Portline®

# Internet Telephony

# Portline®

## PC-based Remote Access Server
## Internet Telephony Gateway
## Least Cost Router

Portline connects the conventional telephone network to the Internet and provides you with voice and data services in the shape of turnkey solutions.

- **Telcos + ISPs**
- **Callcenters**
- **Callshops**

Unlike with proprietary devices, the integration of standard PC components means that maximum flexibility, multifunctionality and excellent scalability (30 to 1152 ports per PC) can be achieved.

Portline is standards-compliant and fits effortlessly into your network environment - a future-proof investment which pays off.

The connection with the Internet means that telephone services are no longer location-dependent - like web contents, you can transport them as data packets world-wide over one medium together with your other data.

Portline functions here as a telephone switch which can not only be operated as a terminal, but also as an exchange with telecommunications systems or other exchanges.

http://www.i-p-tel.com

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# Introduction

## What is Internet telephony?

*Internet telephony is the transmission of voice and video via an IP (Internet protocol) network; this can be a LAN, WAN or the Internet.*

*If the telephone network or PBX is linked to the Internet, calls can be made not only from PC to PC, but also from telephone to telephone via the Internet (Intranet).*

## Advantages of Internet telephony

*In the wake of the increasing expansion of the Internet (intranet) compared with the conventional telephone network, it is expedient to transmit data and voice uniformly over it.*

*The main benefit of Internet telephony is not that it is an alternative means of voice communication, but in the possibility of integrating telephony and access to the Internet, as well as further multimedia services, and thus to create new services and job opportunities.*

*In future, it will not be the existing telephone network, but the data network that will determine what technology is used (up to now data has been transported over telephone lines; in future telephony will be conducted via data lines).*

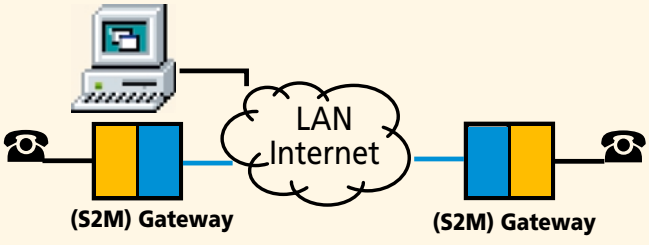
*This permits considerable savings, e.g. on charges for long-distance calls between sites and for external long-distance calls.*

*Particularly advantageous is the fact that voice information can be greatly compressed when it is converted into Internet packets (by up to a factor of 10) and that pauses in speaking are not transmitted.*

## Portline and Internet telephony

*Portline can simultaneously be used as a remote access server for dial-in by modem and ISDN, as an Internet telephony gateway for converting voice calls to TCP/IP (phone-to-phone), as a least cost router for automatically switching calls to the cheapest medium or provider, and as a voice server for interactive announcement services.*

*The integration of these various tasks not only results in direct cost reductions, but also lower consequential running costs thanks to the greater flexibility and better utilisation of capacity*



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# Voice quality

**i-p-tel.com**, one of the pioneers in the field of telephone-to-telephone communication over the Internet, implemented the relevant ITU standard H.323 in Portline as early as 1997.

Since then, the voice quality has been perfected through robust echo suppression, short delays and improved voice compression to such an extent that it is virtually no longer possible to notice any differences in quality compared with the conventional telephone network.

## Delay

In order to compensate for transit time fluctuations in the Internet, Portline delays the voice either by a firmly definable or an automatically adjusted time.

In transmission over dedicated lines in Europe, Portline usually achieves delays of less than 100ms, which the persons talking cannot perceive.

## Echo suppression

Echoes resulting from delay are virtually imperceptible - even when both callers talk at the same time - since Portline eliminates them reliably and robustly by means of adaptive echo suppression (complying with the G.165 standard).

## Encryption

The built-in IPsec gateway allows Portline to be used for connecting to other gateways via a tap-proof Virtual Private Network (VPN). This even works thru firewalls and NAT routers.

