SmartNode™ Feature Matrix

Release 3.20

About this Feature Matrix

This document lists the features of the SmartNode product family. The features described are available with release 3.20 of the SmartWare software.

Release 3.20 of the SmartWare software provides a full-featured IP QoS access router with IPSec VPN support, DHCP, PPPoE and VPN pass-through, a SIP Gateway, H.323 and MGCP/IUA. With respect to prior releases the primary new features are a webbased GUI, an auto-provisioning feature, support for multiple VLANs and IP interfaces per Ethernet port and support for various new HW platforms. New Features are indicated in **bold** writing.

Customer Deliverable Documentation
English
Revision 1.00 Jun. 9, 05

SmartNode™ News

This section describes the main enhancements introduced with SmartWare Release 3.20:

New SmartNode™ Platforms

SmartWare release 3.20 supports all of the existing SmartNode models and versions.

In addition to these, SmartWare 3.20 supports are range of new SmartNode models. Refer to the model overview section bellow.

New SmartWare Features

SmartWare 3.20 brings various additions to the already highly flexible SmartNode products.

The key new feature are:

- Web based GUI
- Auto-Provisioning
- Multiple VLANs per Ethernet port
- Multiple IP Interfaces per Ethernet port

Important Notes

SmartWare 3.20 is available for all customers and targets Provider and LAN Telephony Applications. Note that this release **does not support tunneling of ISDN and QSIG on H.323. Also there is no ISoIP Gateway in this release**. For these applications Release 2.20 continues to be maintained.

Note that configurations created for this new release are **not fully backward compatible** to prior releases due to the introduction of new commands. It is there fore recommended to store the running configuration prior to upgrades to safeguard it should a downgrade be required at any time.

It is recommended to carefully **read the Release Notes** available with each SmartWare build.

Note that a number of optional SmartWare features are subject to a **License Key**. Refer to the Feature Set overview bellow. A number of online documentation and the Software Configuration Guide provide additional details on license procurement and installation.

An online FAQ and license query form is available at:

http://www.patton.com/support/faq (section SmartNode VoIP/ToIP)

http://www.patton.com/support/license/

SmartNode™ Model Overview

This section is provided to facilitate the selection of the right SmartNode hardware.

SmartNode™ Model Code Syntax

Various models can be found in the price list including pre-configured bundles with installed interface cards and software options. The model codes follow the conventions bellow.

Structure

Baseproduct/Options/Powersupply
For Example: SN2300/4BRVIL/UI

Baseproduct

This is the "box" with a number of fixed on-board interfaces
For Example: SN1200, SN1400, SN4524 etc

Options

These can be hardware and/or software options or factory installed interface cards

HW options

nE1V ...   n factory installed SN-ICE1V cards
nT1V ...   n factory installed SN-ICT1V cards
(4n)FXS ...   n factory installed SN-IC4FXS cards
(4n)BRV ...   n factory installed SN-IC4BRV cards
JS ...   the PSTN ports are of type FXS
JO ...   the PSTN ports are of type FXO
BIS…   Basic Rate ISDN Ports of type S/T (4-wire)
BIU…   Basic Rate ISDN Ports of type U (2-wire 2B1Q)
nJSmJO ...   there are n ports of type FXS and m ports of type FXO
nV….   n VoIP channels (DSP resources)
C   V.35 WAN interface
D   X.21 WAN interface
K   E1/T1 (G.704) WAN interface

SW options

I...   includes IP routing and QoS traffic management features/licence (SNSW-IPR)
L...   includes low bandwidth VoIP compression CODECs

Power Supply

UI ...   internal universal power supply (100-240 VAC)
EUI ...   external universal power supply (100-240 VAC)
RUI   dual redundant internal universal power supply (100-240 VAC)
R48   dual redundant internal 48V DC power supply

Software Version Identification

SmartWare – the SmartNode™ software is available in different versions. The following terminology applies for the identification of the correct Software:

Release: the release number specifies the features of the software at a high level. New releases appear roughly twice a year.

Build: within a Release the build number specifies the hardware platform. New builds become available roughly every month and can contain minor new features and bug fixes.

Feature Set: within a Release and Build there can be different Feature Sets for example H.323, SIP or MGCP. Feature sets are used where the Software must be split into different files for technical reasons.

License: Feature Sets can contain some features which must be enabled using a license key. This license may be included in some models (see section above) or must be purchased separately.

