

# SmartNode SmartWare

## Feature Matrix

### Release 2.20

#### About this Feature Matrix

This document lists the features of the SmartNode product family. The features described are available with release 2.20 of the SmartWare software.

Release 2.20 of the SmartWare software provides a full-featured IP QoS access router with VPN support, DHCP, PPPoE and VPN pass-through, a H.323/T.38 and MGCP Gateway and the Inalp Networks ISDN over IP voice services. With respect to prior releases the primary new feature is H.235 and the IPSec VPN support. New Features are indicated in **bold** writing.

Customer Deliverable Documentation Part Number 80-0162 English Revision 1.02 August 2003
---

## SmartNode News

---

This section describes the main enhancements introduced with SmartWare Release 2.20:

### New SmartNode Platforms

The all new SmartNode 4110 and 4520 series are supported by the SmartWare release 2.20.

The **SmartNode 4520 series** are fully featured IP QoS and VPN Routers with integrated POTS VoIP Gateways. The products offer 2, 4, 6 or 8 FXS or FXO ports (model dependent) and dual 10/100 Ethernet. They support the standard VoIP protocols H.323 and SIP (MGCP is planned).

The SmartNodes 4520 series are used as broadband access routers with integrated POTS-to VoIP Media Gateways. The combination of router and media-gateway allows customers to connect their telephony (Phones, Faxes, PBX's) and LAN (PCs etc.) equipment over a single IP WAN (Internet, VPN) with maximum service quality. QoS features include, IP Traffic classification, traffic prioritization and scheduling (shaping) and QoS labeling (TOS, DiffServ and 802.1p).

The **SmartNode 4110 series** are pure FXS (and FXO) gateways supporting 2-8 analog 2-wire ports and one 10/100bT Ethernet. This series is complementing our integrated gateway-router products as cost efficient alternative in gateway-only applications e.g. in LAN telephony or enterprise networking.

### New SmartWare Features

SmartWare 2.20 brings various additions to the already highly flexible SmartNode products. Most notable is the **IPSec VPN support** which eliminates yet another box in full service enterprise network and carrier access deployments.

The complete list of new features:

- H.323v4
- H.235
- H.245 Tunneling (Single TCP connection for H.225-Q.931 and H.245)
- IC-T1V, NI-2
- Additional NAT features (Static NAT, dynamic/static PAT, PAT Overload)
- Enhanced IP Router (improved performance, VPN support, Improved RIPv2 and SNMP support)
- IPSec VPN tunnels with pre-shared keys, DES 3DES and AES encryption

## Product Overview

This section is provided to facilitate the selection of SmartNode.

SmartNode Product	Telephony Ports	Data Ports	DSP VoIP Channels	Slots for Interface Cards
<b>SN1200</b>	1x ISDN BRI So (S/T) NT 1x ISDN BRI So (S/T) TE	2 x Ethernet 10bT	2	N/A
<b>SN1400</b>	2x ISDN BRI So (S/T) NT/TE configurable	2 x Ethernet 10bT	4	N/A
<b>SN2300</b>	On interface cards	1 x Ethernet 10bT 1 x Ethernet 10/100bT 1 x Serial X.21/V.35	On interface cards (max 60)	3
<b>SN2400</b>	On interface cards	2 x Ethernet 10/100bT	On interface cards (max 120)	4
<b>IC-4FXS</b>	4x 2-wire FXS	N/A	4	N/A
<b>IC-4BRV</b>	4x ISDN BRI So (S/T) TE/TE configurable	N/A	8	N/A
<b>IC-E1V-0</b>	1x ISDN PRI S2m NT/TE balanced 120 Ohm	N/A	0	N/A
<b>IC-E1V-15</b>	1x ISDN PRI S2m NT/TE balanced 120 Ohm	N/A	15	N/A
<b>IC-E1V</b>	1x ISDN PRI S2m NT/TE balanced 120 Ohm	N/A	30	N/A
<b>IC-T1V</b>	1x ISDN T1/PRI NT/TE balanced 120 Ohm	N/A	23	N/A
<b>SN4112</b>	2x 2-wire FXS	1 x Ethernet 10/100bT	2	N/A
<b>SN4114</b>	4x 2-wire FXS	1 x Ethernet 10/100bT	4	N/A
<b>SN4116</b>	6x 2-wire FXS	1 x Ethernet 10/100bT	6	N/A
<b>SN4118</b>	8x 2-wire FXS	1 x Ethernet 10/100bT	8	N/A
<b>SN4522</b>	2x 2-wire FXS	2 x Ethernet 10/100bT	2	N/A
<b>SN4524</b>	4x 2-wire FXS	2 x Ethernet 10/100bT	4	N/A
<b>SN4526</b>	6x 2-wire FXS	2 x Ethernet 10/100bT	6	N/A
<b>SN4528</b>	8x 2-wire FXS	2 x Ethernet 10/100bT	8	N/A

