PATTON

VoIP
Solutions Guide

SmartNode 4528 VoIP Gateway Router
ToIP Integrated Access Device

ToIP, VoIP that works

VoIP Voice-over-IP

Converting Voice to Packet using industry-standard H.323 and SIP protocols is called *VoIP*. Making it work in YOUR network is something else.

Patton's SmartNode Telephony-over-IP gateways and routers offer a full range of solutions to address the challenges of integrating PSTN and IP networks and solve the critical migration issues associated with next-generation IP networks. Unique among VoIP solutions, Patton's SessionRouter™ software offers configurable call-routing policies to support any numbering plan and ease your migration to IP calling.

ToIP Telephony-over-IP

Incorporating PSTN telephony and data services into a seamless and integrated private or public network, TRANSPARENT to the end-user is what Patton calls *Telephony-over-IP™*.
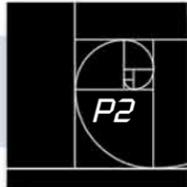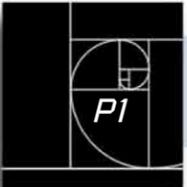
The Case for VoIP

The basic argument for VoIP is the clear advantage of a converged and integrated network. The benefits are cost savings and improved efficiency.

The Case for VoIP

Migration to a Converged Access Network is the challenge.

The New Way
Converged IP Access

- All services are consolidated to the new lower-cost IP access
- Remote extensions are now integrated with remote PBX with full telephony feature transparency
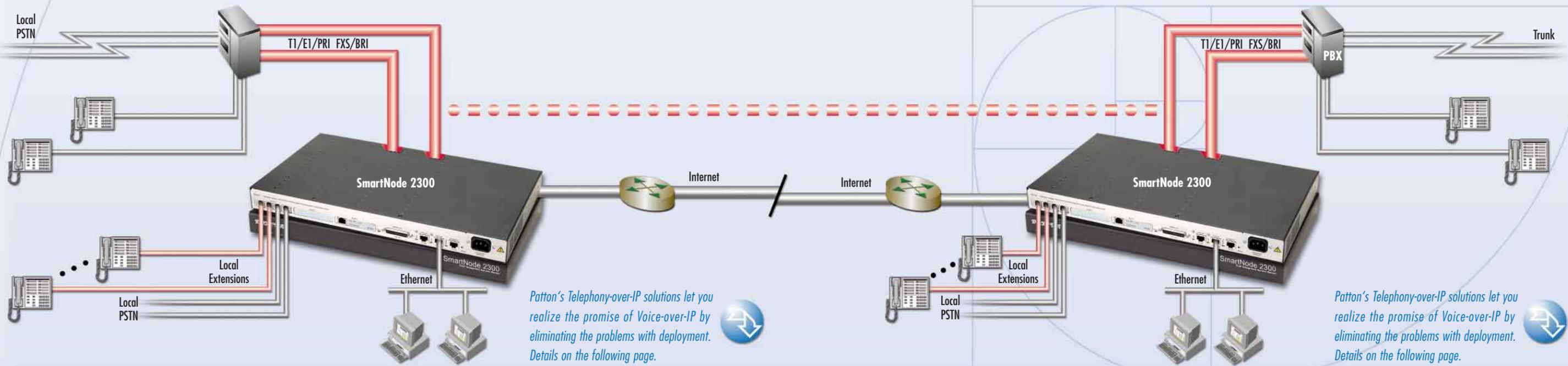- Network = **Asset**

The Old Way
Separate Data & Voice Networks

- Multiple, under-utilized facilities with dedicated services for each application
- Separate phones & circuits for local & remote telephone services
- Network = **Liability**

This Solutions Guide describes how Patton delivers the VoIP promise to Enterprises and Service-Provider Customers.

- *Reduce* your network's underlying cost base and realize a short term return on investment.
- Contain built-in variable network cost increases and improve efficiency.
- Leverage established systems and migrate to next-generation IP-based networks with feature transparency.
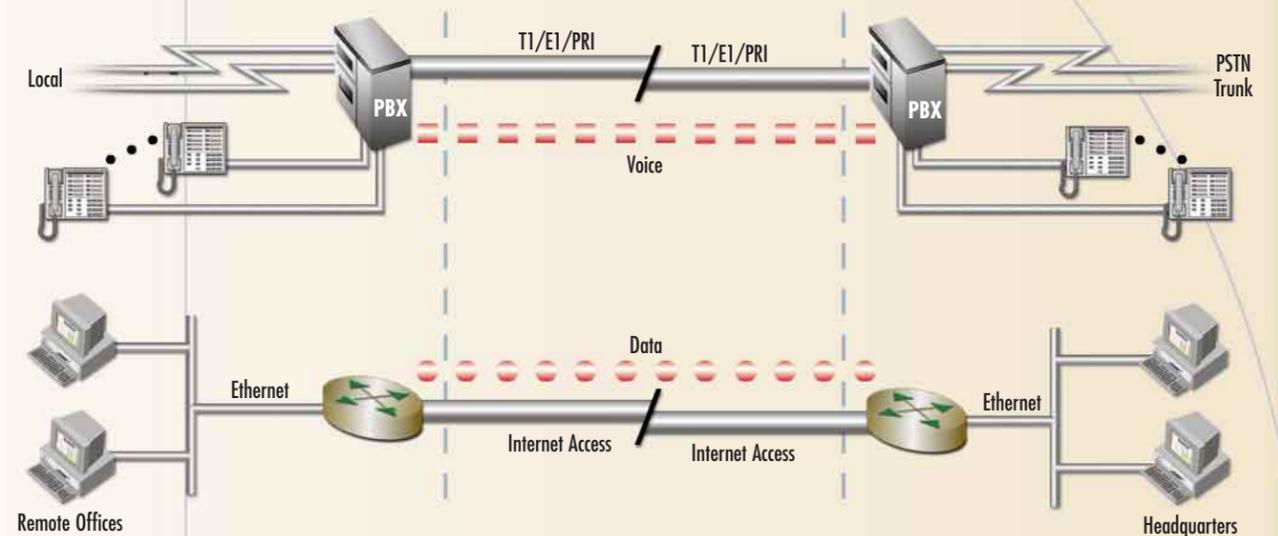- Achieve customer retention and new business development.

Integrated Data & Voice: Network = Asset

Separated Data & Voice: Network = Liability

Local
T1/E1/PRI   T1/E1/PRI
PBX   PBX
PSTN Trunk
Voice

Data
Ethernet   Ethernet
Internet Access   Internet Access

Remote Offices

Headquarters

Realizing the benefits of VoIP involves eliminating unnecessary recurring expenses and hardware costs required to support voice & data services.

Local PSTN
T1/E1/PRI FXS/BRI
Trunk
PBX
T1/E1/PRI FXS/BRI

SmartNode 2300
Internet   Internet
SmartNode 2300

Local Extensions
Ethernet

Local PSTN
Local Extensions
Ethernet

Local PSTN

Patton's Telephony-over-IP solutions let you realize the promise of Voice-over-IP by eliminating the problems with deployment. Details on the following page.

Patton's Telephony-over-IP solutions let you realize the promise of Voice-over-IP by eliminating the problems with deployment. Details on the following page.

The financial benefits of VoIP for residential, enterprise, and service-provider companies has been well known for years now. Many of the reductions in US domestic long-distance rates are the result of carriers adopting VoIP. And, VoIP technology PROMISES reduced costs, increased profits, and greater efficiencies in the networks of enterprises and service providers of ALL shapes and sizes. BUT THIS PROMISE has not yet come true! Problems with deployment and other challenges have hindered mass voice and data integration over a common IP network.

The following points represent the KNOWN FACTS about successful VoIP deployments. Understanding these facts is the key to success for implementing any Converged Network strategy. The following pages of this Solutions Guide present a set of business case models that further develop and illustrate the points below.