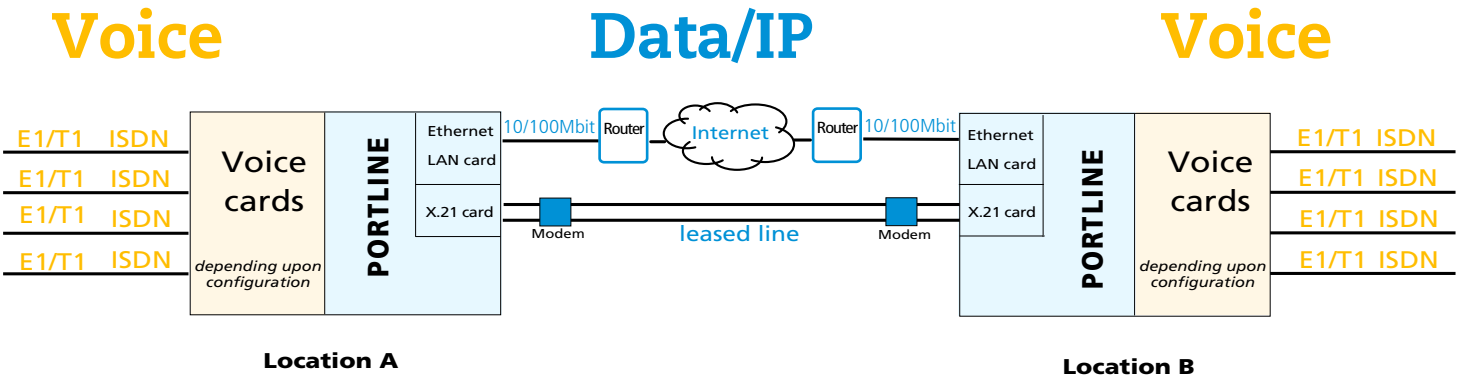
## Voice compression

The following codecs are available for selection, ensuring interoperability with just about all standards-compliant systems:

| Codec | needed bandwidth |
|---|---|
| G.711 | 64 kBit/s |
| G.723.1 | 5.3/6.3 kBits |
| G.729A | 8 kBit/s |
| ADPCM | 16-32 kBit/s |
| GSM | 13 kBit/s |
| Netcoder | 4.8-9.6 kBit/s |

In addition, voice pause compression and compensation can be activated.

Redundant transmission is also possible in order to improve the voice quality with "poor" Internet links.



# Efficient Solutions for Telcos + ISPs

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Portline is excellently suited for constructing an IP-based telephone backbone network. Primary multiplex connections (E1/T1) are used for linking to voice networks, with all internationally widespread signalling methods such as ISDN, CAS and optionally SS7 being supported.

All types of connection are possible for the Internet link: dedicated lines, xDSL, cable networks, wireless LAN and switched lines.

## Direct cost cuts

IP telephone cuts line costs, on the one hand as a result of the 8-fold compression to around 8 kbit/s per call and on the other thanks to the possibility of using Internet lines which offer far more flexibility and are considerably cheaper than direct fixed connections.

## Scalability

Portline caters for a wide range of applications thanks to variable CPU speeds, RAM configuration etc. Up to 36 E1s or 48 T1s can be connected per chassis.

## Billing system

For billing purposes all calls are logged by CDRs (Call Detail Records).

As billing database we recommend the innovative Mind Billing Software iPhonEX. With this system payments and billing can be handled via a web interface both for accounts with limited credit or for prepaid calling cards.