## SmartWare Feature Sets

---

### Feature Sets

All feature sets include complete IP routing and connectivity capabilities including NAT/PAT, ACL, PPPoE, DHCP client/sever etc. By default the H323 feature set is delivered. Please specify MGCP/IUA with the order if required.

Feature Set	H.323	IsolP	MGCP/IUA	SIP	VPN	QSIG
H323	X	X			K	K
MGCP			X		K	K

X ... Included

K ... Keyed software option (payable)

Keyed Software Option	Description
VPN	Software option for IPSec VPN, including DES/3DES and AES encryption, manual key exchange
QSIG Option	QSIG license for QSIG tunneling in PBX networks.

## SmartWare Features

This section provides an overview of the SmartWare features provided with release 2.20.

Features	SmartNode 4000 Series	SmartNode 1000 Series	SmartNode 2000 Series
Supported HW versions	SN4112, SN4114, SN4116, SN4118, SN4522, SN4524, SN4526, SN4528	SN1200v4, v5, v6 SN1400v1, v2	SN2300v1, v2 SN2400v2
<b>Voice Processing</b>			
Voice Codecs ISoIP	N/A	G.711 (64k a-law, $\mu$ -law), G.726 (16, 24, 32, 40k), G.727 (16, 24, 32k), SN1400 only: netcoder 6.4, 9.6k	None <i>(Depending on PMC interface cards mounted in expansion slots)</i>
Voice Codecs ISoIP, H.323, MGCP	G.711 (64k a-law, $\mu$ -law), G.723.1 (6.3k), G.729, G.729a (8k) G.729b		<i>See section PMC Interface Cards</i>
Transparent Codec	N/A	64k without echo cancellation. For ISDN B-channel Data Transmission	
Echo cancellation	G.168 compliant 25ms length adaptive echo canceller		
DTMF Detection and Generation	Yes, in-band (within audio stream), out-of-band (According to H.323 User Input Indication)		
Silence suppression and comfort noise	Yes		
Configurable dejitter buffer	Fix Length and Adaptive		
Configurable tones (dial, ringing, busy)	Yes		
Configurable VoIP packet length	Compound packets of n times standard Codec window		
RTP / RTCP (RFC 1889)	Yes		
<b>Voice Signaling</b>			
Euro ISDN EDSS-1 / ETSI BRI / NET3	N/A	ETS 300 012-1 (ITU-T I.430), ETS 300 402-2 (ITU-T Q.921), ETS 300 403-1/2 (ITU-T Q.931), ETS 300 102-1 (ITU-T Q.931)	<i>(Depending on PMC interface cards)</i> <i>See section PMC Interface Cards</i>
QSIG (PSS-1) (K)	N/A	ECMA-142/143, 148 pre-1995 and current channel numbering	
H.323v4	RAS, H.225, H.245 Fast-connect, early H.245 Gatekeeper auto discovery Alias registration Bloc and Overlap Sending Empty Capability Set (ECS) support (call transfer, hold) H.323v1 call transfer, hold H.323 gatekeeper registration type (terminal or gateway) Gatekeeper failover (up to 3 gatekeeper IP addresses) H.225 Status inquiry can be disabled <b>H.245 tunneling</b> <b>H.235 secure RAS</b>		

