

## UNIVERSAL ACCESS RACK

- ✓ One rack supports a wide range of last-mile technologies
- ✓ Very low profile—only 2U high
- ✓ Ideal for carriers, universities, hospitals, and hotels deploying one-card-per-subscriber systems



See pages 110–113

**96 or 120-Port, V.92/V.90/ISDN Dial-up RAS**

**Model 2996**

This remote access server provides 96 or 120 dial-up ports, each supporting V.92, V.90, K56Flex™, V.34+, and ISDN connections.



The 96/120-port Model 2996 is the latest addition to our NetLink RAS family. Expanding ISPs will be delighted by its dual-redundant power supply, redundant DSPs, no moving parts, and FR/PPP uplink ports.

The Model 2996 supports 96 or 120 digital ISDN or analog (V.92, V.90, K56Flex, V.34+, etc.) modem connections in a single 1U-high (1.75 in./4.45 cm), 19-inch wide rackmount chassis.

**High density dial-up access**

Dial-up RAS systems have come a long way since the days of 1200-bps modems, terminal servers and bulletin boards. The NetLink RAS uses the latest in digital signal processor (DSP) technology to terminate analog (V.92, V.90,

Its standard features include 96 or 120 analog and digital modems, RAS software, 10/100 Ethernet port, IP Routing, Frame Relay forwarding, and four T1/E1 CSU/DSUs. It connects 96 or 120 dial-in-modem V.92, V.90, K56Flex, V.34+ or ISDN users to the Internet, IP LANs, or corporate intranets. Load-sharing dual-redundant power supplies and integrated Web-based SNMP/HTTP management system capabilities make our 2996 RAS the most reliable and easiest to use RAS in the business!

K56Flex, V.34+, etc.) and digital (ISDN BRI) modem calls. This architecture provides the highest density and ensures the highest connection speeds at the lowest possible costs. With technology advances driving the continued reduction in

**FEATURES & BENEFITS**

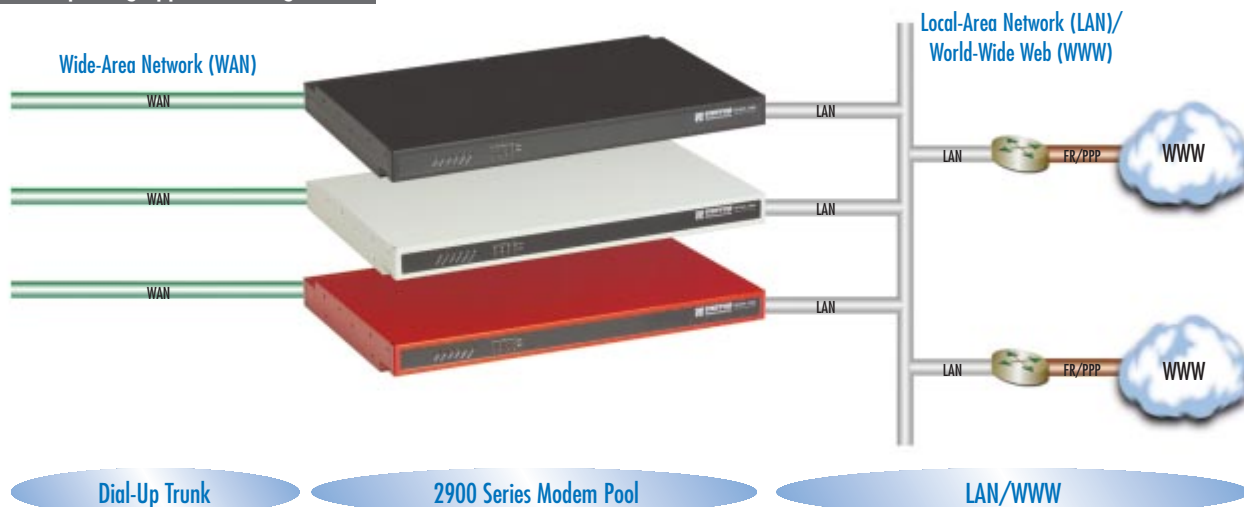
- ✓ 96 or 120 ports in a 1U-high platform
- ✓ Dynamic analog/digital modems
- ✓ 10/100 full-duplex, Auto-sensing Ethernet LAN port
- ✓ Multichassis Multilink enables the 2900 Series RAS to scale-in high-density PoPs and works with all Patton RAS.
- ✓ Integrated WWW server for managing and configuring all 2996 RAS functions
- ✓ Frame relay & PPP network uplinks
- ✓ SNMP/HTTP network management
- ✓ Dual-redundant power supplies

**Bonus! The Model 2996 RAS is available in designer colors**



price-per-port, ISPs and corporate customers alike will benefit from expanding their dial-up access with the Patton NetLink RAS system.

**Virtual modem pooling application diagram**



**Remote access services for enterprises**

The new corporate office is quickly being redefined as “any place where work is being done.” Legislative mandates, high-way traffic and employee retention issues are speeding the growth of teleworking. As more companies respond to this trend, reliable remote access equipment is needed.

The Model 2996 remote access server provides dial-up access to company e-mail, to the corporate Intranet and to other resources for teleworkers and remote users. The Model 2996 delivers the right solution for small, medium and large offices.

**Network Access on the Road**

On the road, users want to get online quickly, send their reports and get their e-mail (see diagram at left). The Model 2996 offers fast V.92/ISDN/Mobile connections. By providing a built-in modem pool, users won't get busy signals either. The next available modem will answer.

The 2996 includes built-in analog and digital modems, support for new services like the wire access protocol (WAP) and support for well-known services like V.44 compression. If the goal is to get on and off the network quickly, the Model 2996 offers the fastest turnaround time.

**Teleworking Access**

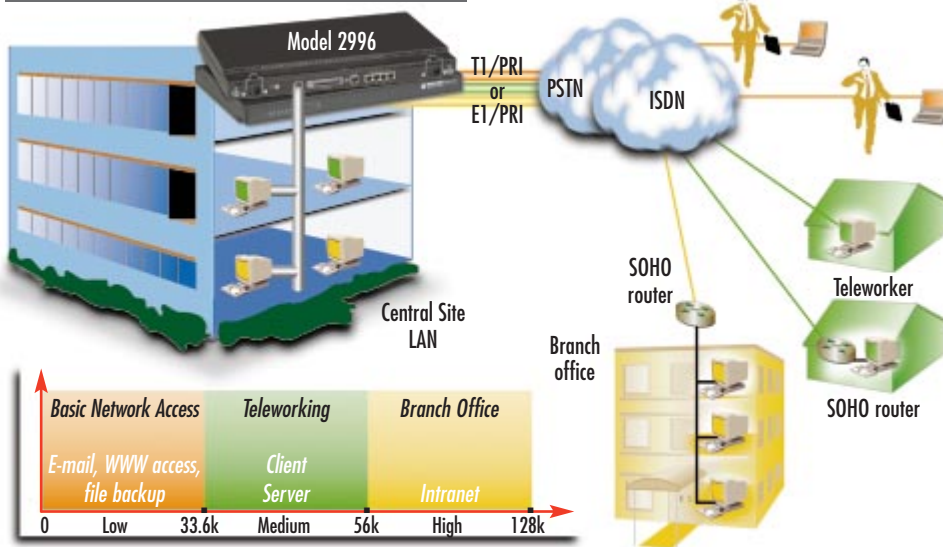
Rather than fight traffic, teleworkers answer their e-mail messages or work at home each day (see diagram at left). Their requirements are for client-server intranet access and the greater bandwidth this application demands. The Model 2996 provides for this through integrated ISDN support and the combining of services using standards-based Multichassis and MultiLink. With MultiLink, the bandwidth available from two or more calls is combined to provide the dial-up user a blazingly-fast connection. It's just like being at the office—without the travel and the hassles required to get there.

**Branch Office Access**

When teleworking prohibits the right level of customer contact or employee interaction, a remote or satellite office may be the right answer (see diagram at left).

Corporate network managers can outfit a small office with a Model 2996 RAS. Now, users can access their e-mail, check status reports on the Intranet and upload projects to their colleagues at headquarters. Patton's low-cost Model 2996 makes this possible.

Enterprise/teleworking application diagram



**Why corporations deploy the 2996 RAS**

**Saves On Office Costs**—Maintaining common work areas for flex-time staff saves money. Employers spend an average of \$10,000 per employee providing basic office space, insurance and other infrastructure. Remote staff costs less.