Telephony-over-IP—Savings and Profit

1 Deploying a dedicated telephone system and a separate data system in remote offices is expensive. It costs less to support remote sites over an IP LAN from a centralized location... When you do it with SmartNode's SessionRouter technology, users won't notice a difference.

2 International voice and fax calling between offices over IP networks is much less expensive than international long-distance calling.

3 Routing voice and fax traffic over an existing IP network infrastructure provides better bandwidth utilization—which equals better asset utilization—and eliminates redundant expenses.

4 Traditional telephone equipment for the enterprise network is low-cost, while leased lines, toll charges, network management systems and support are higher-cost elements. Telephony-over-IP offers tremendous cost reductions by leveraging low-cost legacy telephone equipment and radically reducing costs for other network elements—all without impacting the user's experience.

5 Consolidating private voice and data networks into a single IP-based communications infrastructure with Telephony-over-IP improves the overall efficiency of the entire communications system.

6 Enterprises using Telephony-over-IP realize dramatically reduced administration costs for end-user MACs (moves, adds, and changes).

7 IP Telephony software applications are largely based on newer IP-centric server architectures. Patton SmartNodes enable seamless integration of these packages with pre-existing, non-IP-PBXs, thus eliminating the cost of deploying next-generation enterprise networks.

Problems with deployment and other challenges have hindered mass voice and data integration over a common IP network.

Patton's unique range of Telephony-over-IP products removes the key barriers and solves the issues preventing mass VoIP deployment.

Problems with VoIP

- Supporting numbering plans and dialing procedures
- Supporting supplementary services (Caller-ID, Call-Transfer, etc.)

ToIP Solutions

SessionRouter™ provides a full suite of PBX and PBX-interoperability features. The software allows easy integration with any PBX. You can configure call routing policies that solve practically any numbering and migration issue. The SmartNode SessionRouter supports traffic classification, call filtering, and prioritized routing not only for voice but also for multiple data service classes.

SmartNode SessionRouter™

- Mastering network delay
- Overcoming IP service quality issues

Supporting industry-standard QoS *and* Patton's Down-Stream QoS™ techniques, SmartNodes ensure that time-sensitive telephone calls are prioritized over other traffic traversing the Internet or private IP network.

SmartNode QoS

- Truly integrating IP and PSTN telephony, migrating existing equipment and operational procedures.

Patton's robust core software includes a full suite of IP routing and services software and all standard low-speed and high-speed CODEC and VoIP protocols.

User Transparency

Teach me VoIP

Voice over IP (VoIP)

samples analog voice into blocks of 10–60 ms, wraps them into digital IP packets, sends them over the network, and reassembles the voice stream on the other side. The quality of VoIP depends on the CODEC—compression/decompression—method used, network conditions, and ranges from ISDN toll quality to GSM.

G.711 This standard CODEC converts the analog speech signal to a digital stream using pulse code modulation (PCM), a logarithmic encoding algorithm. G.711 delivers toll-quality voice using 64 kbps of bandwidth per call. Best choice in high-bandwidth environments.
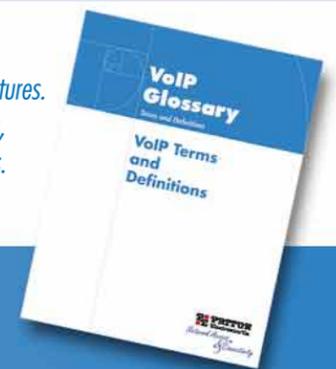
G.723.1 Developed for multimedia, G.723.1 has emerged as the standard low-bandwidth CODEC today. Using just 5.3 kbps or 6.4 kbps of bandwidth per call, G.723.1 delivers good voice quality at low bandwidth in the presence of network impairments such as lost packets and transmission errors.

G.729 This standard CODEC offers toll-quality voice at lower bandwidth. Using 8 kbps of bandwidth, G.729 offers modest processing requirements and tolerates moderate network delay. Delivers high-quality voice in low-bandwidth environments.

SIP (Session Initiation Protocol) is the IETF standard call-control protocol between gateways and switches. With SIP, unified services can be easily created which combine elements from telephony and other applications such as email, messaging, and streaming video.

H.323 is a recommendation from the ITU that sets standards for multimedia communications over IP networks. It also addresses call control, multimedia management, and bandwidth management.

ISoIP is ISDN-Over-IP, a patented feature of the SmartNode products which incorporates full ISDN feature tunneling and Q-SIG feature tunneling including ISDN speech, audio data, and ISDN Supplementary Services.

VoIP Glossary
VoIP Terms and Definitions

Get Your **FREE** *VoIP / ToIP Glossary Today*
Visit http://voip.patton.com

Softswitch is a call control server in a VoIP network providing user Authentication and Accounting services, independent of the VoIP protocol (H.323, MGCP, SIP).

T.38 is a protocol for the real-time transmission of Fax in VoIP networks.

Branch Office Connectivity

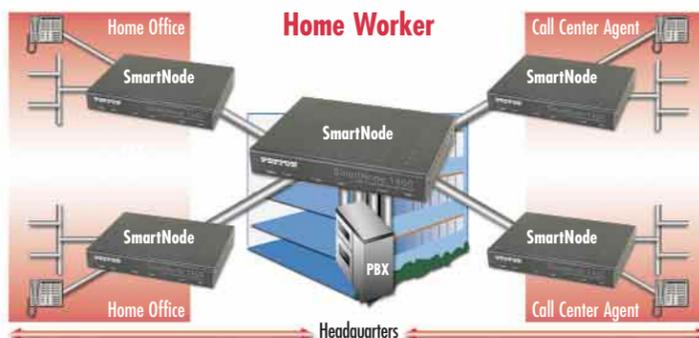There is no reason to deploy a separate telephone system at each location in an enterprise. Using Telephony-over-IP, remote sites CAN be supported over the Internet, transparent to the user and with the same feature set available to "local" users. Each remote site does not need special IP telephones. At the remote site, voice-extensions to the central site can co-exist with local PSTN connectivity.

Branch Office PBX Extension

Headquarters   PBX Extension   Branch Office / Remote Office
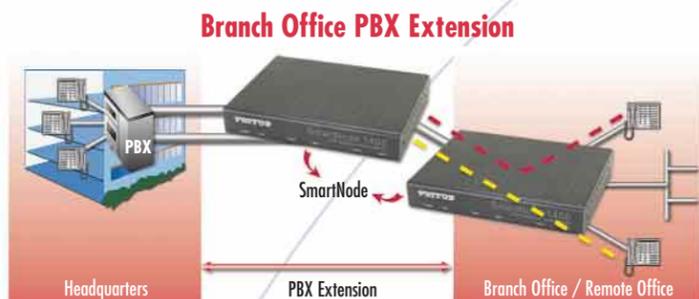
Home Workers, Telecommuters, and Remote Call Center Agents

Executives, as well as part-time or full-time home workers, can access the corporate data network *and* the PBX from home or the office without any differences. Home workers can make and receive calls from the PBX while working online, transparent to the caller. The home worker can reach all PBX extensions and use all the same PBX call features available to "local" users.

In a variation of the home workers application, the IP call center agent is located at a contractor's facility or in a home. From the caller's perspective, the IP extension is transparent and the offsite telephone agent is connected using the existing capabilities of the call center operations, including automated call distribution.

Home Worker

Business Case

For small branch offices, it's expensive to deploy a separate telephone system. It can also be very costly to install and maintain remotely. Usually, the remote PBX does not offer "integrated" connectivity nor the same features and functions available to "local" telephony users. The costs of long-distance calls to support "internal communication" are unnecessary.