## Compatibility with the RADIUS standard

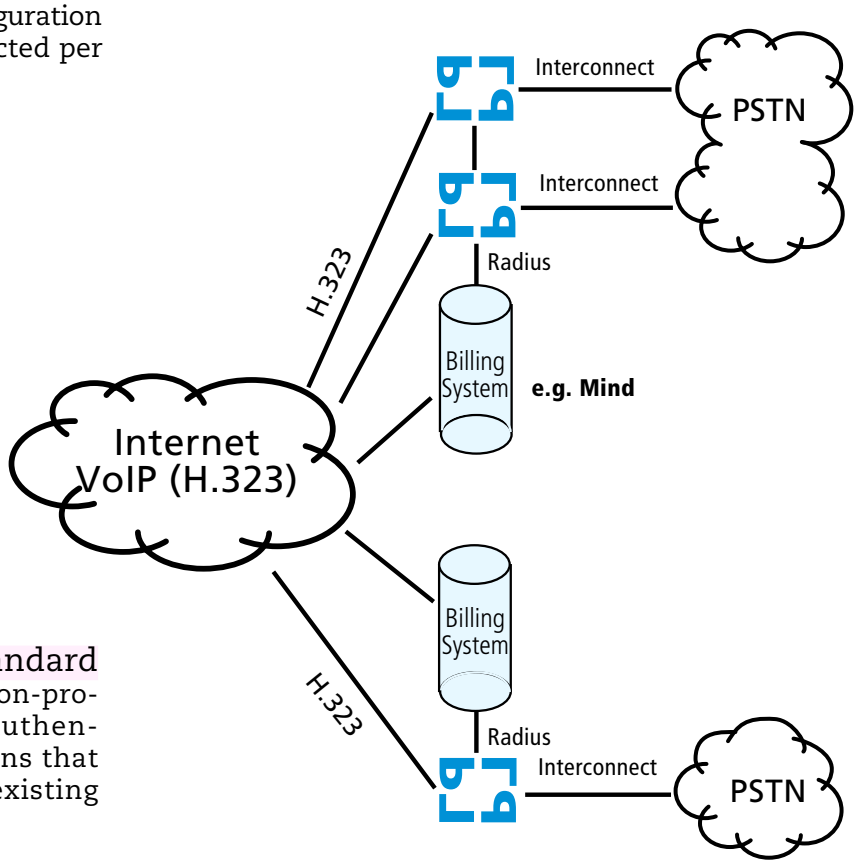
The billing system is integrated in the non-proprietary RADIUS standard (Remote Authentication Dial-In User Service). This means that Portline can also be used simply with existing billing systems.

This "client/server" protocol can be used to manage and monitor all the available RADIUS-compatible dial-in nodes uniformly throughout the network. RADIUS support envisages the combined analysis of source/target call number, name, security code and/or call back.

## Least cost routing

For a network of Portline gateways it is possible to define for every target - on the basis of the time of day - the route to be used for call minutes.

This is possible for telephone-to-telephone and PC-to-telephone calls.

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# Efficient Solutions for Telcos + ISPs

## ITU standard H.323

Support for the H.323 protocol family ensures interoperability with gateways from other vendors. Access to the customer is not restricted to conventional telephone lines as a result, but is also possible via the Internet.

Every PC user world-wide with standards-compliant CTI software (such as Microsoft NetMeeting) is thus a potential customer.

With the Sound4Tel cards additionally produced by **i-p-tel.com**, it is even possible to phone from PC to telephone with the customary telephone quality.

## Limitable traffic

If the number of calls on certain routes or access numbers exceeds a user-definable limit, the calls can be rejected or redirected. In this way a Portline gate-way can be jointly used for different services without these impairing each other.

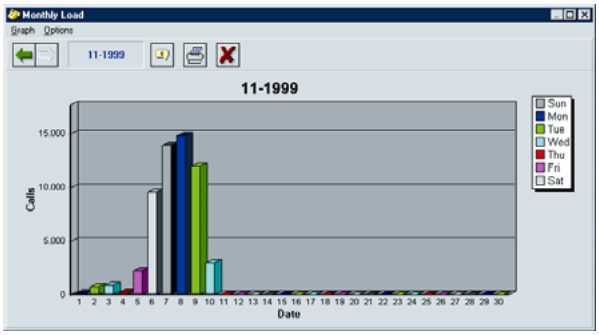
## Calling cards

Portline provides an interactive voice platform for prepaid calling cards. Customers are automatically prompted to enter their security code and the target call number. If a CLI (Calling Line Identification) is stored in the billing system, it is sufficient to enter the target call number only.