**Helps Retain Employees**—Most corporations spend 30% of an employee's salary to recruit the employee. Offering even a little relief to sitting in traffic and providing your employees with more-flexible work hours pleases your workforce and promotes employee retention.

**Extends Geographic Reach**—From business services to recruiting new employees, offering network access and

telecommuting programs makes your company more competitive and attractive.

**Environmentally Responsible**—You can do your part to improve air quality before being subject to pending legislation, regulation and local ordinances.

**It Just Makes Sense**—The number of US telecommuters continues to grow as businesses realize telecommuting is fiscally sound, good for employees and environmentally responsible.

**SPECIFICATIONS**

**Number of Connections:** 96 or 120

**Power Supplies:** Dual Redundant (Fixed) AC or DC

**Ethernet Ports:** One 10/100Base-T

**WAN Ports:** Four

**Management Services:** HTTP, SNMP, TELNET Dial-in and Ethernet or RS-232 console port, SYSLOG client, Remote software upgrade via FTP, User configurable login prompts and banners

**Modem Modulations:** V.92, V.90, K56Flex™, V.34 Annex 12, V.34,

V.32bis, V.32, V.23, V.22, V.22bis, V.21, Bell 212A, Bell 202, Bell 103, EIA-PN-2330, V.8, V.8bis, Sync/Async receiver/transmitter for V.14, 4.44/V.59/V.42/V.42bis error correction & compression

**Authentication:** RADIUS, PAP/CHAP, Username/Password, and Static Users Database (111 Entries)

**PSTN Signaling:** E1 Primary Rate interface (Q.931), E1 MFR2 (R2), T1 Primary Rate Interface, T1 Robbed bit

with Loop/Ground Start or E&M Wink, E&M Immed, Taiwan R1 & Drop & Insert

**Software Upgrades:** Achieved through Flash upgrades via FTP (upgrades available from patton.com)

**Protocol Services**

- TCP/IP suite with extensive protocol statistics
- ICMP/TFTP/FTP/RLOGIN/TELNET
- Point-to-Point Protocol (PPP)
- SLIP protocol
- MultiLink PPP

• Ethernet ARP, Proxy ARP and RARP protocols

• Van Jacobson TCP header compression

• PPP address and protocol compression

• RADIUS authentication and accounting, with support for primary and secondary servers

• RIP, RIPv2 and OSPF dynamic route distribution—user configurable static routes

• Multi-chassis MultiLink

• Layer 3 and Layer 4 IP Filtering

**ORDERING INFORMATION**

**2996/96X/RUI** Dual T1/PRI, 96-port RAS

**2996/120X/RUI** Dual T1/PRI, 120-port RAS

**2996/96X/R48** Dual E1/PRI, 96-port RAS

**2996/120X/R48** Dual E1/PRI, 120-port RAS

X = Specify color: Black Ice (B); Cool White (W), Ultra Red (R)

**96 or 120-Port, V.92/V.90/ISDN, Dial-up RAS**

**Model 3120**

*This new flexible platform delivers enhanced remote access services*

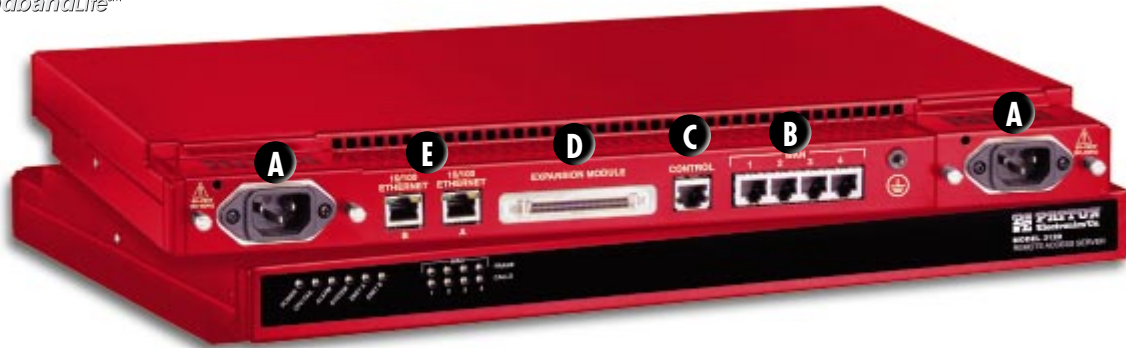
The 3120 supports up to 120 digital ISDN or analog (V.90, V.92, K56Flex, V.34+, etc.) modem connections in a single 1U-high (1.75 in./4.45 cm) rack-mount chassis. It is the highest density, lowest profile remote access server available anywhere. With its dual-redundant hot-swappable power supplies, the 3120 RAS protects against single-point

power failures. Additionally, it has two 10/100-Mbps Ethernet ports for load sharing and traffic balancing.

For maximum flexibility, the 3120 has a slot for an optional expansion module. For example: ISPs can add VPN functionality on dedicated DSL ports for increased revenue opportunities. The 3120 is a one-of-a-kind network access unit.

**FEATURES & BENEFITS**

- ✓ Quad T1/E1/PRI WAN ports
- ✓ Up to 120 simultaneous V.90, V.92 or ISDN connections
- ✓ Dual 10/100 Ethernet ports
- ✓ Integrated IP Router
- ✓ SNMP/HTTP management
- ✓ Expansion port for universal VPN, compression, and DSL
- ✓ 1U high 19 in. stackable chassis
- ✓ AC and DC power options
- ✓ Dual-redundant hot-swappable load-sharing power supplies



**A Hot-swap removable dual-redundant power is standard**  
Supports two AC, two DC, or a mix of AC and DC power supply modules



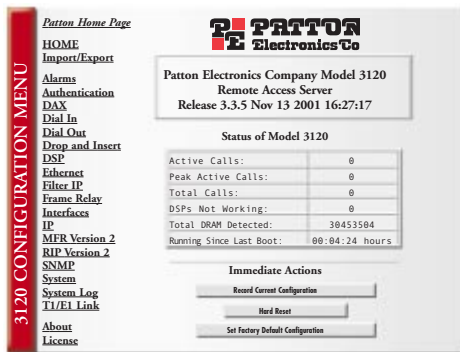
**D PMC expansion card**—Network expansion options enable the 3120 to offer new revenue opportunities



**B Quad T1/E1 ports for 120 RAS or uplink services**—Terminate any combination of 120 modems/ISDN connections, or expand into remote locations and use the 3120 as a complete PoP solution



**C SNMP/HTTP management**—Embedded HTTP server provides complete configuration and control using your web browser



**E Dual 10/100 Ethernet Ports**—Flexible, redundant integration options for your high-performance network





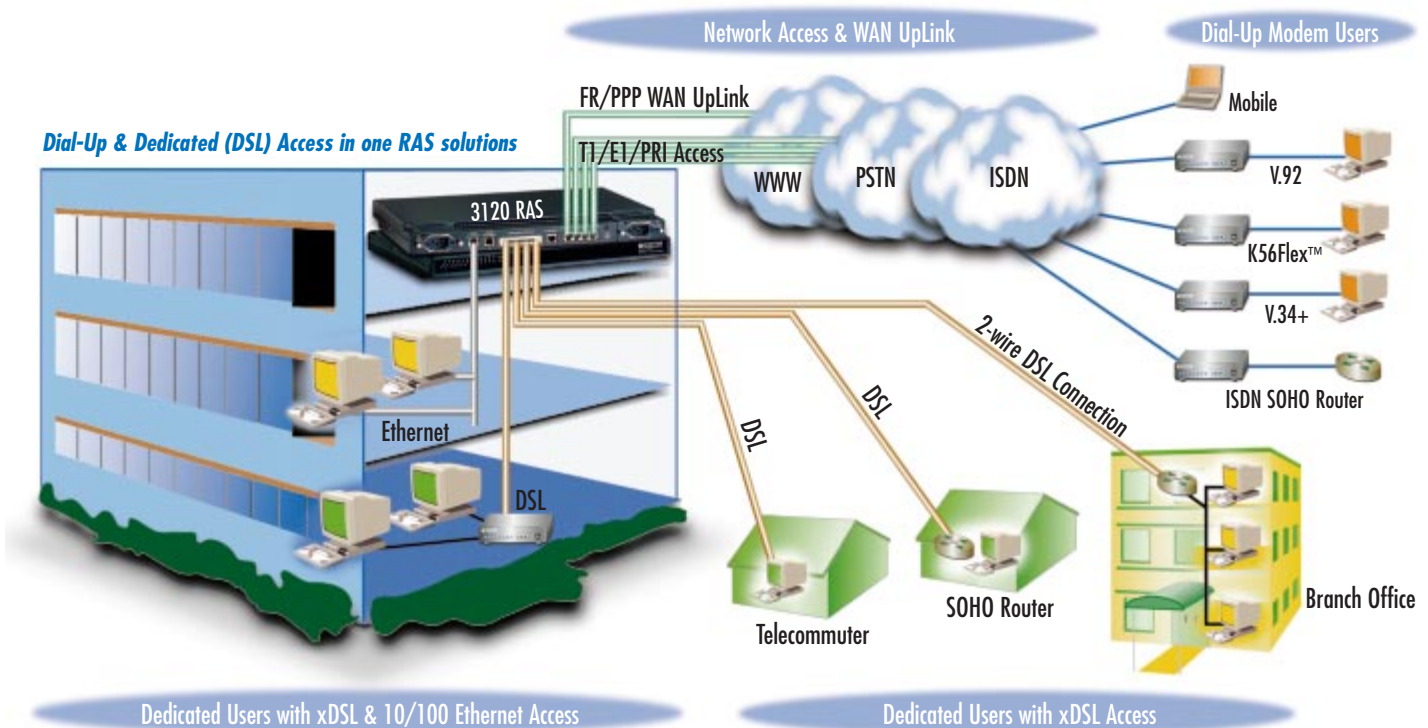
**Dial-up and dedicated access application diagram**