The SmartNode Solution integrates with the HQ's PBX and provides the following benefits:

- Seamless telephone access while expanding your operation's reach and range
- Customers see you as one cohesive organization
- Lowers operational costs by using existing lines and connections
- Lets you realize all the benefits of converged IP and telephony access

Cost Comparison

Telco Based Service with New PBX		
Acquisition & Service Costs	**QTY**	**Total**
Telco Line Install + 1 year Service	4	$2,652
PBX System	1	$2,735
	Total	**$5,387**
	Per 4 man office	**$1,347**

Converged IP Telephony (SmartNode)		
Acquisition & Service Costs	**QTY**	**Total**
Patton SmartNode	2	$1,990
Standard off-the-shelf phones		$200
	Total	**$2,190**
	Per 4 man office	**$548**
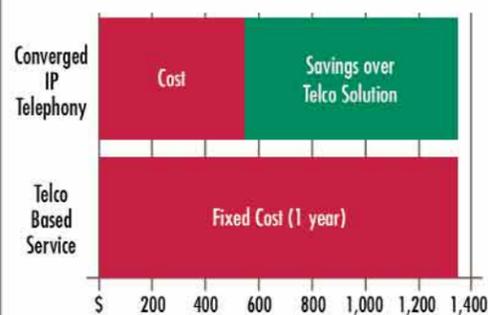
Assumptions: 1 year service and deployment; the PBX is a "small business" PBX with voice mail; Internet connection is present at both sites.

Business Case

The 80/20 rule of long distance: 80% of any company's telephone bill is generated by 20% of the numbers dialed. This 80% includes calls to:

Branch Offices •
Key Customers •
Key Vendors •

The voice intranet is simply an expansion of IP-related voice services, first deployed in your organization and then expanded to attack the next cost center of your communications network.

The advantages of the voice intranet go way beyond the hard currency savings. For example, providing your customers quick, easy, and free access to your company. But there are real tangible savings as well, including the elimination of most toll and long-distance expenses.

Cost Comparison

Long Distanced Based Solution				
Without SmartNode	**Q1**	**Q2**	**Q3**	**Q4**
Local Calling	$2,925	$2,925	$2,925	$2,925
Long Distance	$1,575	$1,575	$1,575	$1,575
Total Phone Charges	$4,500	$4,500	$4,500	$4,500
Cumulative Cash Expense	**$4,500**	**$9,000**	**$13,500**	**$18,000**

Patton Voice Intranet				
With SmartNode	**Q1**	**Q2**	**Q3**	**Q4**
Long Distance Savings	$1,575	$1,575	$1,575	$1,575
Patton SmartNode	$1,990	0	0	0
Total Cash Savings	(S415)	$1,575	$1,575	$1,575
Cumulative Cash Savings	**(S415)**	**$1,160**	**$2,735**	**$4,310**

Assumptions: 50 employee office; 35% of total bill is Long Distance and is bypassed with SmartNode; Internet access is available at all sites.
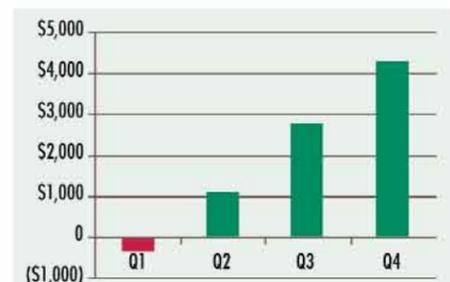
Cumulative total savings over long distance using Patton SmartNode

The Voice Intranet

Long, growing, and increasingly efficient relationships with your clients and vendors are invaluable assets for your business. Such relationships produce growing revenues and increased profits for everyone involved. Creating your own voice Intranet is like putting a virtual-cubicle of your company at your customer and vendor sites. The voice intranet puts you on your customer's PBX, and vice-versa, and puts your company in the same position as internal personnel. You are only a 3-digit extension away. This approach propagates partnerships throughout organizations while SAVING MONEY. The Internet-based voice-intranet uses Patton's SmartNodes, saving on both incoming and outgoing calls between the vendor and supplier, effectively creating cost-free trunk lines. This application enhances customer service by enabling personnel to:

Instantly respond to customer needs

Close a pending sale through information sharing and end-user/agent collaboration

*Generate interest in or close additional sales almost immediately*

Patton's partners are rapidly joining the Patton voice intranet, for details, email sales@patton.com.

Voice Intranet

Your Suppliers   Your Offices   Your Customers
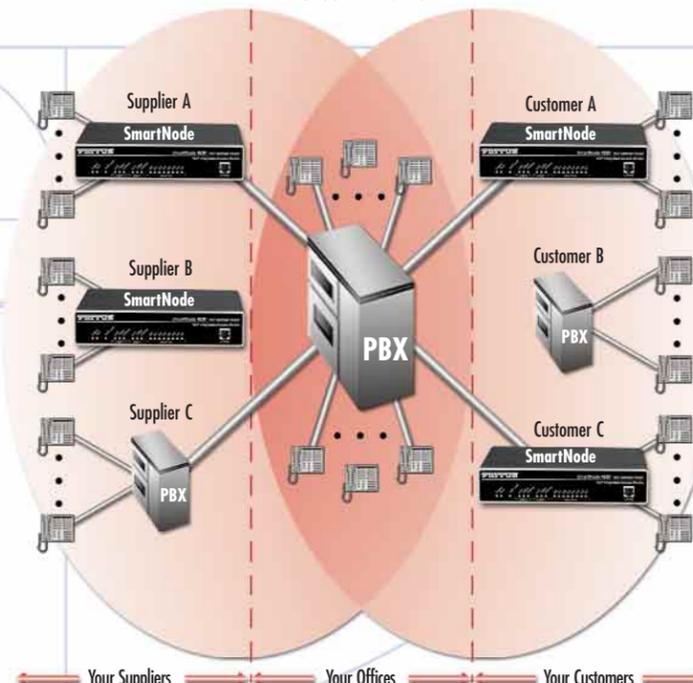
ITSP International Trunking/Bypass

International long-distance calling is still one of the most lucrative opportunities for carriers. The construction of low-cost, IP-based long-distance bypass solutions is one of the fastest growing Competitive Carrier solutions for VoIP. Patton's SmartNode ToIP Gateways can switch long-distance voice and fax calls onto IP-based networks. This application is particularly well suited for prepaid-calling card or corporate telephony contracts. IP voice and fax calls can significantly reduce long-distance costs, particularly if a service provider can generate high volumes of calls to on-network international locations.

Call Patton ...
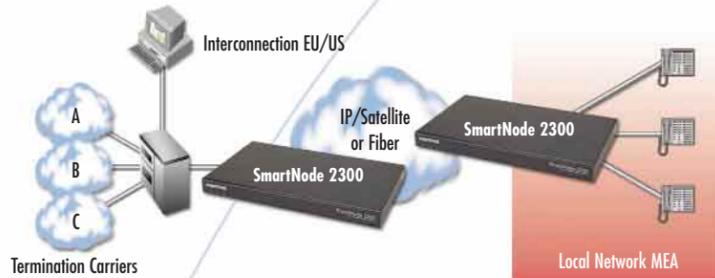
Global Solutions Group Extension x190 for information on Turnkey VoIP Solutions

I'm Benham Malcom, Patton's Director of the Global Solutions Group. We provide a full range of deployment services including engineering, installation, staging, testing and turn-up. We have more than 20 year's experience in designing, building, and implementing networks worldwide. So if you need help building your next-generation network—whether broadband access networks, multi-service data backbone networks, ISP systems, or VoIP infrastructure networks—please give me a call at **(240) 912-1211.** You can also send e-mail to **sales@www.patton.com**

Business Case

Transporting telephony minutes is an incremental revenue source for Competitive Carriers offering international IP connectivity.

- Creating "routes" for long-distance traffic, terminating directly onto mobile and incumbent networks is less expensive using VoIP technology.
- In emerging markets in particular, long distance minutes are extremely expensive, creating a margin opportunity for ITSPs.