Features	SmartNode 4000 Series	SmartNode 1000 Series	SmartNode 2000 Series
ISoIP (ISDN over IP)	N/A	H.323 GW and GK compatible ISDN feature tunneling QSIG feature tunneling Ascom compatible T.35 vendor ID (AIP QSIG tunneling) ISDN speech, audio and data (Fax Gr 4, UD 64, RD 64) ISDN Supplementary Services (see section "ISoIP Supplementary Services" for more details)	
H.323+		Tunneling of ISDN supplementary services through H.323.	
T.38	ITU-T recommendation for real-time Fax over IP Fax Gr 3 up to 14.4 kb/s, UDP redundancy		
Conversion of Number Formats	'unknown', specific ('national', 'international')		
MGCP/SCTP/IUA	N/A	Supported endpoints: ISDN Supported event packages: Generic media (partly), DTMF (full), Line (partly), X-P (partly) Endpoint naming: Automatic endpoint naming, RFC2705 2.1.2 Wildcarding of endpoint names: RFC2705 2.1.2 MGC: Primary and secondary MGC and fallback Event tones: 15 tones configurable and map able to MGCP signal events Supported commands: CRCX, DLCX, MDCX, AUPEP, NTFY, RQNT, RSIP Connection modes: inactive, send only, receive only, send and receive Error codes: RFC2705 2.4 Cyclic RSIP: Cyclic RSIP by the gateway to check MGC activity, configurable timer Configurable MWD (maximum waiting delay), RFC2705 4.3.4 Command retransmission over UDP, RFC2705 4.2 Configurable gateway domain name, Auto set to IPv4 address Traffic measurement per connection	
<b>Call Routing</b>			
Local switching	Switched 64kbit/s circuits between ISDN So and S2m ports. Controlled by Session Router		
Interface hunt groups	Hunting of free channels over multiple ISDN ports		
ISDN broadcast message routing	N/A	Forward ISDN D-channel broadcast messages to destination interface	
Session Router Routing Criteria	Interface Called party number (Destination) Calling party number (Source) Time of day, day of week, date ISDN bearer capability Number type manipulation		
Number Manipulation Functions	Replace numbers Add/remove digits		
Fallback Routing	Soft Fallback to alternative interface or Session Router table		
<b>IP Routing (IP Routing Features with a * are not applicable for the 4110 series, which are pure gateways)</b>			
IPv4 Router *	Yes		
RIPv1, v2 (RFC 1058 and 2453) *	Yes		
Programmable static routes *	Yes		
ICMP redirect (RFC 792)	Yes		
Packet fragmentation *	IP layer fragmentation for reduced voice latency on low bandwidth WAN links		
NAT Features *	<b>Static and dynamic NAT using public address pool</b> NAPT (according to RFC 1631) 20 Static port mapping entries Application level gateway for FTP		