**Dedicated & dial-up access**

The 3120 RAS is designed to scale with your customer's requirements: from dial-up V.92 analog to ISDN 128kbps to dedicated xDSL and fractional T1/E1. Its modular expansion slot can be used for three basic applications:

- Dedicated access using integrated xDSL modems
- Advanced services like Virtual Private Networking (VPN)
- Wide area network uplinks and serial ports, like V.35

And modular expansion means more customers, larger billings for newer Managed Access Services and an overall faster return on your RAS equipment investment. The 3120 RAS delivers a tightly integrated dial and dedicated access platform that your future requires.



*I'm Andria, one of Patton's Technical Support Engineers. If you have technical questions regarding this product or if you can't find the answers you need at [patton.com](http://patton.com), please call me at (301) 975-1000. You can also send e-mail to [support@patton.com](mailto:support@patton.com)*

- On-Line Resources**
- Build Yourself an ISP White paper
  - RAS Product Overview
  - RAS key Selling Points
  - RAS Sales overview
  - T1/E1/PRI Tutorial
  - Introduction to: TCP/IP, PPOP/SLIP, and RADIUS White Papers

- Resources Available By Request**
- Televisa Case Study Article
  - Hotel Remote Access Applications White Paper
  - User Operations Manual
  - RAS FAQ
  - RAS Brochure
  - "I love my RAS..." White Paper

**SPECIFICATIONS**

**LAN:** Dual auto-sensing 10/100 full-duplex Ethernet ports w/primary & secondary IP addresses  
**LAN Protocols:** TCP/IP suite with integrated IP router, RIP, RIPv2, OSPF, RADIUS, TELNET, RLogin, TCP Raw, HTTP, SNMP  
**WAN:** Quad T1/E1/PRI RJ-48C ports  
**WAN Protocols:** Async. and Sync. PPP, MLPPP, Multi-chassis MLPPP, SLIP, Frame Relay (RFC-1490)  
**Signalling:** Robbed-bit, R1, R2, Q.921/Q.931  
**Modems:** Up to 120 V.92, V.90, K56Flex, V.34+, or ISDN B-channel digital calls

**Software:** Upgradable via FTP, free updates from [www.patton.com](http://www.patton.com)  
**Temp.:** 0 to +40°C (0 to 104°F)  
**Humidity:** 5 to 95%, non-condensing  
**Power:** Dual-redundant, load-sharing, requires less than 40 Watts of power  
**AC:** 90 to 264 VAC  
**DC:** 36 to 72 VDC  
**Dimensions:** 1.75H (1U) x 17W x 10.0D in.  
 (4.44H x 43W x 025.4D cm), convection-cooled, NEBS Level 3

**ORDERING INFORMATION**

- 3120/96X/RUI** Quad T1/PRI, 96-port, expandable RAS
- 3120/96X/R48** Quad E1/PRI, 96-port, expandable RAS
- 3120/120X/RUI** Quad T1/PRI, 120-port, expandable RAS
- 3120/120X/R48** Quad E1/PRI, 120-port, expandable RAS
- 3120/PS-UI** 90–260 VAC universal input power supply
- 3120/PS-48** 36–72 VDC input power supply

\* Country-specific power cord included.  
 X = Specify color: Black Ice (B); Cool White (W), Ultra Red (R)

## 4-Port DACs

### Model 2604 Digital Cross Connect Unit

Patton's new DACs allows Any-to-Any DSO cross connection at the most affordable price.



The Patton T1/E1 Digital Cross Connect (DACs) series of products makes cross-connection applications simple and affordable, and most importantly, by offering models with 4, 8, and 16 T1/E1 ports, a growth path for future network expansion. (See pages 104 and 106 for the models 2608 and 2616 DACs)

Using a robust hardware platform and a rich set of software features including a intuitive graphical SNMP/HTTP user interface, the DACs series can be used in a series of applications ranging from non-blocking cross connection, to multiplexing, to transport of E1 over T1 lines, or vice versa.

When enterprise growth includes the use of multiple E1 or T1 lines, the Model 2604, DACs are the ideal tool for managing and maximizing the allocation of 64kbps channel in under utilized lines, reducing the cost per channel and freeing bandwidth for further growth. Enterprise customers can

concentrate data and voice services from local sub T1 and E1 lines onto fully utilized local loop uplink connections with complete freedom and ease of use.

The Model 2604 features an RS-232 and a 10/100Base-T port configuration. The RS-232 port provides access to VT-100 configuration menus, while the 10/100Base-T port allows remote configuration and monitoring via Internet connection from any location in the world. For remote configuration the Model 2604 comes with a built-in web server, which provides intuitive drop down menus for simple configuration testing and monitoring. For complete flexibility, The Model 2604 can also be managed using any standard SNMP software tool.

The Model 2604 comes in a slick 1U high, 19 in. wide chassis for convenient installation on standard telco racks. RJ48C connectors provide standard T1 and E1 interfaces to network

## FEATURES & BENEFITS

- ✓ 4 T1/E1 ports—switch up to 120/64 kbps channels
- ✓ DACs, multiplexer, or T1/E1 converter—all in one box
- ✓ SNMP/HTTP management
- ✓ Complete local and remote alarm facilities
- ✓ Full suite of T1/E1 diagnostics
- ✓ Compact 1U chassis
- ✓ Convection cooled design allows stacking with no fans or other moving parts
- ✓ AC/DC dual-redundant power supplies

and local lines, while compact RS-232 Console and 10/100Base-T ports allow complete command and control of local and remote units. Dual redundant powers supplies, with choices of DC or AC inputs, assure uninterrupted operation and service. Front panel LEDs provide at-a-glance status of system and network signals, while a comprehensive set of diagnostics features and alarms enable network personnel to quickly isolate failures and minimize down time.

The Model 2604 series of DACs products can also be used in conjunction with Patton DSL, T1/E1 NTUs, fiber optics T1/E1 multiplexers, and network extenders, etc to provide a complete geographical solution to enterprise costumers in wide area network deployments.

## SPECIFICATIONS

**T1/E1 Ports:** 4 T1/E1 ports: E1 (HDB3/AMI line coding), T1 (AMI/B8ZS line coding)

**Ethernet Port:** One 10/100Base-T (RJ-45 connector)

**Clocking:** Internal, Network (from T1/E1 WAN port), External BITS (Building Integrated Timing Supply) Clock Source via 3-pin terminal block

**Front Panel Indicators:** LEDs for power, CPU, system, Ethernet, External clock, test mode, and WAN ports frame and error status

**Power Supplies:** Dual-redundant universal AC/DC (fixed); AC power: 90–264 VAC (50/60 Hz); DC power: -36 to -72 VDC

**Management Services:** HTTP, SNMP, TELNET Ethernet, RS-232

Console Port, SYSLOG Client, Remote Software Upgrade via FTP

**Alarm Reporting:** Configurable alarms; Remote SNMP Traps; Front Panel LEDs; 3-Contact Relay for local alarm (3-pin terminal block)

**Compliance:** Safety: UL/CSA per UL1950 (METS) Canadian cMET and CS-03. EMC Directive 89/336/EEC, Low-Voltage Directive 73/23/EEC

(EN 60950), FCC Part 15, CE Mark, CTR12, CTR13, FCC Part 68.