IP Satellite Transport Case

	Cents/Minute
Long distance rate MEA countries*	50
Wholesale Termination rates in EU/US	3
Margin for termination in US/EU	47
Number of minutes/month on E1 link (at -70% load)	30,000
Total Margin on E1 link (30 channels)	$14,100
Cost for 1MHz Satelite Bandwidth (1 Mb/s) per year	$60,000
Cost per month	$5,000
Monthly profit for long distance transport	9,100.00
Equipment 2 SN2300/E1VIL/UI Installation	$13,990
Total investment	$3,000
ROI after	1.9 month
Profit after first year	$92,210
Profit each following year	$109,200

* MEA = Middle East / Africa

Business Case

Cyber-cafes, call shops and Internet/telephony kiosks can generate large revenue and profits, especially in areas with mid to low tele-densities.

- Using VoIP you can bypass Local Carrier Access with a low-cost broadband Internet connection.
- Bypass savings depend on call destination and access cost (an average 20% of bypass savings can be easily achieved).
- The following Business Case does not contemplate either the nominal incremental cost to provide Internet access or the additional revenues and margins available.

Call Shop Kiosk

Investment Costs	2 hours/ day usage	5 hours/ day usage
10 Shops w/8 Lines	$71,550.00	$71,550.00
Central Site	$12,495.00	$12,495.00
Total Investment	$84,045.00	$84,045.00
Total Fixed Monthly Expenses	$12,333.33	$12,333.33
Usage Based (LD) Expense	$10.800.00	$27,000.00
Monthly Expenses	$23,133.33	$39,333.33
Monthly Revenue	$57.600.00	$144,000.00
Monthly Net Income	$34,466.67	$104,666.67
Return on Investment (month)	2.4	0.8
Earnings year one	$329,555.00	$1,171,955.00
Earnings each following year	$413,600.00	$1,256,000.00
Earnings per shop, year one	$32,955.50	$117,195.50
Earnings per shop, each following year	$41,360.00	$125,600.00

Assumptions

# Remote call shops	10
# Customer lines per shop	8
Days per month open	30
Shop IP Access	330
Shop Equipment maint./month	$30
Customer Service or Tech Rep expense/year	$100,000
Installation Costs per shop	$700
PRI to PSTN carrier/month	$700
SIP Server	$500
Billing software	$1,000
% of calls that are LD	0.75
Price to consumer per minute	0.2
LD and toll (USA domestic) costs per minute	0.05

Call Shops and Kiosks

Call shops or telephone kiosks are typically partnerships between telephony service providers and independent call shop or kiosk operators, where the wholesaler provides worldwide connectivity and wholesale billing to the operator. Typically, telephony connections to the call shop or kiosk are via the local PSTN using "carrier selection digits" or call-back operations. The call shop or kiosk operator marks up the wholesale rates in order to make a profit. Using VoIP for call shop operations or kiosks provides not only additional margin on telephony traffic, but affords new sources of margin through multi-functional "Internet Cafe + Call Shop" functionality or "Internet + Phone Kiosk" operations.

Call Patton ...
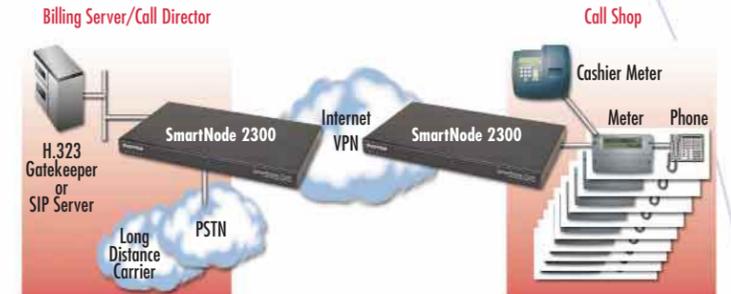
Global Solutions Group Extension x190 for information on Turnkey VoIP Solutions

Monthly Earnings
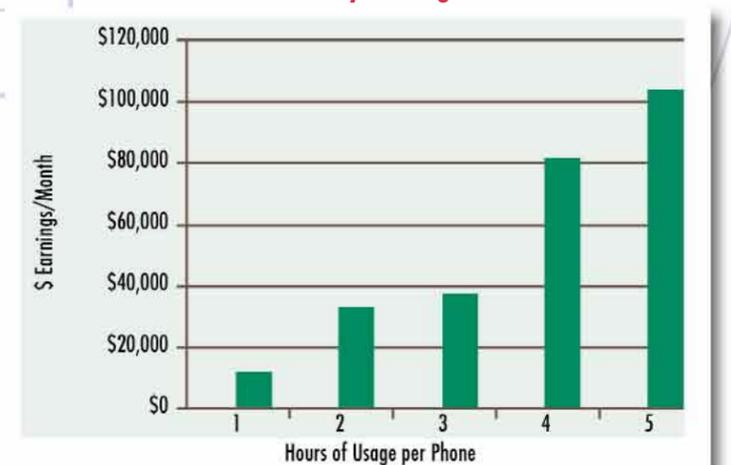
Broadband Service Provider

The single largest cost factor in providing voice services today is the cost of last-mile access between the end user and the service provider's central office. Analog loops and digital carrier loops supporting residential key system or private line trunks to business customers are expensive to deploy, maintain and operate. These costs represent a significant competitive DISADVANTAGE to traditional Carriers.

Meanwhile, ISPs and other "wireline" service providers have deployed broadband access data networks for providing high-speed access to the Internet or VPN services between business locations. DSL, cable, WiFi, FTTPs, IP-VPN are all suitable Digital Carrier Loop bypass technologies since VoIP has become a mature technology. VoIP technology allows legacy voice services to be transported over these access networks with far lower costs than the current arrangement of separate voice and data access facilities.

By using these new telephony access networks, VoIP ELIMINATES the cost and time delay of provisioning voice services.

The converged carrier model is coming true as profits are available to existing and emerging broadband service providers. The following business case focuses on a single model (VoIP over DSL with unlimited local and long-distance calling for business or residential customer calling.)
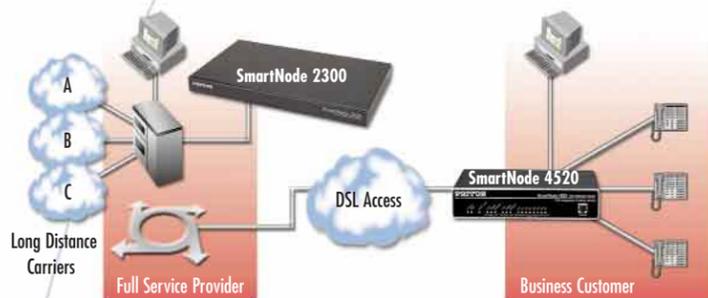
Other Converged Carrier Applications:

- VoIP Enterprise Services for interconnecting PBXs and IP-PBXs (see Enterprise Solutions) enables remote branch offices to be part of the same dialing plan as the home office and eliminates the need for separate PBX equipment at the branch office, reducing equipment operations and provisioning cost.
- IP Centrex services enable small and medium sized businesses to eliminate totally the investment in PBX or IP-PBXs.
- Unified Messaging where SmartNode IP Gateways are used to integrate voice mail, email, fax etc.
- Global-Number Portability services would enable VoIP road warriors and tele-workers to gain access to telephony services at any location that provides broadband access.
- IP Conferencing where standard telephones or video phones are denoted as an IP presence for NetMeeting applications.

Business Case

Patton's SmartNode Telephony-over-IP solutions enable broadband service providers to deliver more value over IP and acquire new sources of revenue. SmartNode solutions generate new revenue and increase profitability for the broadband service provider.

- Gain a competitive advantage by using existing broadband access networks, combined with VoIP, to bypass expensive analog loops and digital carrier loops.
- Offer competitive voice services using VoIP for SIGNIFICANT revenue growths, with nominal incremental investments.
- Increase ROI by leveraging existing networks to deploy additional competitive next-generation solutions.
- Enable service providers to win new business from subscribers by providing converged voice and data applications.

Business Case Totals

For Service Providers offering broadband access, the additional investment in providing VoIP Services has a compelling ROI.