Features	SmartNode 4000 Series	SmartNode 1000 Series	SmartNode 2000 Series
Static Firewall ACL	Access Control Lists (ACL), IP traffic filter for source, destination address, port and protocol		
VPN Support (K)	IPSEC AH & ESP Modes, pre-shared keys, AES/DES/3DES Encryption		
VPN Pass-Through *	A host connected to the LAN can establish PPTP/GRE and IPSec/ESP tunnels through the SmartNode NAT/PAT router. However, only one host can establish and operate (several) such tunnels at a time. The pass-through does not support L2TP.		
Frame Relay	N/A	SN2300: IP over Frame Relay (RFC1490) FRF.12 end-to-end and interface fragmentation IP unnumbered 8 PVCs LMI as per Q.933D, ANSI 617D and Gang of Four	
DHCP	DHCP server: Up to 128 clients Configurable lease time (2 minutes to infinite) Up to 8 network profiles Dynamic address allocation from up to 4 address ranges per profile Windows client support Options: Routers, DNS, NetBIOS Name Server, Domain Name, Boot File, Next Server Name DHCP Client: Automatically configures IP address and netmask		
PPP	PPPoE and PPP over Leased Line, Authenticated or non-authenticated connections. Serial Ports (2000 series): Encapsulation options: Frame Relay, PPP Authentication: In- and/or outbound authentication (CHAP and PAP) Subscriber profiles for authenticated connections Subscriber Profiles: Login name and password Used IP interface Fixed IP address Max. concurrent active session for the subscriber Absolute or idle timeout LCP Options: Maximum Receive Unit (MRU) auto-negotiation between 68 and 1920 octets. Asynchronous Control Character MAP (ACCM), negotiated but not used over SHDLCL. Authentication Protocol: CHAP, PAP, auto-negotiated Quality Protocol: Link-Quality Report Magic Number Periodic echo requests, automatic link restart IPCP Options: When operating over a serial link, the local address is defined by the local interface. When operating over PPPoE, the remote side defines the local address.		
PPPoE	Ethernet Ports: Encapsulation options: IP, PPPoE or both PPPoE: Multiple sessions to multiple access concentrators On-demand or static connection establishment Link loss detection and automatic session restart		
<b>IP Quality of Service</b>			
Traffic classification	local-voice class for voice traffic from the integrated gateway		
TOS and DiffServ labeling	Configurable TOS/Precedence bits or DiffServ codepoints for each internal traffic class		
IEEE 802.1p/Q	Send and receive VLAN and mixed VLAN non-VLAN frames One VLAN tag configurable		

Features	SmartNode 4000 Series	SmartNode 1000 Series	SmartNode 2000 Series
Traffic scheduling	Priority for local-voice		
Traffic classification	Classification of routed IP traffic according to source, destination address, port and protocol (ACL)		
IEEE 802.1p/Q	Eight service class tags configurable		
Traffic scheduling	Weighted fair queuing (WFQ) and shaping of traffic classes Configurable burst tolerance Hierarchical traffic classes Policing of traffic classes (discard excess traffic)		
<b>Management</b>			
Industry standard CLI	Yes		
Local console and remote Telnet access	Password protected Multiple user accounts with operator and administrator rights		
TFTP configuration down- and upload	Yes		
TFTP firmware download	Yes		
SNMP	SNMPv1 Agent (MIB II and private MIB), <b>SNMP triggered software download</b> <b>SNMP triggered configuration up-/ and download</b> <b>SNMP triggered system reboot</b> <b>MIB-2 interface MIB objects to support network monitoring applications (e.g. MRTG)</b>		
SNTP client	Anycast, Multicast, Unicast, 2 SNTP server addresses		
Built-In Diagnostic Tools	ICMP Ping CLI call application ISDN protocol trace (layer 1 to 3) H.323, ISoIP, PPP(oE) protocol trace Session Router trace Call Control trace System Exception log		
System self-test	Interface Card presence and bus test, Interface Card software load verification DSP and DSP memory test, Individual software component verification/start		

## Interface Card Software

The driver software is delivered together with the SmartWare release. Interface Card driver software can be updated independent of the SmartWare Application.