**Op. Temp.:** 0–40°C (32–104°F)

**Humidity:** 5–90% non-condensing

**Dimensions:**  
48.25W x 32.00D x 4.44H cm  
(19.00W x 12.60D x 1.75H in.)

## ORDERING INFORMATION

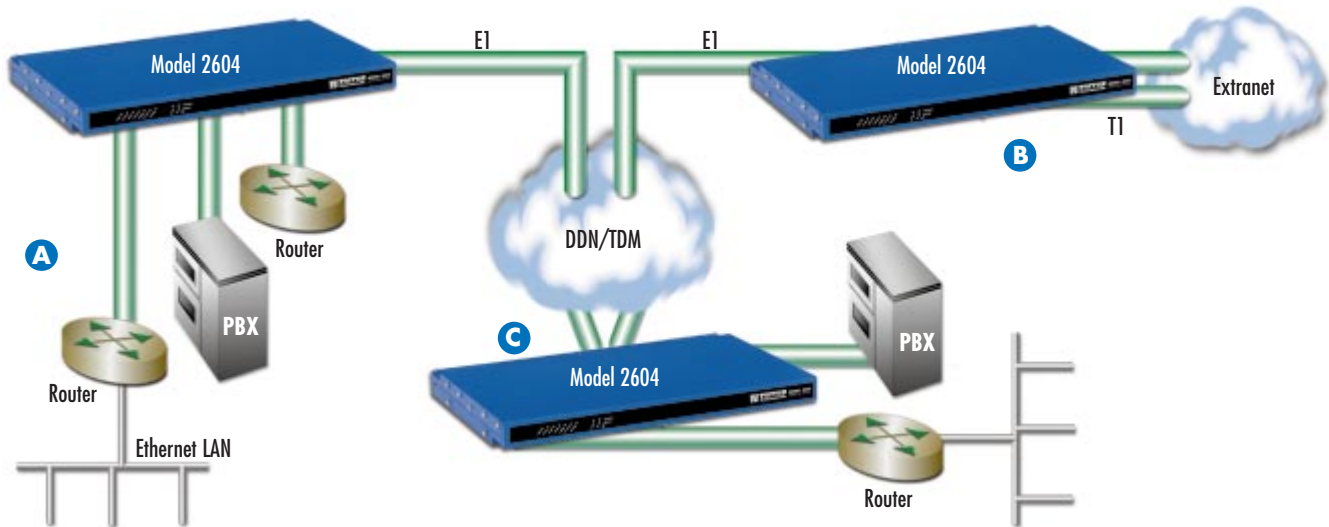
### 4-port DACs

**2604/U/RUI** Cobalt Blue, Dual AC supplies

**2604/U/R48** Cobalt Blue, Dual DC supplies

Standard product is Cobalt Blue.

Application diagram



**A T1/E1 Aggregation.** Medium-size enterprises can aggregate and groom time slots from up to three partially used local T1/E1 lines onto a single outgoing link. This capability enables routers, PBXs, and other network devices dispersed over the campus area to efficiently use a single T1/E1 line for network access.

**B T1/E1 Conversion.** In situations where T1 and E1 networks converge, ports on the Model 2604 can be configured as E1 or T1 interfaces. This feature provides the capability for mapping and transparently transport T1 64 kbps time slots over E1 lines, and up to 24 E1 channels per T1 line.

**C Wide Area Deployment—Local Switching.** In a wide area deployment, medium- and large-size enterprises can use the Model 2604 for local timeslot switching from multiple local or remote T1/E1 lines. The model 2604 HTTP/SNMP flexible management allows provisioning and monitoring of switching sites from any remote or central location.

2604 HTTP/SNMP Configuration Management Screens



Point-and-click HTTP management menus offer customers the simplest way to configure and monitor the Model 2604.

DSO Mapping screens display a colorful grid of ports and 64kbps channels, simply click and drag timeslots from a port to any other port within the grid and the connection will be completed transparently by the 2604. Channels that have active connections appear in green, inactive channels in red... it doesn't get any simpler than this. Additionally, for those who prefer to enter command line type configuration, the 2604 offers the option to switch to command line screens.

T1/E1 configuration screens, offers line configuration by intuitive drop down menus, while the T1/E1 link activity page offer per link status information, current and historical near and far end line statistics, and alarm configuration... all at the click of a mouse.

For greater flexibility, the 2604 management software also allows configuration and monitoring via third party, industry standard SNMP software packages.

## 8-Port DACs

### Model 2608 Digital Cross Connect Unit

The most cost-effective DACs solution for mobile telephony or enterprise T1/E1 aggregation



The Patton T1/E1 Digital Cross Connect (DACs) series of products makes cross-connection applications simple and affordable, and most importantly, by offering models with four, eight, and sixteen T1/E1 ports, a growth path for future network expansion.

Using a robust hardware platform and a rich set of software features including a intuitive graphical SNMP/HTTP user interface, the DACs series can be used in a series of applications ranging from non-blocking cross connection, to multiplexing, to transport of E1 over T1 lines, or vice versa.

When enterprise growth includes the use of multiple E1 or T1 lines, the model 2608, DACs are the ideal tool for managing and maximizing the allocation of 64kbps channel in under utilized lines, reducing the cost per channel and freeing bandwidth for further growth. Enterprise customers can concentrate data and voice services from local sub T1 and

E1 lines onto fully utilized local loop uplink connections with complete freedom and ease of use.

The Model 2608 features an RS-232 and a 10/100 Base-T port configuration. The RS-232 port provides access to VT-100 configuration menus, while the 10/100 Base-T port allows remote configuration and monitoring via Internet connection from any location in the world. For remote configuration the Model 2608 comes with a built-in web server, which provides intuitive drop down menus for simple configuration testing and monitoring. For complete flexibility, The Model 2608 can also be managed using any standard SNMP software tool.

The Model 2608 comes in a slick 1U-high, 19" chassis for convenient installation on standard telco racks. RJ-48C connectors provide standard T1 and E1 interfaces to network and local lines, while compact RS-232 Console and

## FEATURES & BENEFITS

- ✓ 8 T1/E1 ports—switch up to 240 64-kbps channels
- ✓ DACs, multiplexer, or T1/E1 converter—all in one box.
- ✓ SNMP/HTTP Management
- ✓ AC/DC dual-redundant power supplies
- ✓ Complete local and remote alarm facilities
- ✓ Full suite of T1/E1 diagnostics
- ✓ Standard reach of 1.6 km on any T1/E1 port
- ✓ Compact 1U chassis
- ✓ Convection cooled design with no fans or other moving parts supports chassis stacking

10/100Base-T ports allow complete command and control of local and remote units. Dual redundant powers supplies, with choices of DC or AC inputs, assure uninterrupted operation and service. Front panel LEDs provide at-a-glance status of system and network signals, while a comprehensive set of diagnostics features and alarms enable network personnel to quickly isolate failures and minimize down time.

The DACs series of products can also be used in conjunction with Patton DSL, T1/E1 NTUs, fiber optics T1/E1 multiplexers, and network extenders, etc to provide a complete geographical solution to enterprise costumers in wide area network deployments.

## SPECIFICATIONS

**T1/E1 Ports:** 8 T1/E1 ports: E1 (HDB3/AMI line coding), T1 (AMI/B8ZS line coding)

**Ethernet Port:** 1 10/100Base-T (RJ-45 connector)

**Clocking:** Internal, Network (from T1/E1 WAN port), External BITS (Building Integrated Timing Supply) Clock Source via 3-pin terminal block

**Front Panel Indicators:** LEDs for power, CPU, system, Ethernet, External clock, test mode, and WAN ports frame and error status

**Power Supplies:** Dual-redundant universal AC/DC (fixed); AC power: 90–264VAC (50/60 Hz); DC power: -36 to -72VDC

**Management Services:** HTTP, SNMP, TELNET Ethernet, RS-232

Console Port, SYSLOG Client, Remote Software Upgrade via FTP

**Alarm Reporting:** Configurable alarms; Remote SNMP Traps; Front Panel LEDs; 3-Contact Relay for local alarm (3-pin terminal block)

**Compliance:** Safety: UL/CSA per UL1950 (METS) Canadian cMET and CS-03. EMC Directive 89/336/EEC, Low-Voltage Directive 73/23/EEC

(EN 60950), FCC Part 15, CE Mark, CTR12, CTR13, FCC Part 68.