Digital Gateways and VoIP Routers

SmartNode Model	Telephony Ports	Data Ports	DSP VoIP Channels
SN1200	1x ISDN BRI So (S/T) NT 1x ISDN BRI So (S/T) TE	2 x Ethernet 10bT	2
SN4552	1x ISDN BRI So (S/T) NT 1x ISDN BRI So (S/T) TE	10/100bT Ethernet WAN 4x10/100bT LAN switch	2
SN1400	2x ISDN BRI So (S/T) NT/TE configurable	2 x Ethernet 10bT	4
SN2300	On interface cards 3 slots	1 x Ethernet 10bT 1 x Ethernet 10/100bT 1 x Serial X.21/V.35	On interface cards (max 60)
SN2400	On interface cards 4 slots	2 x Ethernet 10/100bT	On interface cards (max 120)
IC-4FXS	4x 2-wire FXS	N/A	4
IC-4BRV (EOL)	4x ISDN BRI So (S/T) 2x NT, 2x NT/TE configurable	N/A	8
IC-4BRV-8V	4x ISDN BRI So (S/T) NT/TE configurable	N/A	8
IC-E1V	1x ISDN PRI S2m NT/TE balanced 120 Ohm	N/A	30
IC-T1V	1x ISDN T1/PRI NT/TE balanced 120 Ohm	N/A	23

Analog Gateways

SmartNode Model	Telephony Ports	Data Ports	DSP VoIP Channels
SN4112/JS	2x FXS	1 x Ethernet 10/100bT	2
SN4114/JS	4x FXS	1 x Ethernet 10/100bT	4
SN4116/JS	6x FXS	1 x Ethernet 10/100bT	6
SN4118/JS	8x FXS	1 x Ethernet 10/100bT	8
SN4112/JO	2x FXO	1 x Ethernet 10/100bT	2
SN4114/JO	4x FXO	1 x Ethernet 10/100bT	4
SN4116/4JS2JO	4x FXS, 2x FXO	1 x Ethernet 10/100bT	6
SN4118/4JS4JO	4x FXS, 4x FXO	1 x Ethernet 10/100bT	8

Analog VoIP Routers

SmartNode Model	Telephony Ports	Data Ports	DSP VoIP Channels
SN4522/JS	2x FXS	2 x Ethernet 10/100bT	2
SN4524/JS	4x FXS	2 x Ethernet 10/100bT	4
SN4526/JS	6x FXS	2 x Ethernet 10/100bT	6
SN4528/JS	8x FXS	2 x Ethernet 10/100bT	8
SN4522/JO	2x FXO	2 x Ethernet 10/100bT	2
SN4524/JO	4x FXO	2 x Ethernet 10/100bT	4
SN4526/4JS2JO	4x FXS, 2x FXO	2 x Ethernet 10/100bT	6
SN4528/4JS4JO	4x FXS, 4x FXO	2 x Ethernet 10/100bT	8

SnycSerial VoIP IADs

SmartNode Model	Description
SN4832/JSC/EUI	SyncSerial VoIP IAD, Dual FXS, Dual Fast-Ethernet, V.35 WAN
SN4832/JSD/EUI	SyncSerial VoIP IAD, Dual FXS, Dual Fast-Ethernet, X.21 WAN
SN4834/JSC/EUI	SyncSerial VoIP IAD, Quad FXS, Dual Fast-Ethernet, V.35 WAN
SN4834/JSD/EUI	SyncSerial VoIP IAD, Quad FXS, Dual Fast-Ethernet, X.21 WAN
SN4836/JSC/EUI	SyncSerial VoIP IAD, 6 FXS, Dual Fast-Ethernet, V.35 WAN
SN4836/JSD/EUI	SyncSerial VoIP IAD, 6 FXS, Dual Fast-Ethernet, X.21 WAN
SN4838/JSC/EUI	SyncSerial VoIP IAD, 8 FXS, Dual Fast-Ethernet, V.35 WAN
SN4838/JSD/EUI	SyncSerial VoIP IAD, 8 FXS, Dual Fast-Ethernet, X.21 WAN
SN4832/JOC/EUI	SyncSerial VoIP IAD, Dual FXO, Dual Fast-Ethernet, V.35 WAN
SN4832/JOD/EUI	SyncSerial VoIP IAD, Dual FXO, Dual Fast-Ethernet, X.21 WAN
SN4834/JOC/EUI	SyncSerial VoIP IAD, Quad FXO, Dual Fast-Ethernet, V.35 WAN
SN4834/JOD/EUI	SyncSerial VoIP IAD, Quad FXO, Dual Fast-Ethernet, X.21 WAN
SN4834/2JS2JOC/EUI	SyncSerial VoIP IAD, Dual FXS and FXO, Dual Fast-Ethernet, V.35 WAN
SN4834/2JS2JOD/EUI	SyncSerial VoIP IAD, Dual FXS and FXO, Dual Fast-Ethernet, X.21 WAN
SN4836/4JS2JOC/EUI	SyncSerial VoIP IAD, Quad FXS, Dual FXO, Dual Fast-Ethernet, V.35 WAN
SN4836/4JS2JOD/EUI	SyncSerial VoIP IAD, Dual FXS, Dual FXO, Dual Fast-Ethernet, X.21 WAN
SN4838/4JS4JOC/EUI	SyncSerial VoIP IAD, Quad FXS and FXO, Dual Fast-Ethernet, V.35 WAN
SN4838/4JS4JOD/EUI	SyncSerial VoIP IAD, Dual FXS and FXO, Dual Fast-Ethernet, X.21 WAN