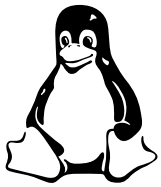
Operating the calling card service requires Portline, as well as a billing system, which can also be supplied ready for use by **i-p-tel.com**.

## Realtime fax relay

Portline Voice Cards automatically detect fax transmissions with Internet telephony connections, so that a codec is selected for group 3 transfers. Faxes are transferred via Internet protocol on the basis of the T.38 standard.




Screenshot: graphical Network Management Software



## PC/Linux platform guarantees simple maintenance

Portline is more powerful and open than proprietary solutions not only because of its PC hardware concept, but also thanks to its operating system platform Linux, a UNIX derivative. For example, *RADIUS server software, firewalls, WWW servers, WWW cache servers, news, mail and FTP servers* and *graphical network management software* are available, at no additional cost.

As long ago as 1995, Linux was thus one of the most popular web server operating systems. In an appropriate hardware configuration (ECC RAM, flash disk, redundant power supply units and network adapters), Portline is distinguished by a high level of stability and availability.

## Support

Since Portline has been developed in Germany, direct and competent support is available from here.

**i-p-tel.com** provides all Portline users with technical support by telephone and e-mail and updates *free of charge for life*. If you have a LAN link to the Internet, all that is required to start up the device is to install it: if desired, **i-p-tel.com** can configure the software for you by remote maintenance.

Technical support from **i-p-tel.com** by remote maintenance is also optionally possible *around the clock*.

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# Individual Solutions for Callcenters

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As regards calls received from the Internet, existing callcenters can be universally used and offer greater customer proximity if a Portline gateway is connected to the PBX.

Alternatively, a conventional telecommunications system can be dispensed with completely; Portline takes over this function in the LAN.

ISDN primary multiplex connections are used for linking to the public telephone network.

All types of connection are possible for the Internet link: dedicated lines, xDSL, cable networks, radio bridges and switched lines.

## Call me buttons

A "Call me" button - placed on the Internet page of the company - allows visitors to the page to conduct a personal dialog with the company; they are automatically routed to a callcenter workstation.

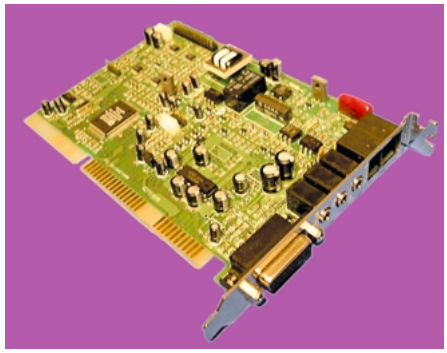
Support for the H.323 protocol family means that access to the customer is not restricted to conventional telephone lines, but is also possible via the Internet.

Every PC user world-wide with standards-compliant CTI software (such as Microsoft NetMeeting) is thus a potential customer.