**Op. temp.:** 0–40°C (32–104°F);

**Humidity:** 5–90% non-condensing

**Dimensions:**

48.25 W x 32.00 D x 4.44 H cm (19.00 W x 12.60 D x 1.75 H in.)



*I'm Dick, one of Patton's Technical Support Engineers. Patton has put together this resource listing for companies interested in this technology. If you don't find the answers you need at [www.patton.com](http://www.patton.com), please call me. You can also send e-mail to [support@patton.com](mailto:support@patton.com).*

#### Resources Available By Request

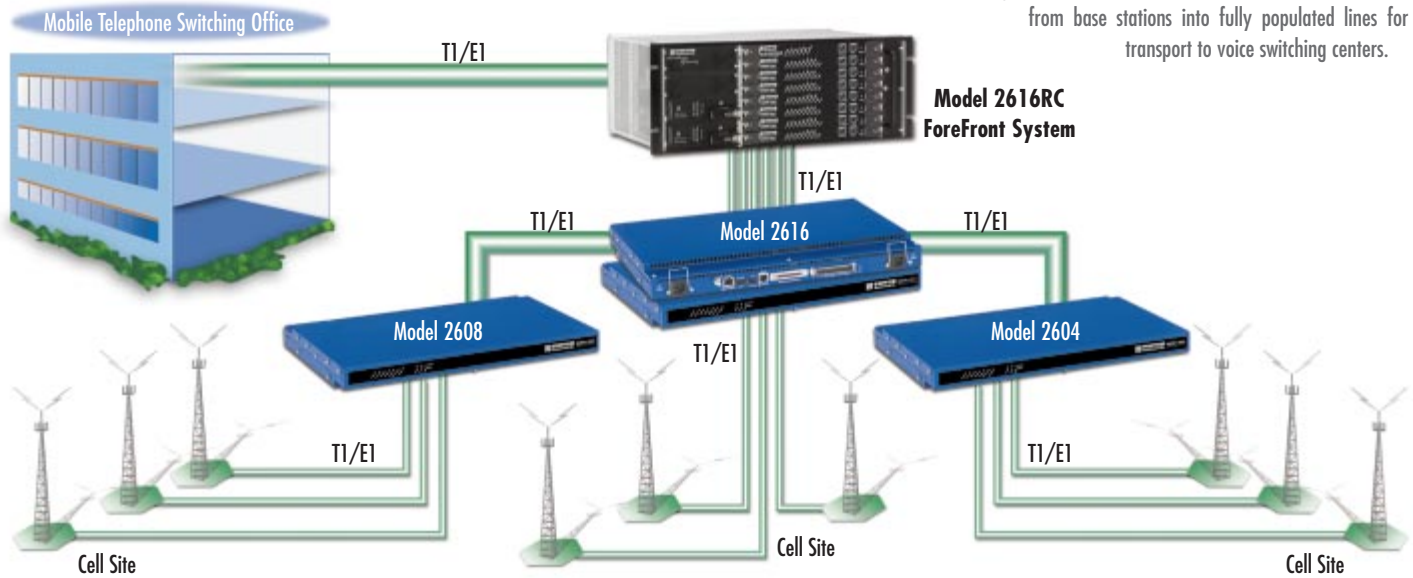
G.703/704 Powerpoint E1 Course Materials  
Remote Router Porting (RRP) with E1 white paper

#### On-Line Resources

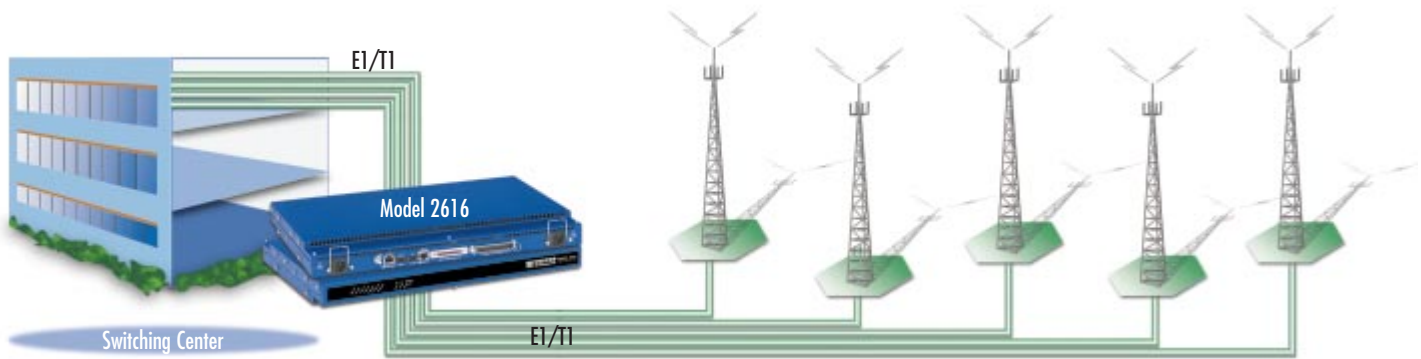
G.703 Products Brochure  
Product Data Sheets  
User Manuals

**Cell Site Switching Center Access**

The explosion of wireless cellular networks in urban and suburban areas creates the need for more efficient transport and access of voice carrying circuits from cell sites to Mobile Telephony Switching Centers. The Model 2616 and the Patton Family of DACS products (4, 8 and 16 port units) enable cellular service providers to efficiently concentrate and groom DSO channels from partially used T1/E1 lines from base stations into fully populated lines for transport to voice switching centers.



**T1/E1 Back haul – Mobile Telephony**



The model 2616 can combine traffic from multiple T1/E1 lines connecting cell site locations to a switching center. Cell towers dispersed over urban and suburban areas are equipped with T1/E1 equipment to carry voice channels to switching centers. The model 2616 is used to connect multiple cell sites via partially used T1/E1 lines, groom DSO channels, and concentrate over fully utilized lines for connection to voice switches.

**ORDERING INFORMATION**

**8-port DACS**

**2608/U/RUI\*** Cobalt Blue chassis, Dual AC supplies

**2608/B/RUI\*** Black Ice chassis, Dual AC supplies

**2608/W/RUI\*** Cool White chassis, Dual AC supplies

**2608/R/RUI\*** Ultra Red chassis, Dual AC supplies

**2608/U/R48** Cobalt Blue chassis, Dual DC supplies

**2608/B/R48** Black Ice chassis, Dual DC supplies

**2608/W/R48** Cool White chassis, Dual DC supplies

**2608/R/R48** Ultra Red chassis, Dual DC supplies

\* Country-specific power cords included.

## High Density Rack System for Universal Access

### Model 1001 Telco Rack System

The Model 1001MC supports a variety of last-mile devices in a 2U-high, 19-inch wide rack-mount chassis with redundant AC/DC power supplies.



The Model 1001 high-density rack system supports a variety of last-mile devices in a 2U-high, 19-inch wide rackmount chassis with redundant AC/DC power supplies.

When users require higher density solutions, a rack system becomes more economical. The NetLink Model 1001 rack system consists of a 2U-high chassis that can be mounted in any standard 19-inch wide telco rack. The Model 1001 chassis supports up to 16 modem modules and a single AC or DC power supply, or dual-redundant AC or DC power supplies.

The rack shown below is a fully-configured NetLink Model 1001 rack system containing 13 modems, a network

management module, and two power supply modules that fill the 18 front rack slots. Equipment/network interface modules that fill the rear slots of the rack chassis connect to the front modules through a midplane bus that extends the width of the rack.

Nearly all of the electrical and physical interfaces—from Ethernet to V.35—are available as I/O modules. Dual redundant AC or DC power supplies can be installed in the rack system to help avoid catastrophic failures caused by power fluctuations or outages.