3C: Business Case Totals

Earnings	**$227,031**
Revenues	**$1,361,150**
Gross Profit	**$521,600**
Care Team	**$90,000**
Hotline	**$140,000**
Amortization	**$13,137**
Interest	**$1,432**
Marketing	**$50,000**

Revenues & Gross Profits ③

While dramatically decreasing end user costs and providing integrated services on a single bill, the converged carrier still can generate dramatic gross profits.

3A: Revenues & Gross Profit

Total	Enterprise	SME	SOHO	
1,000	50	250	700	# of subscribers
3,500	600	1,500	1,400	# of voice channels at subscriber site
$1,361,150	$235,500	$762,000	$363,650	Revenues
$839,550	$144,000	$474,000	$221,550	Costs
$521,600	$91,500	$288,000	$142,100	Gross Profit

3B: Operational Expenses

$90,000	**Customer Care Team**
$100	# of customers per care
$10	# of care people
$9,000	Cost per sales
$140,000	**Hotline Costs**
$200	# of SO per hotline workers
$18	# of hotline workers
$8,000	Cost per hotline worker
$13,137	**Amortization of Capital Expenditures**
$36	Amortization periods
$8,102	CO gateway amortization
$5,035	# of hotline workers
$1,432	**Interest Rates**
$0	Rate per month
$190,972	Average capital employed

Capital Expenditures

$290,000	**CO Gateway**
2	CO oversubscription rate
58	# of E1 at CO
$5,000	CO Gateway costs per E1
$181,250	**SoftSwitch**
1	# of concurrent calls per voice channel
2,625	# of concurrent calls
$50	License fee per cc-call
$50,000	Base license fee
$100,000	**Initial Setup (activated)**
$100,000	Installation of CO

Broadband Service Provider

The Case for Market Value ❶

Converged Carrier can offer a compelling case to Subscribers based on lower cost of services for converged voice and telephony services.

	Retail	
	$25.00	Monthly fee for 1 Voice Channel
	$0.06	National Daytime Voice Minutes
	$0.65	Fixed to Mobile Minutes
	$0.10	European Daytime Minutes
	$0.10	Overseas Daytime Minutes

Market

Value

Cost	Retail	
$0.00	$10.00	Monthly fee for 1 Voice Channel
$0.01	$0.03	National Daytime Voice Minutes
$0.30	$0.45	Fixed to Mobile Minutes
$0.02	$0.06	European Daytime Minutes
$0.02	$0.06	Overseas Daytime Minutes

Customer Type Assumptions ❷

The following customer-type assumptions capture typical end-customers ranging in size from small offices with 5 employees up to medium-sized enterprises with 100 employees.

SOHO (Assumes 5 Employees)

	Per Employee	SOHO (Total)	Retail	Costs	Margins
Number of Voice Channels		2	$20.00	$0.00	$20.00
National Minutes per month	$200	$1,000	$30.00	$10.00	$20.00
Fixed to Mobile Minutes per month	$200	$1,000	$450.00	$300.00	$150.00
European Minutes per month	$45	$225	$13.50	$4.50	$9.00
Overseas Minutes per month	$20	$100	$6.00	$2.00	$4.00
Total per month			**$519.50**	**$316.50**	**$203.00**

SME (Assumes 40 Employees)

	Per Employee	SOHO (Total)	Retail	Costs	Margins
Number of Voice Channels		6	$60.00	$0.00	$60.00
National Minutes per month	$150	$6,000	$180.00	$60.00	$120.00
Fixed to Mobile Minutes per month	$150	$6,000	$2,700.00	$1,800.00	$900.00
European Minutes per month	$30	$1,200	$72.00	$24.00	$48.00
Overseas Minutes per month	$15	$600	$36.00	$12.00	$24.00
Total per month			**$3,048.00**	**$1,896.00**	**$1,152.00**

Enterprise (Assumes 100 Employees)

	Per Employee	SOHO (Total)	Retail	Costs	Margins
Number of Voice Channels		12	$120.00	$0.00	$120.00
National Minutes per month	$120	$12,000	$360.00	$120.00	$240.00
Fixed to Mobile Minutes per month	$90	$9,000	$4,050.00	$2,700.00	$1,350.00
European Minutes per month	$15	$1,500	$90.00	$30.00	$60.00
Overseas Minutes per month	$15	$1,500	90.00	$30.00	$60.00
Total per month			**$4,710.00**	**$2,880.00**	**$1,830.00**

SmartNode 2300

DSL Access

SmartNode 4520

Long Distance Carriers

Full Service Provider

Business Customer

A

B

C

Ethernet is not just data anymore: Voice, Video, Data over Ethernet

Ethernet now drives a host of industrial applications. Manufacturing process control, security surveillance, and roadside assistance devices all run over Ethernet. Offering pre-existing infrastructure with low-cost components, Ethernet dominates today's industrial network. Having realized its many advantages, decision-makers in the world of industrial computing have made standard Ethernet their technology of choice.

- Ethernet and IP are now the most common and widely used networking protocols.
- Ethernet/IP cameras simply plug into your existing network infrastructure and give you instant eyes.
- Wireless 802.11 is Ethernet over the air.
- Bar code readers connect to servers via Ethernet.
- Security access control and badge readers use Ethernet for communications.
- With SmartNode gateways, voice communications can use Ethernet/IP for voice/telephony access over industrial ethernet networks.

For other Ethernet solutions, visit www.patton.com.

Hot Line Voice

Often used as courtesy phones at ATMs, information kiosks, and emergency assistance pedestals, Private Line Automatic Ringdown—or PLAR—can establish voice communication quickly and automatically, without the need for dialing.

Also known as "hot line", its operation is simple: when you pick up the local handset, the remote handset immediately begins ringing. Using Patton's Telephony-over-IP Gateways, multiple remote locations can all connect to a central site office.
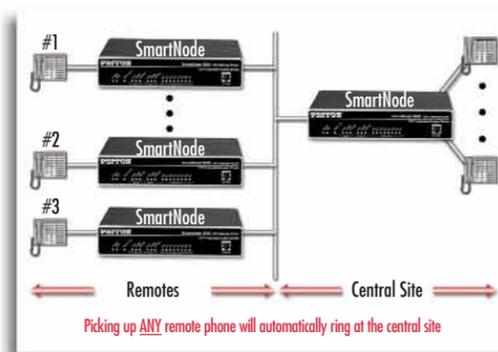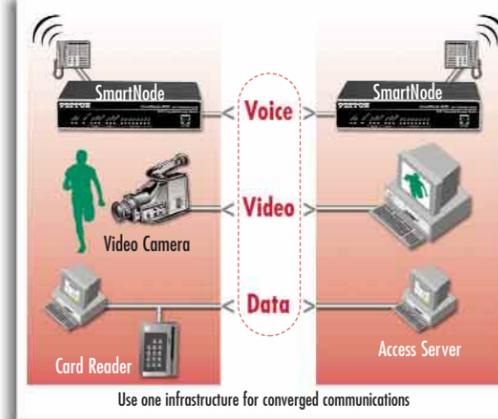
Using an existing Ethernet network, remote telephone access can be available everywhere and with multiple locations:

- When any remote handset is picked up, the central phone will immediately ring. When the central phone is picked up, the two users can talk freely.
- The Central site can have multiple phones with roll-over if one phone is busy. The roll-over feature enables one location to serve multiple remotes without busy signals.
- By dialing a remote extension, the central site can establish communication with any remote site. As an alternative, the central site can be configured to automatically ring a certain remote when someone picks up the central handset.

Business Case

Individual Infrastructure Costs	
Voice average cost per drop	$111
Video average cost per drop	$418
Data average cost per drop	$204
Total per Drop	**$733**

Costs of Converged Network Infrastructure	
Ethernet average cost per drop	**$204**
Cost Savings per Drop with Everything Over Ethernet	**$529**

Assumptions: 10 drops, 1000 ft (220 m) of cable, labor, drop ceiling, materials, & permits.