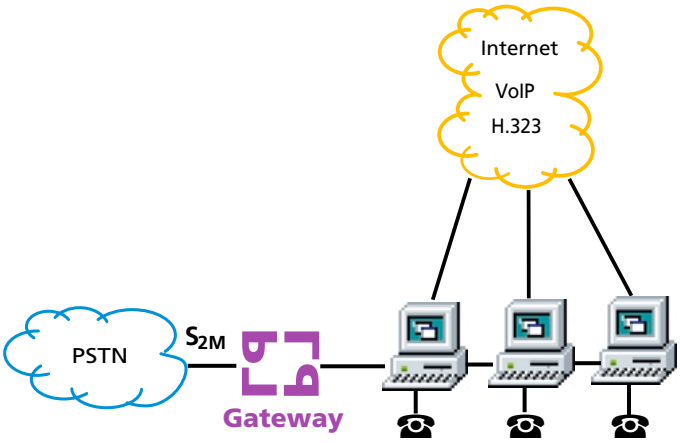
## LAN-based PBX

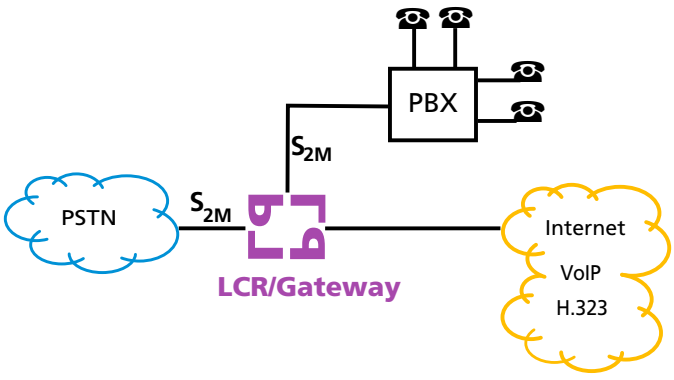
Portline converts incoming and outgoing calls from the telephone network to the LAN without any loss of quality and forwards the calls to the PC workstation.

PC-to-phone and PC-to-PC communication could only be used to a very limited extent up to now with loudspeakers and a microphone or headset, due to the annoying echoes produced.



The additionally available Sound4Tel cards now allow conventional telephones to be directly connected to PCs. As a result, you can call from PC to PC in the customary telephone quality (optionally with video), with all widespread netphone and CTI software being supported.
This means that telecommunications systems can be set up completely on a LAN basis.



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# Individual Solutions for Callcenters

## Additional functions

Features such as call number display and direct transfer to the database, call list, waiting music or routing to another number are available.

Since the source code of the callcenter application is also provided if requested, the IT specialists of the callcenter can incorporate further company-specific functions quickly and easily.

## Call recording

In order to monitor and improve the quality of the callcenter, it is possible to select random calls that are to be recorded or archived.

## Decentralised callcenters

Up to now, callcenters basically have had a centralised structure, since every workstation requires a database and voice link with all their features.

Thanks to the use of Internet telephony, voice connections and all the features can be sent to home workstations with Sound4Tel hardware-/software over the same Internet switched line that is also used for the database link.

## PC/Linux platform cuts maintenance costs

Portline is easier to maintain and more open than proprietary solutions not only because of its PC hardware concept, but also thanks to its operating system platform Linux, a UNIX derivative.

As long ago as 1995, Linux was thus one of the most popular server operating systems. In an appropriate hardware configuration (ECC RAM, flash disk, redundant power supply units and network adapters), Portline is distinguished by a high level of stability and availability.

## Support

Since Portline has been developed in Germany, direct and competent support is from available here.

**i-p-tel.com** provides all Portline users with technical support by telephone and e-mail and updates *free of charge for life*.

If you have a LAN link to the Internet, all that is required to start up the device is to install it: if desired, **i-p-tel.com** can configure the software for you by remote maintenance.

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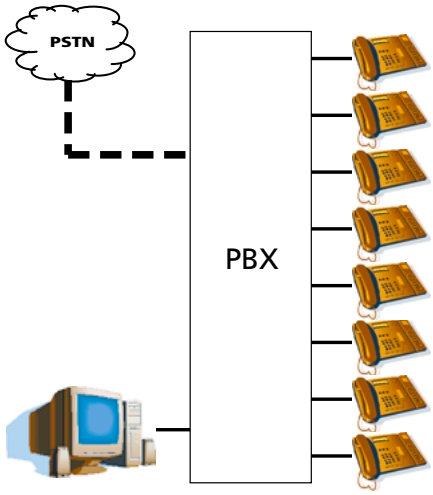
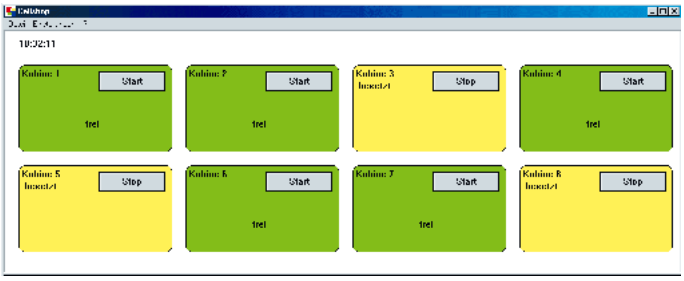
# Global Solutions for Callshops