### FEATURES & BENEFITS

- ✓ High-density rack system supports up to 16 modems in a 2U-high, 19-inch wide rack-mount chassis with integral AC/DC power supply
- ✓ Configurable input/output modules support all serial, voice/fax, Ethernet and G.703 DTE interfaces.
- ✓ The NetLink rack system can expand to 320 modems in a standard 40U-high rack system.
- ✓ Integrated SNMP and HTTP management system
- ✓ Automatic load-sharing, dual-redundant AC and DC power supplies
- ✓ Manage up to Eight Racks through a signal 1001MC SNMP management card
- ✓ Choose the technology you need
  - iDSL • E1/G.703 • mDSL • T1/FT1
  - VDSL • Baseband • E1/FE1 • Ethernet

Technology	Modem Rack Card Model	Description	CPE Model (Standalone)	Page
xDSL	iDSL	64/128 kbps; 2/4 wire iDSL modem	1092ARC	56
	HDSL	128 kbps–1 Mbps; 2 wire HDSL modem	1094A • 1089	52 • 53
	mDSL	128 kbps–2.3 Mbps; 2 wire mDSL modem	1095 • 1088	48 • 50
	VDSL	1058RC	12.5 Mbps, 2-wire VDSL modem	1058
1068RC		16 Mbps, 2-wire variable rate modem	1068 • 1058	44 • 43
E1/Frac. E1	2701RC	nx64 kbps up to 2.048 Mbps G.703 NTU	2715 • 2701	83 • 78
E1/G.703	2703RC	2.048 Mbps G.703 NTU	2703	81
T1/Frac. T1	2710RC	1.544 Mbps/nx56/64 kbps CSU/DSU	2710	73
Fiber	SMF	Single-mode fiber for G.703 termination	1193	60
	MMF	Multi-mode fiber for G.703 termination	1186	120
Baseband	1092RC	64/128 kbps; 2-wire baseband modem	1092	56
	1065	64 kbps; 4-wire industrial modem	1065	160
	1080ARC	64 kbps; 4-wire multi-drop modem	1080A	159
Ethernet	2168RC	16 Mbps, 2-wire multi-rate Ethernet extender	2158 • 2168	15 • 14
	2158RC	12 Mbps, 2-wire Ethernet extender	2158	15
	2157RC	4.6 Mbps, 2-wire Ethernet extender	2157	16
	2156RC	2.3 Mbps, 2-wire Ethernet extender	2156	17
	2155RC	128 kbps, 2-wire Ethernet extender	2155	18

**Network Management via  
 SNMP or HTTP**

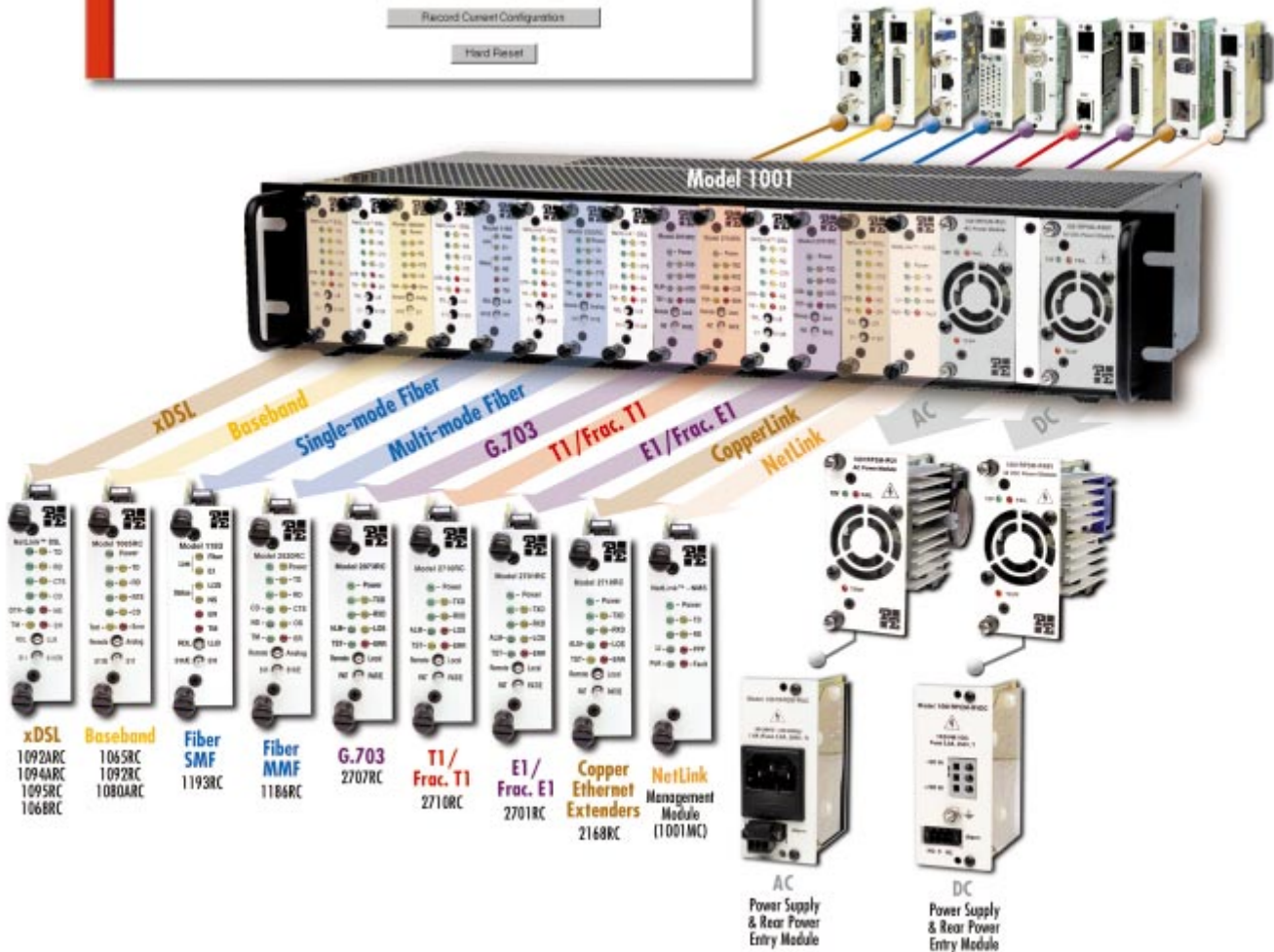
The NetLink rack system enables users to configure, control, and perform diagnostics via SNMP or HTTP. To manage a rack system, the operator need only install a NetLink Management

Module (Model 1001MC), connect a workstation to its Ethernet port, and launch a standard Web browser (i.e., Netscape Navigator or Internet Explorer). Now, any operator can manage any NetLink rack card or standalone modems from a local PC or via the Internet.

**Dual-Redundant AC and DC Power Supplies**

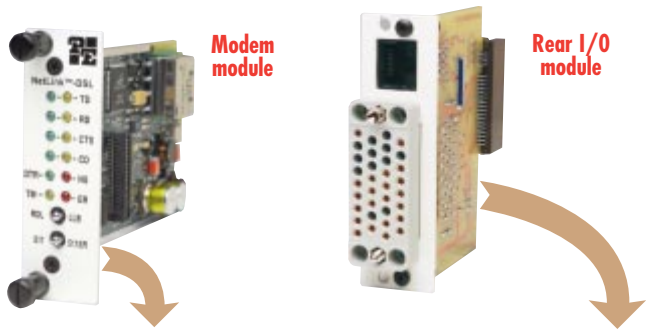
The Model 1001 rack system can have one or two 90–264 VAC or -12/-24/-48 VDC power supplies installed in any combination. Each power supply can support a fully-loaded rack configured with any combination of front modem modules and rear I/O cards. If two power supplies are installed, they automatically self-configure for dual-redundant, load-sharing operation. In dual-redundant configuration, each power supply shares 50% of the load.

In the unlikely event of a supply failure, the other supply immediately begins providing 100% of required power; the operator is notified by an audible alarm; an LED flashes on the front panel; and the central site operator is notified via the network management system.



**High Density Rack System for Universal Access** (continued)

**Model 1001 Telco Rack System**



**Great Modularity & Interface Functionality**

The NetLink rack system's midplane bus connects front modem modules and rear I/O modules, delivering the right combination of modem technology and interface support. Physical/electrical interface conversion is also built-in to the system architecture. For example rack cards with G.703/G.704 interfaces will connect to V.35/X.21/EN standalone units.