Multiport Analog VoIP Routers and IADs

SmartNode Model	Description
SN4912/JS/RUI	12 FXS VoIP Router, 2x10/100bTX, H.323 and SIP, redundant UI power
SN4912/JSC/RUI	12 FXS VoIP IAD, V.35, 2x10/100bTX, H.323 and SIP, redundant UI power
SN4912/JSD/RUI	12 FXS VoIP IAD, X.21, 2x10/100bTX, H.323 and SIP, redundant UI power
SN4912/JS/R48	12 FXS VoIP Router, 2x10/100bTX, H.323 and SIP, redundant 48VDC power
SN4912/JSC/R48	12 FXS VoIP IAD, V.35, 2x10/100bTX, H.323 and SIP, redundant 48VDC pwr
SN4912/JSD/R48	12 FXS VoIP IAD, X.21, 2x10/100bTX, H.323 and SIP, redundant 48VDC pwr
SN4916/JS/RUI	16 FXS VoIP Router, 2x10/100bTX, H.323 and SIP, redundant UI power
SN4916/JSC/RUI	16 FXS VoIP IAD, V.35, 2x10/100bTX, H.323 and SIP, redundant UI power
SN4916/JSD/RUI	16 FXS VoIP IAD, X.21, 2x10/100bTX, H.323 and SIP, redundant UI power
SN4916/JS/R48	16 FXS VoIP Router, 2x10/100bTX, H.323 and SIP, redundant 48VDC power
SN4916/JSC/R48	16 FXS VoIP IAD, V.35, 2x10/100bTX, H.323 and SIP, redundant 48VDC pwr
SN4916/JSD/R48	16 FXS VoIP IAD, X.21, 2x10/100bTX, H.323 and SIP, redundant 48VDC pwr
SN4924/JS/RUI	24 FXS VoIP Router, 2x10/100bTX, H.323 and SIP, redundant UI power
SN4924/JSC/RUI	24 FXS VoIP IAD, V.35, 2x10/100bTX, H.323 and SIP, redundant UI power
SN4924/JSD/RUI	24 FXS VoIP IAD, X.21, 2x10/100bTX, H.323 and SIP, redundant UI power
SN4924/JS/R48	24 FXS VoIP Router, 2x10/100bTX, H.323 and SIP, redundant 48VDC power
SN4924/JSC/R48	24 FXS VoIP IAD, V.35, 2x10/100bTX, H.323 and SIP, redundant 48VDC power
SN4924/JSD/R48	24 FXS VoIP IAD, X.21, 2x10/100bTX, H.323 and SIP, redundant 48VDC pwr
SN4932/JS/RUI	32 FXS VoIP Router, 2x10/100bTX, H.323 and SIP, redundant UI power
SN4932/JSC/RUI	32 FXS VoIP IAD, V.35, 2x10/100bTX, H.323 and SIP, redundant UI power
SN4932/JSD/RUI	32 FXS VoIP IAD, X.21, 2x10/100bTX, H.323 and SIP, redundant UI power

SN4932/JS/R48	32 FXS VoIP Router, 2x10/100bTX, H.323 and SIP, redundant 48VDC power
SN4932/JSC/R48	32 FXS VoIP IAD, V.35, 2x10/100bTX, H.323 and SIP, redundant 48VDC pwr
SN4932/JSD/R48	32 FXS VoIP IAD, X.21, 2x10/100bTX, H.323 and SIP, redundant 48VDC pwr

SmartWare Feature Sets and Licenses

Feature Sets

Different Feature Sets are available for on the various SmartNode platforms. The following tables provide information on the available Feature Sets. The "Default" feature set is shipped with each unit if nothing else is specified. For other software order the feature set as a separate order line item.

SN1200 and 1400

Feature Set	Description and Notes
SNSW-1000-220	Release 2.20 with ISDN and QSIG tunneling capabilities
SNSW-1000-MGCP	Current Release with MGCP/IUA Gateway for ISDN BRI
Default	Current Release with H.323 Gateway
SNSW-1000-SIP	Current Release with SIP Gateway

SN2300

Note: The SmartNode 2300 can support a maximum of **two different Interface Cards** in one system. When using G.711 with 10ms packet length the total number of VoIP calls is limited to 50. With any other codec the call limitation is according to the following Feature Sets.

Feature Set	Description and Notes
SNSW-2300-220	Release 2.20 with ISDN and QSIG tunneling capabilities
SNSW-2300-H323	Current Release with H.323 Gateway for **60 calls**, **NO IPSEC, NO Web GUI**
SNSW-2300-SIP	Current Release with H.323 Gateway for **60 calls**, **NO IPSEC, NO Web GUI**
SNSW-2300-H323-VPN	Current Release with H.323 Gateway for **30 calls**, **incl IPSEC, Web GUI**
SNSW-2300-SIP-VPN	Current Release with H.323 Gateway for **30 calls**, **incl IPSEC, Web GUI**

SN2400

Feature Set	Description and Notes
SNSW-2400-220	Release 2.20 with ISDN and QSIG tunneling capabilities
Default	Current Release with SIP and H.323 Gateway

SN4110, 4520, 4830, and 4900 Series

Feature Set	Description and Notes
Default	Current Release with SIP and H.323 Gateway

SN4552

Feature Set	Description and Notes
Default	Current Release with H.323 Gateway
SNSW-4552-SIP	Current Release with SIP Gateway

Feature Licenses

The following feature licenses are available. These feature licenses must be purchased and installed to activate the respective features. Note that some models include factory installed licenses (refer to the model description).