Features	IC-E1V, ICT1V	IC-4BRV	IC4FXS
Supported HW versions	IC-E1V v3	IC-4BRV v2	IC-4FXS v1
ETSI Technical Base regulation			TBR-21
<b>Voice Processing</b>			
Standard Voice Codecs for ISoIP	G.711 (64k a-law, $\mu$ -law), G.726 (16, 24, 32, 40k), G.727 (16, 24, 32k), netcoder (6.4, 9.6k)		G.711 (64k a-law, $\mu$ -law)
Voice Codecs ISoIP, H.323, MGCP/IUA	G.711 (64k a-law, $\mu$ -law), G.723.1 (6.3k), G.729, G.729a (8k) G.729b		
Transparent ISDN data transmission	Yes	Yes	N/A
Echo Suppression / Cancellation	G.168 compliant 25ms length adaptive echo canceller		
Parallel Voice Connections	30 on E1, 23 on T1	8	4
DTMF Detection and Generation	Yes, in-band (within audio stream), out-of-band (According to H.323 User Input Indication)		
Silence suppression and comfort noise	Yes		
Configurable dejitter buffer	Fixed Length and Adaptive		
Configurable tones (dial, ringing, busy)	Yes		
Configurable VoIP packet length	Compound packets of n times standard Codec window		
RTP / RTCP (RFC 1889)	Yes		
<b>Voice Signaling</b>			
Euro ISDN (EDSS-1)	ETSI PRI / NET5 ETS 300 012-1 (ITU-T I.430), ETS 300 402-2 (ITU-T Q.921), ETS 300 403-1/2 (ITU-T Q.931), ETS 300 102-1 (ITU-T Q.931)	ETSI BRI / NET3 ETS 300 012-1 (ITU-T I.430), ETS 300 402-2 (ITU-T Q.921), ETS 300 403-1/2 (ITU-T Q.931), ETS 300 102-1 (ITU-T Q.931)	N/A
US T1/PRI ISDN	NI-2	N/A	N/A
QSIG (PSS-1) (K)	ECMA-142/143, 148 pre-1995 and current channel numbering		N/A

## ISoIP Supplementary Services

ISoIP relays signaling messages and therefore supports switch based ISDN / QSIG supplementary services over an IP access network. The table below illustrates the ISDN supplementary services, which are available with ISoIP Version 1 and 2 and SmartWare Release 2.20.

Detail Feature	Description	Reference	SN1200	SN1400	SN2300/2400	IC-4BRV	IC-E1V/T1V
3PTY	Three Party Service	ETS 300 186	x	x		x	(x)
AOC-D	Advice of Charge, during call	ETS 300 179	x	x		x	x
AOC-E	Advice of Charge, end of call	ETS 300 180	x	x		x	x
AOC-S	Advice of Charge, at call set-up time	ETS 300 178	x	x		x	x
CCBS	Completion of Call to Busy Subscribers <sup>1)</sup>	ETS 300 357	x	x		x	(x)
CCNR	Completion of Call if No Reply <sup>1)</sup>	---	x	x		x	(x)
CFB	Call Forwarding on Busy (stimulus and functional protocol)	ETS 300 199	x	x		x	(x)
CFNR	Call Forwarding no Reply (stimulus and functional protocol)	ETS 300 201	x	x		x	(x)
CFU	Call Forwarding Unconditional (stimulus and functional protocol)	ETS 300 200	x	x		x	(x)
CLIP	Calling Line Identification Presentation	ETS 300 089	x	x		x	x
CLIR	Calling Line Identification Restriction	ETS 300 090	x	x		x	x
CNIP	Calling Name Identification Presentation	QSIG	(x)	(x)		(x)	(x)
CNIR	Calling Name Identification Restriction	QSIG	(x)	(x)		(x)	(x)
COLP	Connected Line Identification Presentation	ETS 300 094	x	x		x	x
CONP	Connected Name Identification Presentation	QSIG	(x)	(x)		(x)	(x)
COLR	Connected Line Identification Restriction	ETS 300 095	x	x		x	x
CONF	Conference Call	ETS 300 183	x	x		x	x
CUG	Closed User Group	ETS 300 136	x	x		x	x
CD	Call Deflection	ETS 300 202	x	x		x	x
CW	Call Waiting <sup>1)</sup>	ETS 300 056	x	x		x	(x)
DDI	Direct Dial In	ETS 300 062	x	x		x	x
PNP	Private Numbering Plan	EN 300 172	(x)	(x)		(x)	(x)
ECT	Explicit Call Transfer	ETS 300 367	x	x		x	(x)
HL	Hot Line	---	x	x		x	(x)
HOLD	Call Holding	ETS 300 139	x	x		x	(x)
MCID	Malicious Call Identification	ETS 300 128	x	x		x	x
MSN	Multiple Subscriber Number	ETS 300 050	x	x		x	(x)
MWI	Message Waiting Indication	ETS 300 650	x	x		x	x
OCB	Outgoing Call Barring	---	x	x		x	(x)
PR	Partial Rerouting	---	x	x		x	x
SUB	Sub Addressing	ETS 300 059	x	x		x	(x)
TP	Terminal Portability <sup>1)</sup>	ETS 300 053	x	x		x	