Use one infrastructure for converged communications

Picking up ANY remote phone will automatically ring at the central site

Integrated Voice, Video, Data for Railway Access

For any industry with multiple remote sites, delivering centralized supervision, control, and information to distant locations can be difficult and costly. Not only must information be gathered and disseminated, but video surveillance and two-way communications are also required. Such communications systems are critical for ensuring facility safety, often serving as eyes and ears for facility managers.

As an example, consider a railway system with its many stations. Required system services include electronic schedule delivery, video surveillance, paging, and emergency pedestals. Traditionally, each of these functions required its own separate infrastructure, control system, and local support. Today, Patton's Voice-over-Ethernet™ offers an efficient integrated solution. Leveraging low-cost components for both LAN and WANs segments, Voice-over-Ethernet connects all remote stations to the central management site. The combined system delivers all services over a single low-cost infrastructure.

In the example below, SmartNodes connect to the remote stations via the Ethernet infrastructure. Two Ethernet ports at each station connect to a paging amplifier and a telephone with hot-line capability. For broadcast announcements, servers at the central site deliver the message through a SmartNode to all stations simultaneously. For emergencies at the stations, the remote handset automatically calls the central site for help.
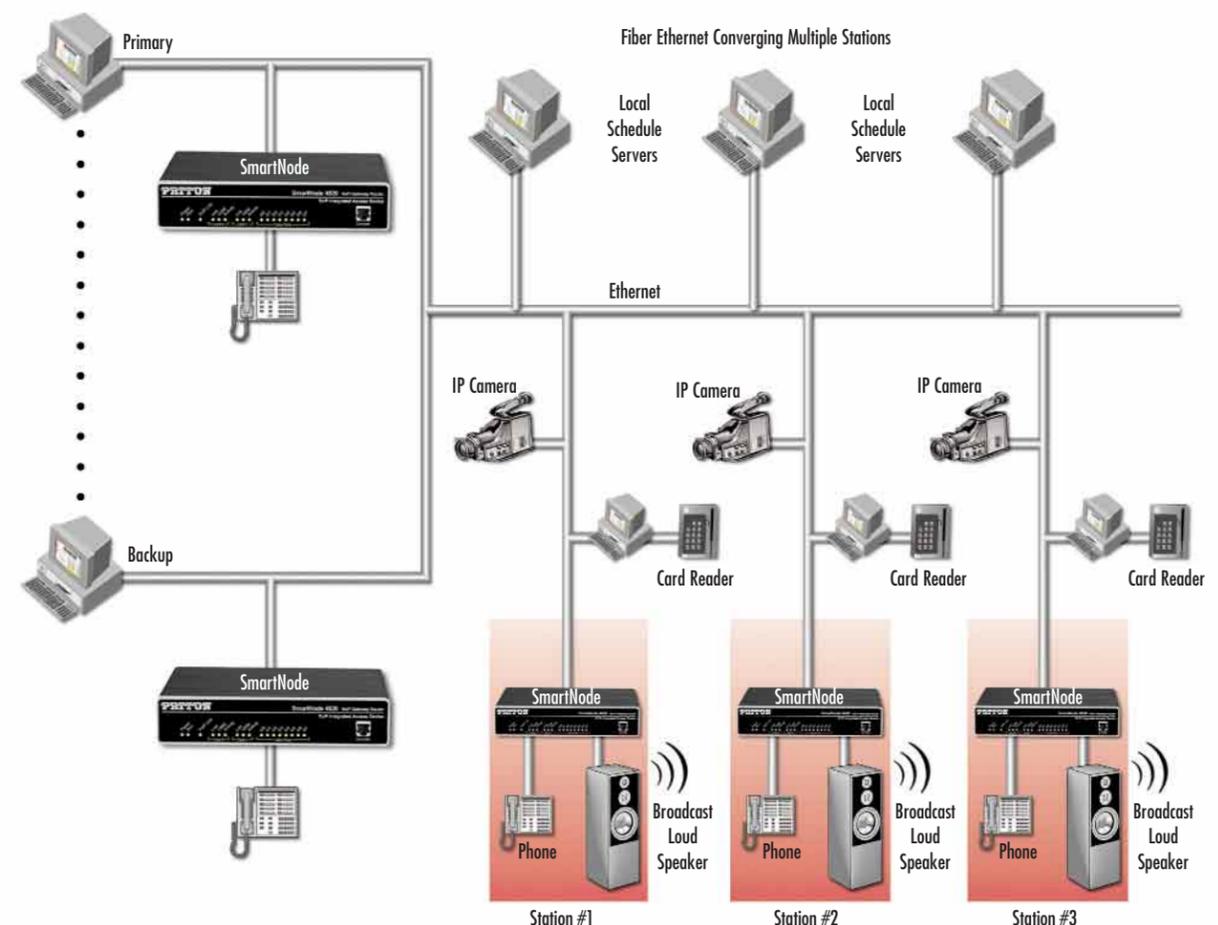
SmartNode
VoIP Gateways & Routers

Modular VoIP Gateways & Routers (Mixed Analog & Digital)

Modular Media Gateways / Modular Routers

	Modular Media Gateways		Modular Routers	
Model Number	**Model SN2350**	**Model SN2450**	**Model SN2300**	**Model SN2400**
VoIP Calls Capacity with modules	4–60	4–120	4–60	4–120
Expansion Modules/Slots	3	4	3	4
WAN Data Interfaces	none	none	1 – V.35/X.21	none
Ethernet Ports	one	one	Dual	Dual
Call Control	H.323v4/SIP 2.0/MGCP*/ISoIP			
Call Switching and Reachability Control	ToIP—Full call routing based on number and complete number manipulation			
Quality of Service	ToS/DiffServe Bits Set		Upstream and Downstream QoS with WFQ/Fixed Rates/ Split-Flow Scheduler; Priority Queuing	
Connectivity Features	Standard IP Host		NAT/PAT/NAPT; Static Routes, RIPv1/v2; PPPoE, DHCP Client & Server, IPSec VPN with DES/3DES/AES Manual Key, VLAN .p and .Q	

Modular VoIP Interfaces

	FXS	BRI	E1	T1
	SNIC-4FXS	**SNIC-4BRV**	**SNIC-E1**	**SNIC-T1**
Model Number				
Voice Calls	4	8	30	23/24
Voice Interface	FXS	ISDN TE/NT selectable	E1 PRI NT/TE selectable	T1 PRI NT/TE selectable
CODECS	G.711 µ-Law/A-Law (PCM); G.726 ADPCM (40, 32, 24, 16 kbps); **G.723**.1 (5.3/6.3); **G.729**ab (8kbps); G.168 echo; full silence suppression and comfort noise generation			
FAX	**T.38** FAX and G.711 fax bypass			

Ordering Information: Modular VoIP Media Gateways and Routers

Modular Media Gateways

SN2300/4FXSL/UI	4 Call, FXS Media Gateway QoS ToIP, Internal UI (90–260VAC) power
SN2300/4BRVL/UI	8 Call, BRI So Media Gateway QoS ToIP, Internal UI (90–260VAC) power
SN2300/1E1L/UI	30 Call, E1 RRI Media Gateway QoS ToIP, Internal UI (90–260VAC) power
SN2300/1T1L/UI	24 Call, T1 RRI Media Gateway QoS ToIP, Internal UI (90–260VAC) power
SN2300/2E1L/UI	60 Call, E1 RRI Media Gateway QoS ToIP, Internal UI (90–260VAC) power
SN2300/2T1L/UI	48 Call, T1 RRI Media Gateway QoS ToIP, Internal UI (90–260VAC) power
SN2400/16FXSL/UI	16 Call, FXS Media Gateway QoS ToIP, Internal UI (90–260VAC) power
SN2400/16BRVL/UI	32 Call, RRI SoMedia Gateway QoS ToIP, Internal UI (90–260VAC) power
SN2400/4E1L/UI	120 Call, E1 RRI Media Gateway QoS ToIP, Internal UI (90–260VAC) power
SN2400/4T1L/UI	96 Call, T1 RRI Media Gateway QoS ToIP, Internal UI (90–260VAC) power