SN1200, 1400, 4552

Licenses	Description
SNSW-IPR1	Enables the SmartNode to work as an IP router (forward packets between logical IP interfaces)
SNSW-VPN1	Software option for IPSec VPN, including DES/3DES and AES encryption, manual key exchange
SNSW-QSIG1	Enables QSIG Termination on the ISDN BRI and PRI ports (no tunneling, for tunneling use SmartWare Release 2.20)

SN4110, 4520, 4830, 4900 Series

Licenses	Description
SNSW-VPN1	Software option for IPSec VPN, including DES/3DES and AES encryption, manual key exchange
SNSW-CSBRG	Enables the SmartNode to setup nailed-up connections between FXS ports for voice-band leased line replacements over IP

SN2000 Series

Licenses	Description
SNSW-IPR2	Enables the SmartNode to work as an IP router (forward packets between logical IP interfaces)
SNSW-VPN2	Software option for IPSec VPN, including DES/3DES and AES encryption, manual key exchange
SNSW-QSIG2	Enables QSIG Termination on the ISDN BRI and PRI ports (no tunneling, for tunneling use SmartWare Release 2.20)

SmartWare Features

This section provides an overview of the SmartWare features provided with release 3.20.

Note that hardware dependent features (e.g. FXS features) are only available on the respective models equipped with the corresponding ports.

Also Note that some features are only available in the corresponding Feature Sets. Refer to the available Feature Sets for each SmartNode model Series.

Features	Specification and Notes
Voice Processing	
Voice Codecs SIP, H.323, MGCP	G.711 (64k a-law, μ-law), G.723.1 (6.3k), G.729, G.729a (8k) G.729b, G.726* (16k, 24k, 32k, 40k), G.727* (16k, 24k, 32k), **G.726-CISCO (16k, 24k, 32k)** * H.323 vendor ID specific, SIP and MGCP standard
Transparent Codec for ISDN data calls	64k without echo cancellation. For ISDN B-channel Data Transmission
Echo cancellation	G.168 compliant 25ms length adaptive echo canceller
DTMF Detection and Generation and Relay	In-band (within audio stream), Out-of-band (According to H.323 User Input Indication or according to RFC 2833 over RTP)
Silence suppression and comfort noise	Yes
Configurable dejtter buffer	Configurable 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, **configurable RTP port range**
Voice Signaling	
ISDN BRI Signaling	Euro ISDN EDSS-1 (ETSI BRI /NET3)
	Standards: 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)
	Compliance: TBR3
	Additional Features: Send ISDN time based on system time
	Japan BRI (NTT 64): **uLaw support on B-channels, no overlap dialing acc. to NTT 64 standard**
ISDN PRI Signaling	Euro ISDN EDSS-1 (ETSI PRI / NET5)
	Standards: 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)
	Compliance: TBR4
	US T1/PRI ISDN NI-2
	Nortel DMS- 100 : **based on NI-2 without inband information indication**
QSIG (PSS-1) (K)	ECMA-142/143, 148 pre-1995 and current channel numbering