Detail Feature	Description	Reference	SN1200	SN1400	SN2300/2400	IC-4BRV	IC-E1V/T1V
UUS (1/3)	User to User Signaling (1/3)	ETS 300 284	x	x		x	x

**Table 1: ISoIP Version 1 and 2 Supplementary Services supported by SmartWare Release 2.20**

#### Remarks

- 1) Feature requires broadcast messages
- x Feature supported on Inalp Networks equipment
- (x) Feature supported on Inalp Networks equipment. Functionality depends on the supported features of operator side equipment or PBX (e.g. switch).

## SmartNode Hardware Specifications

This section provides detailed SmartNode hardware specifications.

### SmartNode 1000 Series

Hardware Specification	SmartNode 1200	SmartNode 1400
<b>System</b>		
Processor Type CPU	Motorola MPC850 @ 50 MHz	Motorola MPC850 @ 50 MHz
System Memory	16 MB SDRAM	16 MB SDRAM
Flash Memory	4 MB	4 MB
Internal Power Supply	100-240 VAC (50/60 Hz)	100-240 VAC (50/60 Hz)
Power dissipation	4W	4W
Number of DSP Vol channels	2	4
<b>Voice Connectivity</b>		
ISDN Interfaces	2 ISDN BRI So (S/T), RJ45 One Usr (TE) port, One Net (NT) port	<ul style="list-style-type: none"> <li>2 ISDN BRI So (S/T), RJ45 Both configurable as Usr (TE) or Net (NT)</li> </ul>
point-point and point-multipoint	Yes	Yes
ISDN Line Power	With external Phantom Power Supply	With external Phantom Power Supply
Power-down Bypass Relay (Life Line Support)	Yes	Yes
<b>Data Connectivity</b>		
On-board Ethernet	2 ETH 10bT, RJ45 half or full duplex	2 ETH 10bT, RJ45 half or full duplex
Console Port	RS-232, RJ45 Cisco pinout	RS-232, RJ45 Cisco pinout
<b>Packaging</b>		
Chassis	Alu, desktop, wall-mount	Alu, desktop, wall-mount
Dimensions (W/H/D)	220/40/160 mm	220/40/160 mm
Unit Weight	600g	600g
Shipping Weight	1.2kg	1.2kg
<b>Compliance</b>		
Safety	EN60950	EN60950
EMC	EN55022, EN55024	EN55022, EN55024
CE compliant	Yes	Yes
<b>Environmental Conditions</b>		
Operating Temperature	0 – 40 °C	0 – 40 °C
Storage Temperature	-40 – 75 °C	-40 – 75 °C
Relative Humidity	5 – 80 % (non condensing)	5 – 80 % (non condensing)