Technology	Model	Description	Rear Rack I/O Cards
xDSL	1092ARC	iDSL—2W/4W	
	1094ARC	HDSL—2W	
	1095RC	mDSL—2W	
	1058RC	VDSL—2W	
	1068RC	VDSL—2W (Variable rate)	
Baseband	1092RC	2W Modem	
T1 CSU/DSU	2710RC	T1/FT1	
E1/Frac. E1 CSU/DSU	2701RC	G.703/G.704	
G.703/2 Mbps Converter	2703RC	E1/G.703	
	2707RC	E1/G.703	
Fiber Modem	1193RC	SMF	
	1186RC	MMF	
Copper Extenders	2168RC	16.67 Mbps Multi-Rate	
	2158RC	12.5 Mbps	
	2157RC	4.6 Mbps	
	2156RC	2.3 Mbps	
	2155RC	144 kbps	
Industrial Short-range Modems	1065RC	Ruggedized	
	1080ARC	Multi-drop	



Three Kinds of CPE

**A** **Micro-Pak**—Ultra-Miniature access devices packed with features



**B** **QuikConnect**—One base unit supports a wide variety of applications and interfaces



**C** **Economy (Fixed Interface)**—Just what you need at a low cost



Compatible CPE	Compatible CPE Model	Page
<b>B</b>	1092A	56
<b>B</b>	1094A • 1089	52 • 53
<b>B</b>	1095 • 1088	48 • 50
<b>C</b>	1058 • 1068	40 • 44
<b>C</b>	1058 • 1068	40 • 44
<b>C</b>	2710 • 2711	73 • 73
<b>B</b>	2073	85
<b>A</b>	2715 • 2701	83 • 78
<b>C</b>	2703	81
<b>C</b>	2707	82
<b>C</b>	1193	60
<b>C</b>	1186	120
<b>C</b>	2158 • 2168	15 • 14
<b>C</b>	2158 • 2168	15 • 14
<b>C</b>	2157	16
<b>C</b>	2156	17
<b>C</b>	2155	18
<b>B</b>	1065	160
<b>A</b>	1080	159

SPECIFICATIONS

**19-in. Rack Mountable Chassis**  
Temp.: 32–122°F (0–50°C)  
Humidity: 5–90% non-condensing

**1001MC Management Card**  
**Management:** SNMP/HTTP—SNMP Version 1, Enterprise MIB  
**FTP Update Support:** Integrated FTP server to receive new code images  
**Interface:** 10Base-T Ethernet via RJ-45 Terminal Interface via RS-232

DTE: 19200 bps Async, 1 stop bit, 8 data bits, and 0 parity  
**LED indicators:** Power, Transmit/Receive, Ethernet, PPP, Poll, Fault  
**Multi Chassis:** Up to 8 chassis Daisy-chained via 1001CC  
**48 VDC Power**  
**Input Voltage:** 42–60 VDC  
**Input Current:** 2.2A nominal  
**Surge Protection:** to 75 VDC  
**LED indicators:** Normal, Power Failure, Over Temperature

**Weight:** 0.7 lbs (0.32 kg)  
**AC Power**  
**Input Voltage:** 90–264 VAC  
**Input Frequency:** 50/60Hz  
**Input Current:** 1.8 A RMS  
**Surge Protection:** to 300 VAC  
**LED indicators:** Normal, Power Failure, Over Temperature  
**Weight:** 0.7 lbs (0.32 kg)  
**Approvals:** NRTL US UL/1950, CAN CSA/950, EN60950, CE Listing, FCC Part 15 Class A

ORDERING INFORMATION

- 1001R16P/48V** 16-slot Model 1001 rack; one -48 VDC power supply & rear power entry module (RPEM)
- 1001R16P/UI** 16-slot Model 1001 rack; one 90–260 VAC power supply & RPEM with an IEC-320 connector.
- 1001R14P/R48V** 14-slot 1001 rack; two -48 VDC power supplies operating in a load-sharing, dual-redundant mode.
- 1001R14P/RUI** 14-slot 1001 rack; two 90–260 VAC power supplies & RPEMs operating in a load-sharing, dual-redundant mode.
- 1001R14P/RUI48** 14-slot 1001 rack; one -48VDC & one 90–260 VAC power supply, one AC and one DC RPEM operating in a load-sharing, dual-redundant mode.
- 1001R** 16-slot 1001 rack with midplane bus.
- 1001RPSM-RUI** 90–264 VAC power supply.
- 1001RPEM-RAC** Rear power entry module (RPEM) with IEC-320 connector.
- 1001RPSM-R48V** -48 VDC power supply.
- 1001RPEM-RVDC** Rear power entry module (RPEM) for DC power source.
- 1001MC** SNMP/HTTP management module (requires one slot).
- 1001CC** Control module for daisy-chaining additional racks

<b>Model #</b>		<b>Page</b>	<b>Model #</b>		<b>Page</b>	<b>Model #</b>		<b>Page</b>
05R16	Blank Front and Rear Rack Panels	175	1026PRC	Powered X.21, Modem Eliminator Rack Cards	164	1092A	KiloModem, 2B1Q Encoding, 2- or 4-Wire Baseband Modem	56
056S1	Rack System Pan Head Screws and Washers	175	1030	Self-Powered, Synchronous SRM	154	1092ARC	KiloModem, 2B1Q Encoding, 2- or 4-Wire Baseband Rack Card	56
0805	Rack System Power Card	175	1035	High Speed, Synchronous SRM	155	1094A	NetLink 1.152-Mbps HDSL Modem	52
0821R	Rack System Fuses	175	1040	Synchronous/Asynchronous SRM	153	1094ARC	NetLink 1.152-Mbps HDSL Rack Card	52
1000	Simple Point-to-Point Async SRM, DB-25/Terminal Block	150	1045	High Speed, SRM (RS-232 & RS-530)	156	1095	NetLink, 2-Mbps, 2-wire, mDSL modem	48
1000CU2	ClusterBoxes, 2-slot	174	1045RC	High Speed, SRM (RS-232 & RS-530) Rack Card	156	1095RC	NetLink, 2-Mbps, 2-wire, mDSL Rack Card	49, 51
1000CU4	ClusterBoxes, 4-slot	174	1050	AC Powered SRM (up to 38.4 kbps)	157	11	DB-25 to Modular Adapter	181
1000CU8	ClusterBoxes, 8-slot	174	1058	12.5-Mbps VDSL Voice and Data Modem/Router	42	1110	Miniature, Async, Fiber Optic Modem	165
1000R16	Mini-Rack System, 16-slot	174	1058RC	12.5-Mbps VDSL Voice and Data Rack Card	42	1110RC	Miniature, Async, Fiber Optic Rack Card	165
1000RC	Simple Point-to-Point Async SRM	150	1060	AC Powered Async SRM (up to 115.2 kbps)	157	1140	Miniature, Async, Fiber Optic Modem	165
1001	High Density Telco Rack System for Universal Access	110	1060RC	AC Powered Async SRM (up to 115.2 kbps) Rack Card	157	1140RC	Miniature, Async, Fiber Optic Rack Card	165
1002	Full-Duplex Over 2-Wire Twisted Pair or Coax	151	1065	Industrial SRM, Ruggedized for Outdoor Use	160	1170M	FibreLink Multimode Ethernet Extender, 100Base-TX to 100Base-FX	19
1003	Full-Duplex Over 2-Wire Twisted Pair or Coax	151	1065RC	Industrial SRM, Ruggedized for Outdoor Use, Rack Card	160	1170S	FibreLink Single Mode Ethernet Extender, 100 Mbps	20
1004A	High Speed, Multi-Point Short-Haul Modem, DB-25	152	1065RCE	Industrial SRM, Extended Environment Rack Card	160	1171M	FibreLink Multimode Ethernet Extender, 10Base-T to 10Base-FL	19
1004ARC	High Speed, Multi-Point Short-Haul Rack Card	152	1068	Variable Rate VDSL Modem	44	1171S	FibreLink Single Mode Ethernet Extender, 10 Mbps	20
1008	High Speed, Multi-Point Short-Haul Modem, DB-9	152	1068RC	Variable Rate VDSL Rack Card	44	1172M	FibreLink Multimode Ethernet Extender, 10Base-T/100Base-TX to 10Base-F/100Base-FX	19
1009	Simple Point-to-Point Async SRM, DB-9/Terminal Block	150	1070	AC Powered SRM, Sync & Opto-Isolated	158	1172S	FibreLink Single Mode Ethernet Extender, 10/100 Mbps	20
1010B	Transformer Isolated SRM Rack Card	150	1070RC	AC Powered SRM, Sync & Opto-Isolated Rack Card	158	1180	Asynchronous/Synchronous, Single-Fiber Modem	64
1010R16	General-Purpose, 16-Card, Front-Loading Rack	176	1075	AC Powered X.21 SRM, Sync & Opto-Isolated	158	1180RC	Asynchronous/Synchronous, Single-Fiber Rack Card	64
1012A	Asynchronous SRM	153	1080A	Universal SRM	159	1184	KiloLight 128 kbps Single-Fiber Modem	65
1012ARC	Asynchronous SRM Rack Card	153	1080A-64	Universal SRM	159	1184	KiloLight Single-Fiber Modem	166
1015	Simple Point-to-Point Async SRM, DB-15/Terminal Block	150	1080ARC	Universal SRM Rack Card	159	1184RC	KiloLight 128 kbps Single-Fiber Rack Card	65
1015	Transformer Isolated SRM	150	1082	iDSL Modems with V.35, X.21, or 10Base-T (Ethernet) Interfaces	57	1184RC	KiloLight Single-Fiber Rack Card	166
1016	Transformer Isolated SRM	150	1084	High Speed, Multipoint, Baseband Modem	161	1185	KiloLight 256 kbps Single-Fiber Modem	65
1018	Async SRM with Extra Controls	156	1088	2.304-Mbps mDSL Modem with Extended Ranges	50	1185	KiloLight Single-Fiber Modem	166
1019	Transformer Isolated SRM	150	1089	1.152-Mbps HDSL Modem Over Two Wires	53	1185RC	KiloLight 256 kbps Single-Fiber Modem	65
1020	Self-Powered, Synchronous SRM	154				1185RC	KiloLight Single-Fiber Rack Card	166
1025	Self-Powered, Synchronous SRM	154						
1026P	Powered X.21, Modem Eliminator	164						