Features	Specification and Notes
FXS Signaling	Dialing methods: DTMF or Pulse
	Caller-ID: Type-1/2 FSK FSK according to ITU V.23 and Bell 202 (pre- or mid-call) Standards: PSTN Subscriber line protocol over the local loop for display services; Part 1: On hook data transmission (ETS 300 659-1, February 1997) Part 2: Off hook data transmission (ETS 300 659-2, September 1996 Draft) is not implemented
	Compliance: TBR-21, Euro POTS (ETSI EG201 188)
	Supplementary Features: Flash-Hook with configurable duration End of call signaling with configurable loop brake and busy tone Call Connect signaling with Battery-reversal
FXS Country Profiles	CH (Swiss), US, GB (UK), ZA (South Africa), ETSI (e.g. for ring voltage, cadence etc) Additional profiles on request
FXO Signaling	Off-hook and ring detection supervision Automatic and programmable line gain Programmable ring count before call pick-up
	End of Call detection by Line drop (call release indication) and busy tone detection Battery reversal detection
	Hook-Flash sending: programmable duration, H.245 Hook-Flash relay ("!" in user input) DTMF send and detect: programmable interdigit timer, DTMF-Relay
	Caller ID FSK CLI reception and relay to VoIP Signaling (Bellcore/ANSI and ETSI/ITU) Call routing based on Caller ID
	Second dial-tone for two-stage DTMF dialing, Call routing based on DTMF numbers
FXO Country Profiles	CH (Swiss), US, GB (UK), ZA (South Africa), ETSI (e.g. for ring voltage, cadence etc) Additional profiles on request
Calling Features	
PSTN Gateway features H.323 (features supported by a SmartNode connected to the PSTN through ISDN BRI/PRI or FXO ports)	Call on Hold and Resume initiated on remote end-point (Empty Capability Set) Blind call transfer initiated by remote endpoint (H.323v1) Attended Call transfer initiated by remote endpoint (H.323v1) CLIP, CLIR, DTMF-Relay
PSTN Gateway features SIP (features supported by a SmartNode connected to the PSTN through ISDN BRI/PRI or FXO ports)	CLIP, CLIR (draft-sip-privacy-01) Call Forward CFU, CFB, CFNR configured on remote end-point (accept 303 temp moved) Call Hold and Resume initiated on remote end-point (rtp port 0) Blind Call Transfer initiated on remote end-point (accept 303 temp moved) Attended Call Transfer initiated on remote SIP end-point (Passive)
FXS Terminal Gateway Features (features supported for PSTN Phones connected to a SmartNode FXS port)	Call Waiting: reject (flash 0), terminate and accept (flash 1), hold and accept (flash 2) toggle between calls (flash 2)
	2nd Call Offering: get dial tone (flash), toggle between calls (flash 2)
	Call Blocking: Can be configured using call routing tables
	Fast Dial: Can be configured using Called Party Number mapping function
	Attended Call Transfer: Hang up with one active call and one call in hold (see above) and the two calls are connected locally
	Caller-ID (Bell, ETSI see FXS specs)

Features	Specification and Notes
BRI Terminal Gateway Features (features supported for ISDN phones connected to a SmartNode BRI port in point-multipoint configuration; S-BUS)	Q.931 Call Hold and Retreive
	Q.931 Call Waiting: Supported by ISDN phones upon 2nd call setup from NT
	2nd Call Offering: Supported by ISDN phones through hold and 2nd call setup
	Caller-ID: CLIP and CLIR
	Keypad and/or DTMF dialing (configurable)
Call Routing	
Local switching	Switched 64kbit/s circuits between ISDN So and S2m ports. Controlled by Session Router
Session Router Routing Criteria	Virtual Interfaces Called party number (Destination) Calling party number (Source) Time of day, day of week, date ISDN bearer capability Number type manipulation Longest prefix match, wildcard match, regular expression match **Manipulate and make routing decisions depending on the redirecting number and redirect reason properties.**
Number Manipulation Functions	Replace numbers Add/remove digits Regular Expressions
Fallback Routing	Soft Fallback to alternative interface or Call Router table
Interface hunt groups	Hunting of free channels over multiple call destinations (any port) Cyclic or bottom-up hunting Forced hunting with configurable timeout Configurable release rode list for hunt causes
Distribution Groups	Distribution of calls to multiple destinations (ring multiple phones) Immediate distribution and delayed addition of destinations Cyclic distribution starting at a different destination for each call
Call Limiter	Limit maximum number of concurrent calls Limit maximum call rate per day/hour/minute/second Allows Overflow routing to different destination Configurable release code for dropped calls
Second Dial-Tone Service	Accepts calls and plays a dial-tone or an announcement message (from a server) Allows routing of calls based on inband DTMF dialed digits
ISDN broadcast message routing	not supported
Conversion of Number Formats	'unknown', specific ('national', 'international')
VoIP Signaling	
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 H.245 tunneling H.235 secure RAS Fax-Bypass (G.711) T.38 Fax-Relay

Features	Specification and Notes
SIP	RFC2806: URLs for Telephone Calls RFC3261: SIP: Session Initiation Protocol RFC 3264: SIP SDP codec negotiation RFC3263: Session Initiation Protocol (SIP): Locating SIP Servers, DNS SRV records draft-ietf-sip-cc-transfer-02 draft-ietf-sip-cc-transfer-05 draft-ietf-sip-refer-02 draft-ietf-sip-replaces-01 draft-ietf-sip-session-timer-04 draft-ietf-sip-session-timer-08 Caller ID (without CNIP) Support for proxy and redirect servers CLIR (receive from PSTN) RFC2833: DTMF Relay Fax-Bypass (G.711) T.38 Fax-Relay Compression CODECs Session Timer Record-Routing Authentication Handle receive re-invites Fax/Modem bypass Remote Party ID (called and calling number)
T.38 (UDP)	ITU-T recommendation for real-time Fax over IP Fax Gr 3 up to 14.4 kb/s, UDP redundancy
MGCP/SCTP/IUA	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, AUEP, 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
Data Link Layer Features	
IEEE 802.3 Ethernet	CSMA/CD, ARP, **ARP display, ARP flush** **Multinetting support for multiple IP addresses on Ethernet ports**
IEEE 802.1p/Q VLAN	Send and receive VLAN and mixed VLAN non-VLAN frames **Multiple VLANs per Ethernet port** **Mapping of all 8 CoS values to internal traffic classes and vice versa**
Frame Relay	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