## SmartNode 4000 Series

Hardware Specification	SmartNode 4110 Series	SmartNode 4520 Series
<b>System</b>		
Processor Type CPU	Motorola MPC859 @ 50 MHz	Motorola MPC859 @ 50 MHz
System Memory	32 MB SDRAM	32 MB SDRAM
Flash Memory	4 MB	4 MB
Number of DSP VoIP channels	2 – 8 depending on model	2 – 8 depending on model
Power Supply	100-240 VAC (50/60 Hz) Internal on 2,4 port models External on 6,8 port models	100-240 VAC (50/60 Hz) Internal on 2,4 port models External on 6,8 port models
Power dissipation	4 – 12 W depending on model	4 – 12 W depending on model
<b>Voice Connectivity</b>		
FXS ports	2, 4, 6, or 8 depending on model	2, 4, 6, or 8 depending on model
FXS Characteristics	2-wire loop start, RJ-11/12 Short haul 1.1km @ 3REN (300m for 8 port model)	2-wire loop start, RJ-11/12 Short haul 1.1km @ 3REN (300m for 8 port model)
Caller-ID	Type-1/2 FSK FSK according to ITU V.23 and Bell 202	Type-1/2 FSK FSK according to ITU V.23 and Bell 202
Ring Voltage	30 VRMS	30 VRMS
On-hook Voltage	29 VDC	29 VDC
Conformance	Euro POTS (ETSI EG201 188)	Euro POTS (ETSI EG201 188)
<b>Data Connectivity</b>		
On-board Ethernet	1 Ethernet 10/100bT, RJ45 full duplex, autosensing	2 Ethernet 10/100bT, RJ45 full duplex, autosensing
Console Port	RS-232, RJ45 EIA-561 pinout	RS-232, RJ45 EIA-561 pinout
<b>Packaging</b>		
Chassis	Desktop plastic	Desktop plastic
Dimensions (W/H/D)	127/39/106 mm	127/39/106 mm
Unit Weight	< 500g	< 500g
Shipping Weight	< 1 kg	< 1 kg
<b>Compliance</b>		
Safety	EN60950 CB Scheme	EN60950 CB Scheme
EMC	EN55022, EN55024	EN55022, EN55024
CE compliant	Yes	Yes
FCC	Part 15 Class A	Part 15 Class A
Telecommunications	FCC Part 68 (FXO) RTTE 99/5/EC (FXO) Canadian CS-03 (FXO)	FCC Part 68 (FXO) RTTE 99/5/EC (FXO) Canadian CS-03 (FXO)
<b>Environmental Conditions</b>		
Operating Temperature	0 – 40 °C	0 – 40 °C
Storage Temperature	-40 – 75 °C	-40 – 75 °C
Relative Humidity	5 – 80 % (non condensing)	5 – 80 % (non condensing)

## SmartNode 2000 Series

Hardware Specification	SmartNode 2300	SmartNode 2400
<b>System</b>		
Processor Type CPU	Motorola MPC860 @ 50 MHz	Motorola MPC750 @ 333 MHz
System Memory	16 MB SDRAM	32 MB SDRAM Up to 128 MB SO-DIMM
Flash Memory	4 MB	8 MB
Internal Power Supply	100-240 VAC (50/60 Hz)	100-240 VAC (50/60 Hz)
Optional Line Power Module	48/40 VDC line power module to IC-4BRV	40 VDC line power module to IC-4BRV
Power dissipation	30W (fully loaded IC slots, no line power)	30W (fully loaded IC slots, no line power)
Interface Card Slots	3 slots PCI (packet) interface, PCM (circuit) interface	4 slots PCI (packet) interface, PCM (circuit) interface
<b>Voice Connectivity</b>		
None (Depending on PMC interface cards mounted in slots) See section interface cards		
<b>Data Connectivity</b>		
On-board Ethernet	1 ETH 10/100bT, RJ45 auto-sensing, half- or full-duplex  1 ETH 10bT, RJ45 half- or full-duplex	2 ETH 10/100bT, RJ45 auto-sensing, half- or full-duplex
Serial Interface	V.35, X.21 DTE, DB25 (up to 2Mbit/s)	None
Console Port	RS-232, RJ45 Cisco pinout	RS-232, RJ45 Cisco pinout
<b>Packaging</b>		
Chassis	Alu, desktop, rack-mount	Alu, desktop, wall-mount
Dimensions (W/H/D)	440/42/265 mm	440/42/265 mm
Unit Weight	1650g	1650g
Shipping Weight	2.9kg	2.9kg
<b>Compliance</b>		
Safety	EN60950	EN60950
EMC	EN55022, EN55024	EN55022, EN55024
CE compliant	Yes	Yes
<b>Environmental Conditions</b>		
Operating Temperature	0 – 40 °C	0 – 40 °C
Storage Temperature	-40 – 75 °C	-40 – 75 °C
Relative Humidity	5 – 80 % (non condensing)	5 – 80 % (non condensing)

## 2000 Series Interface Cards

The IC-E1V and IC-4BRV are voice and ISDN over IP interface cards for the SmartNode 2000 series. The IC-E1V provides one ISDN S<sub>2m</sub> interface, IC-4BRV provides 4 ISDN S<sub>0</sub>/T<sub>0</sub> interfaces. **The IC-4FXS is an analog voice and POTS over IP interface card for the SmartNode 2000 series. It provides 4 analog FXS interfaces.**

All cards are active gateway cards with own CPU, memory and DSP resources.