A classical callshop usually looks like this:




## Billing software for Callshops

The billing software developed by i-p-tel is perfect for the usage in callshops. It runs on a Windows PC and realizes the complete accounting in an easy and trouble-free way. The conducted calls can be watched and discounted. Each cabin may be enabled or disabled just by clicking its icon on screen:

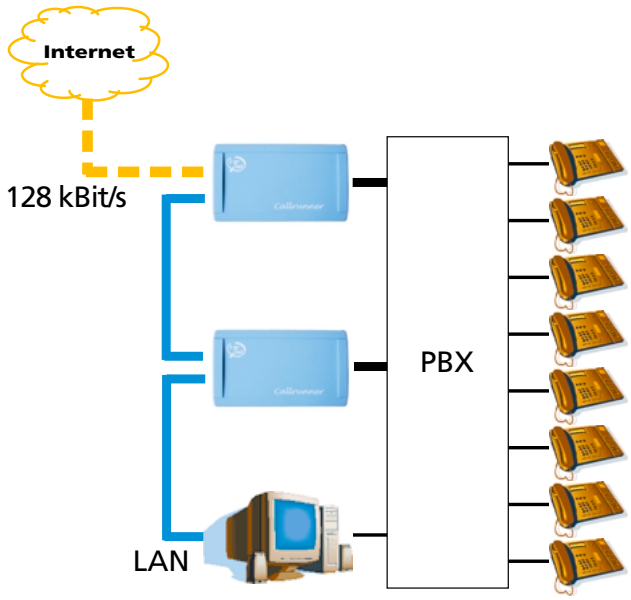


All tariffs and connection charges can be modified, of course. The PBX is used to log the calls and for least cost routing.

## IP telephony to replace PSTN lines

Replacing the 8 phone lines by an Internet line with a bandwidth of 128 kBit/s (e.g. DSL) cuts phone costs.

This saves costs for the traditional phone lines on the so called "last mile". In countries, where communication has not been liberalised yet, now cheap international carriers can be reached over the Internet.




Every four cabins are served by one "Callrunner" IP telephony gateway. It compresses the calls and converts them into IP packets. An IP telephony carrier terminates the calls to the destination country at low rates (by using Portline or other H.323 compliant gateways).

For the cashpoint i-p-tel provides the same billing software as described above.

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# Hardware

## Case and CPU

The Portline case in 19" industry format, the backplanes and CPU board have been optimised to ensure high reliability and extremely simple maintenance. RAM access by the CPU is error-protected by ECC.

The faulty unit can then be replaced online (*hot swap*).

Error states are indicated by the electronics of the power supply unit visually and acoustically.

Alternatively, Portline is equipped with larger redundant power supply units with two separate power leads.

| | |
|---|---|
| 19" case, 4 HE | 8 Slots, 2x300W power supply |
| 19" case, 4 HE | 14 Slots, 2x250W power supply |
| CPU card | Pentium, PCI and ISA |
| PMX WAN card | 1 or 2 PMX ports with 0, 32 or 64 HDLC processors |
| Multimodem card | 30 digital modems each usable as HDLC processor |
| Voice DSP card | 32 - 192 voice ports G.711/723/729/ADPCM/ Netcoder, echo canceller |
| Voice card | 30 echo canceller |
| Serial WAN card | 1, 2 or 4 ports (V.35/X.21/RS449/V.24) |
| Varigate<br>Varigate-E1 | 8 telephone connections<br>30-120 voice ports G.711/723/729/ADPCM/ Netcoder, echo canceller |

Ethernet 10/100Mbit/s cards, FDDI card, Token Ring card, ATM card

## PMX WAN card (E1/T1)

Portline-PMX fulfils three tasks: the link to the public telephone network is established via up to 2 primary multiplex connections per PMX card (30 B channels per PMX connection).

A switch processor allows other Portline modules to be integrated via the MVIP bus. In addition, up to 64 HDLC processors for digital calls are provided for each PMX card.