* Call for availability and product details

Modular Routers

SN2300/4FXSIL/UI	4 Call, FXS Gateway Router QoS ToIP, Internal UI (90–260VAC) power
SN2300/4BRVIL/UI	8 Call, BRI So Gateway Router QoS ToIP, Internal UI (90–260VAC) power
SN2300/1E1IL/UI	30 Call, E1 RRI Gateway Router QoS ToIP, Internal UI (90–260VAC) power
SN2300/1T1IL/UI	24 Call, T1 RRI Gateway Router QoS ToIP, Internal UI (90–260VAC) power
SN2300/2E1IL/UI	60 Call, E1 RRI Gateway Router QoS ToIP, Internal UI (90–260VAC) power
SN2300/2T1IL/UI	48 Call, T1 RRI Gateway Router QoS ToIP, Internal UI (90–260VAC) power
SN2400/16FXSIL/UI	16 Call, FXS Gateway Router QoS ToIP, Internal UI (90–260VAC) power
SN2400/16BRVIL/UI	32 Call, RRI So Gateway Router QoS ToIP, Internal UI (90–260VAC) power
SN2400/4E1IL/UI	120 Call, E1 RRI Gateway Router QoS ToIP, Internal UI (90–260VAC) power
SN2400/4T1IL/UI	96 Call, T1 RRI Gateway Router QoS ToIP, Internal UI (90–260VAC) power

* Call for availability and product details

Modular Interfaces

SNIC-4FXS	4 Port FXS, 2 Port FXO Media QoS ToIP Gateway Router, Internal UI (90–260VAC) Power
SNIC-4BRV	4 Port FXS, 2 Port FXO Media QoS ToIP Gateway Router, Internal UI (90–260VAC) Power
SNIC-E1	4 Port FXS, 4 Port FXO Media QoS ToIP Gateway Router, Internal UI (90–260VAC) Power
SNIC-T1	4 Port FXS, 2 Port FXO Media QoS ToIP Gateway Router, Internal UI (90–260VAC) Power

* Call for availability and product details

SmartNode

Analog VoIP Media Gateways and Routers

Analog Media Gateways / Analog Gateway Routers

	Analog Media Gateways	Analog Gateway Routers
	Model 4110	**Model 4520**
Model Number		
VoIP Call Capacity	2–8 Calls	2–8 Calls
Ethernet Ports	one	Dual
Voice Interface	2–8 FXS or FXO in any 2-port combination	2–8 FXS or FXO in any 2-port combination
Call Control	H.323v4/SIP 2.0/MGCP*/ISoIP	
CODECS	G.711 µ-Law/A-Law (PCM); G.726 ADPCM (40, 32, 24, 16 kbps); **G.723**.1 (5.3/6.3); **G.729**ab (8kbps); G.168 echo; full silence suppression and comfort noise generation	
FAX	**T.38** FAX and G.711 fax bypass	
Call Switching and Reachability Control	ToIP—Full call routing based on number and complete number	
Quality of Service	ToS/DiffServe Bits Set	Upstream and Downstream QoS with WFQ/Fixed Rates/ Split-Flow Scheduler; Priority Queuing
Connectivity Features	Standard IP Host	NAT/PAT/NAPT; Static Routes, RIPv1/v2; PPPoE, DHCP Client & Server, IPSec VPN with DES/3DES/AES Manual Key, VLAN .p and .Q

Ordering Information: Analog VoIP Media Gateways and Routers

Analog Media Gateways

SN4112/JS/EUI	2 Port FXS Media Gateway, External UI (90–260VAC) power
SN4114/JS/EUI	4 Port FXS Media Gateway, External UI (90–260VAC) power
SN4116/JS/EUI	6 Port FXS Media Gateway, External UI (90–260VAC) power
SN4118/JS/EUI	8 Port FXS Media Gateway, External UI (90–260VAC) power
SN4112/JO/EUI	2 Port FXO Media Gateway, External UI (90–260VAC) power
SN4114/JO/EUI	4 Port FXO Media Gateway, External UI (90–260VAC) power
SN4116/JO/EUI	6 Port FXO Media Gateway, External UI (90–260VAC) power
SN4118/JO/EUI	8 Port FXO Media Gateway, External UI (90–260VAC) power
SN4114/2JS2JO/EUI	2 Port FXS, 2 Port FXO Media Gateway, External UI (90–260VAC) power
SN4116/4JS2JO/EUI	4 Port FXS, 2 Port FXO Media Gateway, External UI (90–260VAC) power
SN4118/4JS4JO/EUI	4 Port FXS, 4 Port FXO Media Gateway, External UI (90–260VAC) power

* Call for availability and product details

Analog Gateway Routers

SN4522/JS/UI	2 Port FXS QoS ToIP Gateway Router, Internal UI (90–260VAC) power
SN4524/JS/UI	4 Port FXS QoS ToIP Gateway Router, Internal UI (90–260VAC) power
SN4526/JS/UI	6 Port FXS QoS ToIP Gateway Router, Internal UI (90–260VAC) power
SN4528/JS/UI	8 Port FXS QoS ToIP Gateway Router, Internal UI (90–260VAC) power
SN4522/JO/EUI	2 Port FXO QoS ToIP Gateway Router, Internal UI (90–260VAC) power
SN4524/JO/EUI	4 Port FXO QoS ToIP Gateway Router, Internal UI (90–260VAC) power
SN4526/JO/EUI	6 Port FXS QoS ToIP Gateway Router, Internal UI (90–260VAC) power
SN4528/JO/EUI	8 Port FXS QoS ToIP Gateway Router, Internal UI (90–260VAC) power
SN4524/2JS2JO/EUI	2 Port FXS, 2 Port FXO Media QoS ToIP Gateway Router, Internal UI (90–260VAC) power
SN4526/2JS2JO/EUI	4 Port FXS, 2 Port FXO Media QoS ToIP Gateway Router, Internal UI (90–260VAC) power
SN4528/4JS4JO/EUI	4 Port FXS, 4 Port FXO Media QoS ToIP Gateway Router, Internal UI (90–260VAC) power

* Call for availability and product details

Talk is Cheap Guarantee

We put our money where our mouth is... ON THE NETWORK! We know you can get Toll Quality voice over IP using our improved VoIP technology. We know that you WILL SAVE MONEY. That is why we are offering you our TALK IS CHEAP GUARANTEE. Use any SmartNode VoIP gateway or router... And if you are not TOTALLY SATISFIED, send it back within 60 days for a full credit or refund.

Call Today...
or Email...

Corporate Headquarters:
+1 301 975 1000

EMEA Headquarters:
+41 31 985 2525

voip@patton.com

SmartNode
Digital Media Gateways

Model Number	Model SN1200	Model SN1400	Model SN1410	Model SN1810
VoIP Calls Capacity	2	4	4	8
Ethernet Ports	Dual	Dual	Single	Single
Voice Interface	1x BRI/So S/T NT 1x BRI/So S/T TE	Dual BRI/So S/T NT/TE	3x BRI/So S/T NT/TE	5x BRI/So S/T NT/TE
Call Control	H.323v4/SIP 2.0/MGCP*/ISoIP			
CODECS	G.711 µ-Law/A-Law (PCM); G.726 ADPCM (40, 32, 24, 16 kbps); G.723.1 (5.3/6.3); G.729ab (8kbps); G.168 echo; full silence suppression and comfort noise generation			
FAX	T.38 FAX and G.711 fax by-pass			
Call Switching and Reachability Control	ToIP—Full call routing based on number and complete number manipulation			
Quality of Service	ToS/Diffserve IP Packet Labeling, 802.1 .p .Q			
IP Connectivity Features	IP/DHCP/PPPoE			