Features	Specification and Notes
PPP	PPPoE and PPP over Leased Line, Authenticated or non-authenticated connections. Serial Ports (X.21/V.35): 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 SHDLC. 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. **Forced reconnection after timer expiration. Allows to reestablish a PPP connection at a predefined time to avoid arbitrary interruptions.**
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
IP Routing	
IPv4 Router	Yes
RIPv1, v2 (RFC 1058 and 2453)	Yes
Programmable static routes	Yes
ICMP redirect (RFC 792)	Yes
Ping DoS Detection	The SN will only respond to maximum 10 pings per second. Higher Ping rates are detected as Denial of Service (DoD) attacks and no response is sent.
Packet fragmentation *	IP layer fragmentation for reduced voice latency on low bandwidth WAN links
NAT Features	NAT Static and dynamic using public address pools NAPT **Multiple public IP per system (support for public DMZ interfaces)** **Configurable cone (full-cone, restricted, port-restricted, symmetric)** **DMZ-Host for general port forwarding to private IP** **Configurable port preservation** Static port mapping entries for the following protocols: ah, esp, gre, ipv6, tcp, udp Support for multiple GRE/ESP tunnels through NAPT Application level gateway for FTP
Static Firewall ACL	Access Control Lists (ACL), IP traffic filter for source, destination address, port and protocol
VPN Support	IPSEC AH & ESP Modes, pre-shared keys, AES/DES/3DES Encryption **IPSec tunnels with URL (dynamic IP) peers** **NOTE:** VoIP RTP can not be tunneled through IPSec.
VPN Pass-Through	Multi-host VPN pass-through. Hosts connected to the private LAN can establish PPTP/GRE and IPSec/ESP tunnels through the SmartNode NAT/PAT router. The pass-through does not support L2TP.

Features	Specification and Notes
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, netmask and DNS servers.
DNS Resolver and Relay	Resolves URL to IP address. Multiple DNS Servers (max 3), Local DNS resolver cache for up to 1000 hosts. DNS resolution can be used for: ping, traceroute, tftp, SIP remote gateways, SIP servers SNMP traps, SNTP servers and Radius servers.
DynDNS	Registration of static (permanent) hostname for a dynamic IP address. Uses www.dyndns.org services. The following DynDNS services are supported by the client: Dynamic DNS Static DNS Custom DNS Mail exchanger and backup mail exchanger registration is also supported.
IP Quality of Service	
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 **Multiple VLANs per Ethernet port** **Mapping of all 8 CoS values to internal traffic classes and vice versa**
Traffic classification	Classification of routed IP traffic according to source, destination address, port and protocol (ACL)
Traffic scheduling	Priority for local-voice Weighted fair queuing (WFQ) and shaping of traffic classes Configurable burst tolerance Hierarchical traffic classes Policing of traffic classes (discard excess traffic)
DownStreamQoS™	Dynamic restriction of inbound (downstream) TCP traffic to free bandwidth for voice packets. Improves voice quality in the receiving direction. **Support of routed VoIP traffic in DownStreamQoS (VoIP terminals connected on the LAN side)**
Management	
Industry standard CLI	Fully documented "Cisco-like" CLI **Timed execution of CLI commands (system timers)** On-line or off-line configuration editing
Web GUI	**Web based access to system configuration (IP, DNS, SIP, H.323, Call router etc)** **The following features are NOT yet configurable in the web GUI.** **IPSEC VPN, V.35/X.21/Framerelay, RIP, RADIUS, SNMP, Debug Monitors**
Local console and remote Telnet access	Password protected Multiple user accounts with operator and administrator rights
RADIUS Authentication for Login	Allows to authenticate Telnet and Console login attempts on a RADIUS Server
TFTP configuration down- and upload	Yes
TFTP firmware download	Yes
SNMP	SNMPv1 Agent (MIB II and private MIB), SNMP triggered software download SNMP triggered configuration up-/ and download SNMP triggered system reboot MIB-2 interface MIB objects to support network monitoring applications (e.g. MRTG)
Auto-Provisioning	**Auto-Provisioning settings for timed or periodical configuration and software updates. Automatic download of new configurations.** **Graceful reload restarts unit only if no open calls exist.**

Features	Specification and Notes
SNTP client	Anycast, Multicast, Unicast, 2 SNTP server addresses
Built-In Diagnostic Tools	ICMP Ping and traceroute CLI call application ISDN protocol trace (layer 1 to 3) H.323, SIP, 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 IC-4BRV-8V	IC4FXS
Supported HW versions	IC-E1V v3	IC-4BRV v2 IC-4BRV-8V v3	IC-4FXS v1
Voice Processing			
Voice Codecs SIP, H.323, MGCP/IUA	G.711 (64k a-law, μ-law), G.723.1 (6.3k), G.729, G.729a (8k) G.729b, G.726* (16k, 24k, 32k, 40k), G.727* (16k, 24k, 32k) * H.323 vendor ID specific, SIP and MGCP standard		
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	In-band (within audio stream), Out-of-band (According to H.323 User Input Indication or according to RFC 2833 over RTP)		
Silence suppression and comfort noise	Yes		
Configurable dejtter buffer	Configurable 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		
Signaling and Compliance			
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) TBR4	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) TBR3 Send ISDN time based on system time	ETSI TBR-21
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

SmartNode™ Hardware Specifications

This section provides detailed SmartNode hardware specifications.