The primary multiplex connections can also be used alternatively for fixed connections (dedicated lines with n*64 kbit/s, max. 2 mbit/s).

Telephone systems can also be connected to one or both PMX connections (emulation of the network side) and calls fed through to the telecommunications system of PMX network links.

Portline-PMX has been granted approval in Germany (BZT), the United Kingdom, France, USA, Canada, Japan and the EU (CE). It is compatible with a wide range of telephone switches and supports Euro ISDN and 1TR6 amongst others.

## Multimodem card

Portline Multimodem is a highly integrated card which is equipped with 30 intelligent, fully digital modems. A version with 16 digital modems can also be supplied. The card is attached via the MVIP bus and is connected to the telephone network via Portline PMX cards.

## V.90 modem standard with 56 kBit/s

Portline supports the ITU standard V.90 and the Rockwell technology K56Flex for dial-in at a rate of 56 kbit/s.

Rockwell chip sets are already widespread, with a market share of around 75%, in existing analogue modems and fax machines.

The result is that Portline offers maximum compatibility to the systems of users/customers.

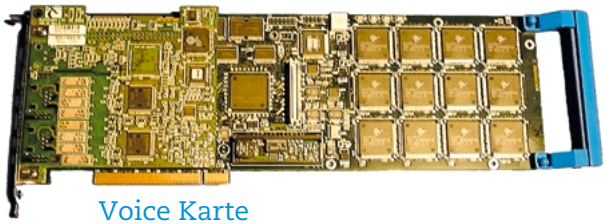
In addition, Portline allows modem firmware to be downloaded and thus creates the ideal prerequisites for supporting future modem standards too.

Portline-Multimodem also supports fax (group 3) in addition to conventional modem standards.

## Voice card

The Portline Voice Card offers pure echo suppression complying with the G.165 standard for 30 ports.

This means that Internet telephony complying with *H.323* is cheaper than with the Voice DSP card, provided that extensive voice compression conforming to G.723.1 or G.729 is not required, but uncompressed transmission (G.711) is sufficient.



Voice Karte

The Portline Voice Card can also be used if Portline is only deployed for encrypting voice information.

## Voice DSP Karte

This PCI plug-in cards permit voice compression for 30 (PCI), 60 (PCI) or 192 (compact PCI) simultaneous calls, including echo suppression complying with the G.165 standard.

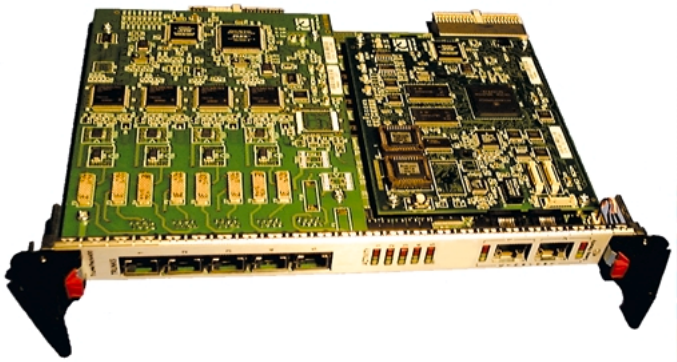
Without loading the CPU, the card handles complete transfer of the voice packets over its own Ethernet interface (on-board).

The voice information can either be uncompressed or compressed with G.723.1, G.729A, ADPCM or Netcoder methods.

G3 fax relay, DTMF relay, voice pause detection and compensation, interpolation of missing voice packets and automatic delay adjustment for perfect voice quality are performed on-board.

The card is attached via the MVIP bus and is connected to the telephone network via Portline PMX cards.

An alternative means of connection directly via an on-board PMX link is in preparation.



This compact PCI plug-in card permits voice compression for up to 192 simultaneous calls.

## Serial WAN card

A serial WAN card extends Portline by 1, 2 or 4 ports, which permit either linking to PPP, Frame Relay or X.25 users or switches. Transmission rates of 9.6 kbit/s to 16 mbit/s can be configured.