Hardware Specification	IC-E1V	IC-4BRV	IC-4FXS
<b>System</b>			
CPU	Motorola MPC850 @ 50 MHz		
Memory	8 MB SDRAM		
PMC Card	32 bit PCI and 30 channel PCM Motherboard interfaces		
Power dissipation	< 2.5 W	< 3 W	< 3W
Line power	Not applicable	Up to 2.5W S-Bus power available in combination with optional power module PM-48V-int	Line Power for each FXS port
<b>Voice Ports</b>			
Physical Connection	1 ISDN balanced 120 Ohm E1, RJ45 ETS 300 011 Configurable Net or Usr (subscriber or network) operation	4 ISDN BRI S/T, RJ-45 <b>all ports configurable for Net or Usr operation (Layer 2) ports 2, 3: Layer 1 configurable ports 0, 1: Fixed Layer 1 (Clock slave)</b> all four ports configurable for point-point or point-multipoint	Four 2-wire analog FXS ports Loop start ETSI EG201 188 (EURO POTS)
Hardware Bypass Relay for Emergency Service (Life Line Support)	No	Yes (Relay between BRI1 and BRI2 port)	
<b>Packaging</b>			
Form Factor	PMC Standard (IEEE P1386.1)	PMC Standard (IEEE P1386.1)	PMC Standard (IEEE P1386.1)
Dimensions (W/H/D)	149/74/12 mm	149/74/13.5 mm	149/74/13.5 mm
Unit Weight	80g	100g	100g
Shipping Weight	400g	500g	400g
<b>Compliance</b>			
Safety, EMC, CE	EN 60950, EN55022, EN55024		
<b>Environmental Conditions</b>			
Operating Temperature	0 – 40 °C	0 – 40 °C	0 – 40 °C
Storage Temperature	-40 – 75 °C	-40 – 75 °C	-40 – 75 °C
Relative Humidity	5 – 80 % (non condensing)	5 – 80 % (non condensing)	5 – 80 % (non condensing)

## Note: Interface Card Combinations on the SmartNode 2300

The SmartNode 2300 can support VoIP Interface Cards in any combination under the following restriction:

- **The total number of VoIP channel must not exceed 60 (e.g. 2 x IC-E1V)**

When using more than 50 VoIP channels concurrently the following additional restriction applies:

- **G.711 must be used with a packet length of minimum 20ms. No restrictions apply with the other Codecs**

## Power Modules

Three types of Power Modules are available to provide line Power for S-Bus Terminals. These Power Modules are only required when line powered Terminals such as ISDN Phones are connected directly to an So port on the SmartNode or IC-4BRV. PBX and PSTN connections do not require line power.

Module	PM-48V-int (SN2300)	PM-38V-int (SN2400)	PM-BRI-ext
Description	Optional line power module for ISDN and analogue Interface Cards in the SN2300	Optional line power module for ISDN and analogue Interface Cards in the SN2400	ISDN-S-Bus phantom power supply
Mounting	Mounted inside the SN2300 chassis	Mounted inside the SN2400 chassis	External connection on the ISDN S-Bus
Input (Primary Side)	40W, 110 – 240 VAC (50/60Hz)	40W, 110 – 240 VAC (50/60Hz)	230 VAC (50Hz)
Connectors	Package includes required cables for mounting	Package includes required cables for mounting	Primary: 2-phase Euro Standard DIN 4964F, CEE7/XVI Country specific on demand Secondary: RJ-45
Output (Secondary Side)	30 W, 48VDC (converted to the respective line voltage on the Interface Cards)	30 W, 38VDC (converted to the respective line voltage on the Interface Cards)	40VDC, 100mA stabilized de-coupling transformer for S-Bus connection
Unit Weight	150g	150g	430g
Shipping Weight	400g	400g	500g