SmartNode 1000 Series

Hardware Specification	SmartNode 1200	SmartNode 1400
System		
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 VoIP channels	2	4
Voice Connectivity		
ISDN Interfaces	2 ISDN BRI So (S/T), RJ45 One Usr (TE) port, One Net (NT) port	2 ISDN BRI So (S/T), RJ45 Both configurable as Usr (TE) or Net (NT)
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
Data Connectivity		
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
Packaging		
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
Compliance		
Safety	EN60950	EN60950
EMC	EN55022, EN55024	EN55022, EN55024
CE compliant	Yes	Yes
Telecom	TBR3	TBR3
Environmental Conditions		
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 4552 Series

Hardware Specification	SmartNode 4552
System	
Processor Type CPU	Motorola MPC875
System Memory	16 MB SDRAM
Flash Memory	4 MB
Power Supply	External Power Adapter (100-240VAC, 50-60Hz) 2.5mm barrel type Conn. Output: 5V DC, 5W (Center pin is +)
Power dissipation	4W
Number of DSP VoIP channels	2
Voice Connectivity	
ISDN Interfaces	2 ISDN BRI So (S/T), RJ45, One Usr (TE) port, One Net (NT) port, point-point and point-multipoint configurable
ISDN Line Power	With external Phantom Power Supply (SN-PM-BRI-EXT/230/EU)
Power-down Bypass Relay	Yes (Life Line Support)
Data Connectivity	
WAN Uplink	10/100bTX Ethernet (RJ-45), auto-sensing, auto-MDIX, configurable speed and duplex operation
LAN	4-port, 10/100bTX Ethernet switch (RJ-45), auto-sensing, auto-MDIX
Packaging	
Chassis	Plastic desktop case, Fire retardant (V0 rating or Better) Color: black
Dimensions (W/H/D)	18.4 cm x 3.8 cm x 16.5 cm / 7.25" x 1.5" x 6.5"
Unit Weight	0.52 kg / 1.15 lbs
Shipping Weight	1.4 kg / 3.1 lbs
Export Information	ECCN export number: 8517.50.1000, Country of origin: United States of America, NAFTA
Compliance	
Safety	EN60950, CB scheme
EMC	EN55022, EN55024, FCC Part 15 Class B
Telecom	TBR3
CE compliant	Yes
Environmental Conditions	
Operating Temperature	0 to 40°C / 32 to 104°F
Storage Temperature	-25 to +85°C / -13 to 185°F
Relative Humidity	5 to 95%, non-condensing
Operating Altitude	0-4,572 meters / 0–15,000 feet
Ventilation requirements	None (refer to user guide for placement recommendations)

SmartNode™ 4110 4520 Series

Hardware Specification	SmartNode 4110 Series	SmartNode 4520 Series
System		

Hardware Specification	SmartNode 4110 Series	SmartNode 4520 Series
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
Voice Connectivity		
FXS ports	2, 4, 6, or 8 depending on model	
FXS Characteristics	2-wire loop start, RJ-11, Short haul 1.1km @ 3REN (300m for 8 port model) Ring Voltage: 30 VRMS On-hook Voltage: 29 VDC	
FXO ports	2 or 4 depending on model	
FXO Characteristics	2-wire loop-start presented as an RJ-11 (RING=4; TIP=3; 6-position plug as specified in FCC 47, CFR 68.500) No ground start 2.5kV line isolation Surge Protection: Voice Ports: Tip & Ring protected by 270 V side actor	
Data Connectivity		
On-board Ethernet	1 Ethernet 10/100bT, RJ45, auto negotiation, half or full duplex	2 Ethernet 10/100bT, RJ45, auto negotiation, half or full duplex, auto MDI-X
Console Port	RS-232, RJ45 EIA-561 (Patton) pinout	RS-232, RJ45 EIA-561 (Patton) pinout
Packaging		
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
Compliance		
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	FXO: FCC Part 68, FCC 47, RTTE 99/5/EC, Canadian CS-03, CFR 68.500 (Connector) FXS and FXO: TBR-21	
Environmental Conditions		
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™ 4830 Series

The SmartNode 4830 series hardware corresponds to the SN4520 series in all aspects except the additional WAN port. The following table provides WAN port specifications. For the rest refer to the table above.