Each port is fitted with either a V.35, X.21, RS-449 or V.24 interface. An external terminal adapter is required for E1/T1.

# Portline® Technical Data

## Hardware

| | |
|---|---|
| **19" case, 4 HE** | 3 PCI slots, 5 ISA slots, thereof 2 for PICMG CPU boards; redundant power supply (hot swap), Floppy, 1GB HD |
| **19" case, 4 HE** | 4 PCI slots; 10 ISA slots, thereof 2 for PICMG CPU boards; redundant power supply (hot swap), Floppy, 1GB HD |
| **CPU board** | Pentium, 32MB ECC RAM, 512KB Cache, PCI/ISA supporting PICMG standard, Watchdog |
| **PMX WAN board** | PCI or ISA bus, 1 or 2 PMX ports (E1/T1) with 0, 32 or 64 HDLC processors<br>E1 interface supporting G.703, RJ45 connectors, User and Network Mode,<br>**Framing formats:** ESF, SF, CRC-4 Multiframing, Basic framing, Unframed, CCITT G.704,<br>Line Codings: B8ZS, AMI Transparent or HDB3, Status LEDs, Protocol monitor<br>**Protocols:** Raw-HDLC, LAP-B (X.25 Level 2, X.75), X.25 Packet Layer (Level 3)<br>Case A and B, X.31, ISO 8208, Frame Relay Q.922 and Q.933 Case A max. 8 DLCIs, LAP-D,<br>V.120, V.110, Inverted HDLC, BONDING, 56K rate adaption<br>**Certification:** CE, EN 41003, EN 60950, ETSI CTR12/13, iCTR4,<br>EN 50082-1 and EN 55022 |
| **Multimodem card** | ISA bus, 30 digital modems, each supporting HDLC<br>**Modem standards:** V.90 (56kBit/s), K56Flex, V.34bis (33.6kBit/s), V.34, V.FC,<br>V.32bis, V.32, V.22bis, V.22A/B, V.23, V.21, Bell212A, Bell 103, V.17, V.29,<br>V.27ter, V.21 Kanal 2, Fax CCITT Group 3<br>**Error correction:** MNP 2-4 and V.42 LAPM,<br>**Data compression:** MNP 5 and V.42bis, MNP 10EC<br>Firmware downloadable, Dimensions 127x338mm |
| **Voice card** | ISA bus, 30 echo canceller G.165 |
| **Voice DSP card** | PCI bus, 32 - 192 ports, G.165, G.723.1, Annex A, G.729A, Annex B, G.711,<br>G.726/7, Netcoder, RFC 1889/1890, 10Base-T |
| **Serial WAN card** | PCI or ISA bus, 1, 2 or 4 ports,<br>**Interfaces:** V.35, X.21, RS-449 or V.24, 9.6kbps to 16mbps<br>**Protocols:** CCITT X.25 1980/1984/1988, PPP, HDLC, Cisco HDLC, LAP-B,<br>Frame Relay, ANSI (Annex D) and LMI (Network and User<br>LMI Modes, LMI Extensions), IETF encapsulation (RFC1294 und RFC1490) |
| **LAN cards** | Ethernet 10/100Mbit/s, FDDI, Token Ring, ATM |
| **Warranty** | 1 year, optional 3 years |

## Software

| | |
|---|---|
| **Scope of supply** | Linux with configured Kernel, reconfiguration possible, Driver software,<br>Firmware, Call switching, Authentication, Accounting, Monitoring,<br>Filtering Firewall, Administration software |
| **Authentication** | RADIUS, UNIX password TACACS, TACACS+, Kerberos (AFS); PAP (password<br>authentication protocol), CHAP (challenge authentication protocol),<br>CLID (calling line identification), Callback, separate dial-in pools for user groups,<br>PIN per DTMF |
| **Internet Telephony** | H.323, H.225.0, H.245, RTP/RTCP per RFC 1889/1890 |
| **Administration** | WWW, Shell, SNMP, syslog |
| **Language** | Software in English, Documentation in German |



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