Ordering Information: Digital Media Gateways

SN1200/2VL/UI	2 Call, BRI plus Bypass Media Gateway, internal UI (100–240VAC) power
SN1400/4VL/UI	4 Call, Dual BRI Media Gateway, internal UI (100–240VAC) power
SN1410/4VL/UI	4 Call, Dual BRI plus Bypass Media Gateway, Internal UI (90–260VAC) Power
SN1810/8VL/UI	8 Call, Quad BRI plus Bypass Media Gateway, Internal UI (90–260VAC) Power
SNSW-IPR1	IP Routing License for SN1200 and SN1400

SmartNode
Digital Gateway Routers

Model Number	Model SN4552	Model SN1200	Model SN1400	Model SN1420	Model SN1820
VoIP Calls Capacity	2	2	4	4	8
Ethernet Ports	One WAN w/ 4 LAN Switch	Dual	Dual	Dual	Dual
Voice Interface	1x BRI/So S/T NT 1x BRI/So S/T TE	1x BRI/So S/T NT 1x BRI/So S/T TE	Dual BRI/So S/T NT/TE	3x BRI/So S/T NT/TE	5x BRI/So S/T NT/TE
Call Control	H.323v4/SIP/MGCP*/ISoIP				
CODECS	G.711 µ-Law/A-Law (PCM); G.726 ADPCM (40, 32, 24, 16 kbps); G.723.1 (5.3/6.3); G.729ab (8kbps); G.168 echo; full silence suppression and comfort noise generation				
FAX	T.38 FAX and G.711 fax bypass				
Call Switching and Reachability Control	ToIP - Full call routing based on number and complete number manipulation				
Quality of Service	Upstream and Downstream QoS with WFQ/Fixed Rates/Split-Flow Scheduler; priority queuing				
IP Connectivity Features	NAT/PAT/NAPT; Static Routes, RIPv1/v2; PPPoE, DHCP Client & Server, IPSec VPN with DES/3DES/AES, 802.1pQ VLAN				

Ordering Information: Digital Gateway Routers

SN4552/BIS/EUI	2 Call, SOHO BRI plus Bypass Media Gateway and QoS ToIP Router external UI (100–240VAC) power
SN1200/2VIL/UI	2 call, BRI plus Bypass Media Gateway and QoS ToIP Router internal UI (100–240VAC) power
SN1400/4VIL/UI	4 Call, Dual BRI Media Gateway and QoS ToIP Router internal UI (100–240VAC) power
SN1420/4VIL/UI	4 Call, Dual BRI plus Bypass Media Gateway and QoS ToIP Router, internal UI (100–240VAC) power
SN1820/8VIL/UI	8 Call, Quad BRI plus Bypass Media Gateway and QoS ToIP Router, internal UI (100–240VAC) power

* Call for availability and product details

Models 2603, 2621, & 2635
IPLink Gateway Routers

Product model code

Patton's IPLink WAN Gateway Routers are complete all-in-one network access devices that easily connect your IP/LAN to any T1/E1, X.21, or V.35 network interface

Close-up unit photograph

Model 2621 – X.21 Interface
Model 2635 – V.35 Interface
Model 2603 – T1/E1 Interface

Features & benefits

Features & Benefits

- V.35, X.21, or T1/E1 WAN interfaces—Get the WAN interface you need in industry-standard connectors
- ATM, PPP, and Frame Relay—Versatile WAN options enable deployment into any network
- NAT/NAPT, Firewall, DHCP—Powerful routing features make shared Internet connectivity simple and secure.

Product description

Overview

The Models 2603, 2621, and 2635 Gateway Routers are the ideal solution for connecting any small to medium enterprise or remote office to an IP/Internet network using standard telco and WAN interfaces.

Combining ease-of-use with a full suite of LAN/WAN routing features, the IPLink routers provide selectable bridging or routing functionality along with advanced IP features such as NAT/NAPT, Firewall, and DHCP. A complete set of configurable ATM/FR/PPP/IP WAN protocols allow a wide range of choices when connecting branches via common WAN services. The IPLink Routers boast easy installation offering Console/VT-100, Telnet, and HTTP/SNMP management options.

Application & graphic

Why use our IPLink Series Routers?

Patton's IPLink Gateway routers deliver all the advanced features for secure, reliable, and high speed Internet data connections. They combine ease-of-use with powerful data routing to make shared Internet connectivity simple and easy.

The IPLink series gives you the right interface needed for your WAN service.

Headquarters — Hub — 2635 IPLink — NTU — IP/FR — ISP — NTU — 2635 IPLink — Hub — Branch Office
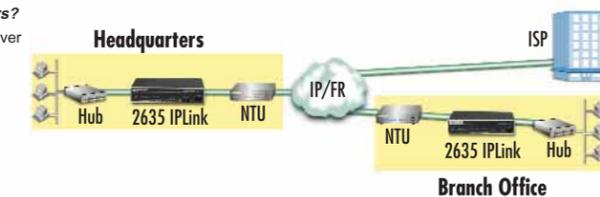
PDF data sheets include detailed ordering info

Related Information

Data Sheets (PDF) -- *Requires Adobe Acrobat to view*
Models 2603, 2621, & 2635 Datasheet   April 3, 2004

Manuals (PDF) -- *Requires Adobe Acrobat to view*
Models 2603, 2621, & 2635 Getting Started Guide   April 3, 2004

Software Upgrades
Model 2603 (2603 Single Port T1/E1 Router)
Model 2621 (High Speed Router X21 Interface.)
Model 2635 (High Speed Router V35 Interface.)

Ordering Information

2603/K/48	T1/E1 (RJ45/BNC) ROUTER W/48VD
2603/K/E	E1 (RJ45/BNC) ROUTER NO POWER SUPPLY
2603/K/EUI	E1 (RJ45/BNC) ROUTER W/EXT UI
2603/K/UI	E1 (RJ45/BNC) ROUTER WITH INTERNAL UI POWER SUPPLY
2603/T/48	Eng - 2603 w/RP-48 (48vDC)

1 2   [Next Page >]

Specifications

Specifications

WAN Interface: 2635: V.35-M/34F, **2621:** X.21-DB15F, **2603:** T1/E1-RJ48C

Ethernet Connection: Single-port 10/100Base-T switch, auto-sensing, full/half-duplex operation, built-in MDI-X

Management: EIA-561 RJ-45 RS-232, VT-100 CLI, TELNET, Embedded WEB/HTTP

ATM Support: UNI 3.0, 3.1, and 4.0 ATM QoS with UBR/CBR/nrt-VBR/rt-VBR and per-VC queuing and shaping.

Protocol: TCP (RFC 793), UDP (RFC 768)

Operating Temp.: 32-122¡F (0-50¡C)

Humidity: 5-90%

Dimensions: 7.3x6.6x1.62" (185x168x41mm)

Made by Patton

PATTON Electronics Co.

Corporate Headquarters
Patton Electronics Company
7622 Rickenbacker Drive
Gaithersburg, Maryland, 20879 USA
Tel: +1 301 975 1000
Fax: +1 301 869 9293
e-mail: sales@patton.com

PATTON inalp NETWORKS

Europe/Middle East/Africa Headquarters (EMEA)
Patton-Inalp Networks AG
Meriedweg 7
CH-3172 Niederwangen, Switzerland
Tel: +41 31 985 25 25
Fax: +41 31 985 25 26

Regional Contacts

USA & Canada
Tel: +1 301 975 1000
Fax: +1 301 869 9293

Western Europe
United Kingdom
Tel: +41 31 985 25 25
Fax: +41 31 985 25 26
e-mail: europe@patton.com

Central Europe CIS
Tel: +1 241 912 1218
eFax: +1 240 597 8442
e-mail: ce@patton.com

Middle East/North Africa (MENA)
Lebanon
Tel: +961 4 712 691
eFax: +1 413 832 9194
e-mail: mena@patton.com

Asia Pacific
Tel: +1 240 912 1217
eFax: +1 208 728 1210
e-mail: asia@patton.com

Latin America/Caribbean
Tel: +1 240 912 1219
Fax: +1 301 869 9293
e-mail: americas@patton.com

www.patton.com