Hardware Specification	SmartNode 4830 Series
System	
Processor Type CPU	Motorola MPC875
System Memory	32 MB SDRAM
Flash Memory	8 MB
WAN ports	
V.35 port ("C" models)	DTE, up to 2 Mb/s, clock-inversion, DB-25 connector (V.35) female, PPP or Frame-Relay
X.21 port ("D" models)	DTE, up to 2 Mb/s, clock-inversion, DB-15 connector (X.21) female, PPP or Frame-Relay

SmartNode™ 4900 Series

Hardware Specification	SmartNode 4900 Series
System	
Processor Type CPU	Motorola MPC875
System Memory	32 MB SDRAM
Flash Memory	8 MB
Number of DSP VoIP channels	12 – 32 depending on model
Power Supply	RUI models: Redundant Internal Universal AC Input power supply voltage range 100–240 VAC, 50/60 Hz via IEC-320 connectors. Current rating 5.4 A, 65W.
	RUI models: DC power supply with -36 to -72VDC via terminal block. Current rating 4.2 A at 12 VDC, 50W.
Voice Connectivity	
FXS ports	12, 16, 24, or 32 depending on model
FXS Characteristics	2-wire loop start, RJ-11, Short haul 1.1km @ 3REN (300m for 8 port model) Ring Voltage: 30 VRMS On-hook Voltage: 29 VDC
Data Connectivity	
On-board Ethernet	2x Ethernet 10/100bT, RJ45, auto-sensing, auto-negotiation, Auto-MDIX, configurable speed and half or full duplex
V.35 port ("C" models)	DTE, up to 2 Mb/s, clock-inversion, DB-25 connector (V.35) female, PPP or Frame-Relay
X.21 port ("D" models)	DTE, up to 2 Mb/s, clock-inversion, DB-15 connector (X.21) female, PPP or Frame-Relay
Console Port	RS-232, RJ45, EIA-561 (Patton) pinout
Packaging	
Chassis	19" rack mountable chassis with active cooling, powder coated steel, black
Dimensions (W/H/D)	1 U height (1.75 inches / 4.44 cm), 19-inch (48.26 cm) width, 12 inches (30.48 cm) depth
Unit Weight	4 kg / 9 lbs
Shipping Weight	5 kg / 11 lbs
Export Information	ECCN export number: 8517.50.1000, Country of origin: United States of America, NAFTA
Compliance	
Safety	EN60950, IEC 60950
EMC	EN55022, EN55024, FCC Part 15 Class A

Hardware Specification	SmartNode 4900 Series
CE compliant	Yes
Telecommunications	FXS: TBR-21 Euro POTS (ETSI EG201 188)
Environmental Conditions	
Operating Temperature	0 to 40°C / 32 to 104°F
Storage Temperature	-25 to +85°C / -13 to 185°F
Relative Humidity	5 to 95%, non-condensing
Operating Altitude	0-4,572 meters / 0–15,000 feet

SmartNode™ 2000 Series

Hardware Specification	SmartNode 2300	SmartNode 2400
System		
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
Voice Connectivity		
None *(Depending on PMC interface cards mounted in slots) See section interface cards*		
Data Connectivity		
On-board Ethernet	1 ETH 10/100bT, RJ45 auto negotiation, half- or full-duplex 1 ETH 10bT, RJ45 half- or full-duplex	2 ETH 10/100bT, RJ45 auto negotiation, 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
Packaging		
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
Compliance		
Safety	EN60950	EN60950
EMC	EN55022, EN55024	EN55022, EN55024

Hardware Specification	SmartNode 2300	SmartNode 2400
CE compliant	Yes	Yes
Environmental Conditions		
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-8V interface cards for the SmartNode 2000 series. The IC-E1V provides one ISDN S_{2m} interface, IC-4BRV-8V provides 4 ISDN S_0/T_0 interfaces. The IC-4FXS provides 4 analog FXS interfaces. All cards are active gateway cards with their own CPU, memory and DSP resources.

Hardware Specification	IC-E1V	IC-4BRV-8V	IC-4FXS
System			
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 / PM-40V-INT	Line Power for each FXS port. Requires optional power module PM-48V-INT / PM-40V-INT
Voice Ports			
Physical Connection	1 ISDN balanced 120 Ohm E1, RJ45 ETS 300 011 Configurable Net or Usr (NT/TE) operation	4 ISDN BRI S/T, RJ-45 all ports configurable for Net or Usr (NT/TE) operation 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	No	No
Clock Accuracy	50ppm on internal clock (if not synchronized to network)		N/A
FXS Characteristics	N/A		2-wire loop start, RJ-11, Short haul 1.1km. 1 REN per port (cyclic ringing)
Ring Voltage	N/A		30 VRMS
On-hook Voltage	N/A		29 VDC
Packaging			
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
Compliance			

Hardware Specification	IC-E1V	IC-4BRV-8V	IC-4FXS
Safety, EMC, CE	EN 60950, EN55022, EN55024		
Physical	ITU-T G.823 Clock Jitter and Wander		
Environmental Conditions			
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)

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