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1186	Campus and Industrial Copper to Multi-Mode Fiber Media Converter	120	1226	AC Powered, Parallel Short-Range Modem	139	2035	Auto-Directional Serial to Parallel Converter, DB-25, 115.2 kbps	136
1186	NetLink Multi-Mode Fiber Modem for G.703 Extension	60	14TB	DB-25 to Terminal Block Adapter	182	2036	Compact Interface Serial to Parallel Converter, DB-25 female to 36 pin, 115.2 kbps	136
1186RC	Campus and Industrial Copper to Multi-Mode Fiber Media Converter, Rack Card	120	15	DB-15 Modular Adapter	181	2036P	Serial to Parallel Printer Converter	137
1186RC	NetLink Multi-Mode Fiber Modem for G.703 Extension Rack Card	60	15HD	HD-15 to Modular Adapter	181	2037	Compact Interface Serial to Parallel Converter, Two DB-25 female connectors, 115.2 kbps	136
1186TRC	Campus and Industrial Copper to Multi-Mode Fiber Media Converter, T1 Rack Card	120	16	DB-9 Modular Adapter	181	2039	Auto-Directional Serial to Parallel Converter, DB-9, 115.2 kbps	136
1193	Campus and Industrial Copper to Single-Mode Fiber Media Converter	120	18PC-M	DB-9 to DB-25 Adapter	183	2040	V.35 to HSSI Converter	128
1193	NetLink Single-mode Fiber Modem for G.703 Extension	60	18PC-P	DB-9 to DB-25 Adapter	183	2041	X.21 to HSSI Converter	128
1193RC	Campus and Industrial Copper to Single-Mode Fiber Media Converter, Rack Card	120	2002	Self Powered RS-232 to TTL	132	2042	RS-422/530 to HSSI Converter	129
1193RC	NetLink Single-mode Fiber Modem for G.703 Extension Rack Card	60	2010	RS-232 Async to Sync Converter	122	2043	E1/G.703 to HSSI Converter	129
1193TRC	Campus and Industrial Copper to Single-Mode Fiber Media Converter, T1 Rack Card	120	2011	High Speed RS-232 Async to Sync Converter	122	2065RC	RS-232 to X.21 Converter Rack Card	124
1194	Single-Mode Fiber Multiplexer with 4 T1/E1 Ports	62	2012	Powered Asynchronous to Synchronous Converter	122	2066RC	V.35 to X.21 Converter Rack Card	124
12	DB-25 to Modular Adapter	181	2014	Passive RS-530 to V.35 Converter	123	2070	Co-Directional G.703 Converter	84
1200	Sync Modem Eliminator	162	2014N	Passive RS-530 to V.35 Converter	123	2072	Powered, G.703 to V.35/X.21 Interface Converter	85
1200P	Powered V.24 Modem Eliminator	163	2015	Passive RS-449 to V.35 Converter	123	2073	G.703/64 kbps Interface Converter	85
1201	Sync Modem Eliminator	162	2016	Mini X.21 to V.35 Converter	124	2084	Interface Powered, RS-232 to RS-485 Interface Converter, 2-Wire	130
1202	High Speed Sync Modem Eliminator	162	2017	RS-232 to Current Loop Converter (20mA or 60mA)	133	2085	Interface Powered, High Speed RS-232 to RS-485 Interface Converter	130
1203	High Speed Sync Modem Eliminator	162	2017RC	RS-232 to Current Loop Converter (20mA or 60mA) Rack Card	133	2085RC	Interface Powered, RS-232 to RS-485 Interface Converter Rack Card	130
1205	V.35 Sync, Modem Eliminator	163	2018	RS-232 to 20mA Current Loop (DB-25 to DB-25)	133	2086	Interface Powered, RS-232 to RS-485 Interface Converter, Opto-Isolation	130
1205P	Powered V.35 Modem Eliminator	164	2020	Passive RS-232 to V.35 Converter	125	2089	Interface Powered, EIA-574 to RS-485 Interface Converter	130
1205PRC	Powered V.35 Modem Eliminator Rack Card	164	2020PRC	RS-232 to V.35 Converter	176	2090	Micro V.35 to T1 Converter	127
1205RC	V.35 Sync, Modem Eliminator Rack Card	163	2020RC	RS-232 to V.35 Converter Rack Card	125	2094	Micro V.35 to G.703/G.704 (E1) Converter	127
1206	X.21 Sync, Modem Eliminator	163	2021	RS-232 to X.21 Interface Converter	126	2120	Ethernet to RS-232 Converter/Terminal Server	134
1206PRC	X.21 Modem Eliminator	176	2022	RS-232 to RS-422/449 (V.36) Interface Converter	126	2120	Single Port Terminal Server	23
1206RC	X.21 Sync, Modem Eliminator Rack Card	163	2025	Auto-Directional Serial to Parallel Converter, DB-25, 38.4 kbps	136	2121	Ethernet MicroBridge, X.21	21
1225	Self-Powered Line Extender	155	2026	Compact Interface Serial to Parallel Converter, DB-25 female to 36 pin, 38.4 kbps	136	2121	Ethernet to X.21 Converter/Bridge	135
1225	Self-Powered Line Extenders	139	2027	Compact Interface Serial to Parallel Converter, Two DB-25 female connectors, 38.4 kbps	136	2124	Ethernet MicroBridge, V.24	21
			2029	Auto-Directional Serial to Parallel Converter DB-9, 38.4 kbps	136	2124	Ethernet to V.24 Converter/Bridge	135
			2030	RS-232/423 to IEEE-1284 Converter	137	2130	Ethernet MicroBridge, EIA-530	21

## WHAT IS HOT...

LOW COST 120 PORT V.92 RAS

COPPER & FIBER ETHERNET EXTENSION

G.703 CONVERTERS & BALUNS

MINI T1-CSU/DSU RACK CARD

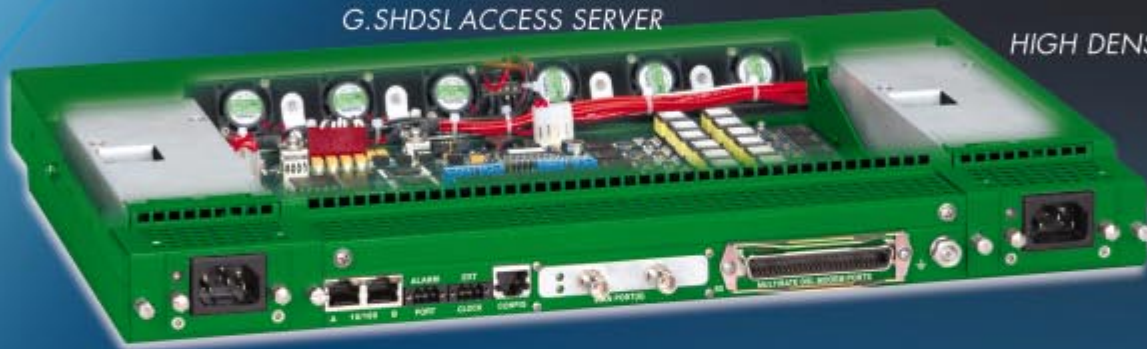
DEVICE SERVERS

MULTISERVICE T1/E1 CROSS CONNECT

G.SHDSL

HIGH DENSITY V.92 RAS

G.SHDSL ACCESS SERVER



w w w . p a t t o n . c o m



## Everything Over DSL

(vDSL, aDSL, G.shDSL, HDSL, mDSL, iDSL)

*From dedicated Internet Access to cell site backhauls—we do it all over DSL*

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