

SOPHO iS3000

Hybrid communication system

Key features

- Scalable communication system offering TDM and IP telephony
- Modular architecture for flexible and expandable system configuration
- Facilitates step-by-step migration to a converged voice/data environment
- Support of open SIP standard by SIP@Net call processing software
- SIP@Net IP call-processing software platform adds feature richness and enables the easy addition of further applications
- In-System IP gateway for IP trunks and IP extensions
- Open communication standards enable the integration of external applications
- Very high system availability
- Fast loading and restart times
- 19-inch housing
- Economical power consumption
- Suitable for high levels of communication traffic and multifunctional applications



The SOPHO iS3000 communication platform, together with SIP@Net, fulfils the modern communication needs of small to very large organisations. Open and flexible, the SOPHO iS3000 platform is IP-proof and offers a comprehensive migration path for your business.

The iS3000 can be configured fully modular to suit all sizes of business, offering between 20 and 65,000 extensions (analogue, digital, cordless and IP).

The SOPHO iS3000 platform is the cornerstone of migration towards a converged network and the SOPHO communications framework of next-generation platforms and applications. The platform's SIP@Net call processing software offers full SIP functionality across extensions, trunk lines and applications.

The system is equipped with native Ethernet interfaces for TCP/IP protocol transmissions, as well as the transmission of voice packets (VoIP). In addition, it is also possible to combine circuit- and packet-switched environments within a single, integrated network.

The system is housed in 19-inch units which can be mounted in 19-inch server racks, or accommodated as floorstanding or wall-mountable modules.

General architecture

The SOPHO iS3000 architecture provides a combination of IP telephony and traditional solutions, resulting in a hybrid system that incorporates the best of both IP packet switching and traditional TDM technology. With its roots in TDM, the SOPHO iS3000 has been updated to a fully hybrid PBX. It supports the broad range of critical voice features and functions with which users are familiar, now in a converged network environment. The new IP call-processing software platform – SIP@Net – forms the basis of migration to a converged network.

An In-System IP Gateway (ISG) incorporated within the SOPHO iS3000 provides an embedded IP-switching module, which registers, interconnects and processes all IP end-points on the network, covering a wide range of SIP-based devices. The ISG also provides trunking between SOPHO systems, SOPHO IP servers and SIP providers.

Uniform hardware architecture and a common software platform produce a scaleable hybrid PBX that can be tailored to meet the needs of different organisations, through customisation or the addition of applications and/or capacity.

This uniform hardware platform is based on distributed architecture that divides the iS3000 platform into four functional modules:

- Central processor Module (CM): responsible for overall system operation, storage of user data and providing central access to external applications.

- Switching network Module (SM): establishes 64 Kbits/s transmission paths between end-users, by means of a single-stage, non-blocking PCM/TDM switching matrix.
- In-System IP switching module: registers, interconnects and processes IP end-points, such as SIP IP phones.
- Peripheral Module (PM): houses the plug-in boards that interface with end-user devices. A PM has access to up to 320 64 Kbits/s transmission paths and can accommodate up to 10 plug-in boards. Larger systems can be assembled by adding PMs as required (up to a maximum of 31).

This distributed architecture relieves the central module of critical and time-consuming tasks, such as end-user equipment administration, and by separating the system into modules, improves its overall reliability.

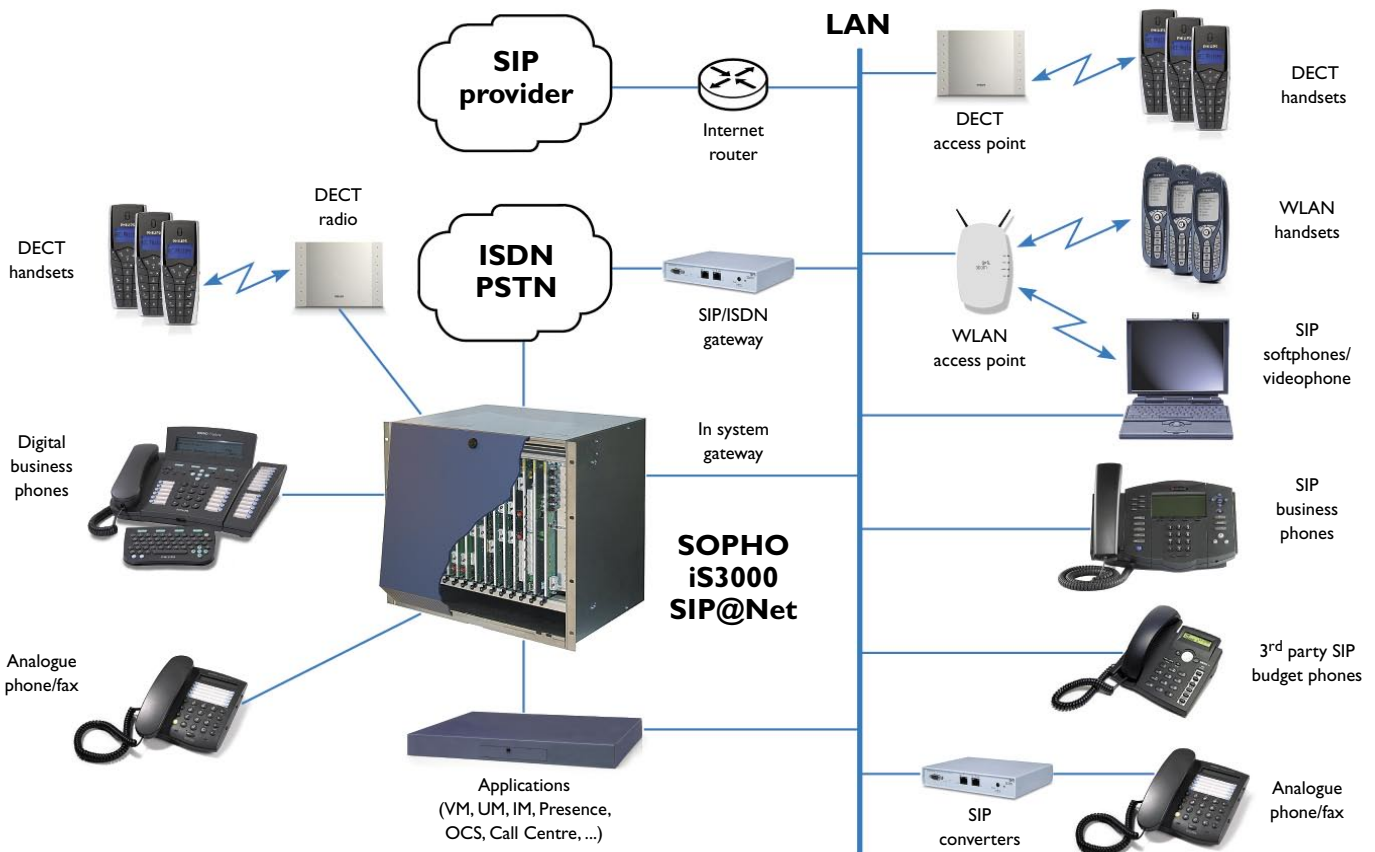
Central Processor Module

The characteristics of a SOPHO iS3000 system depends on the choice of processor unit, which comes in two variants:

- Single-card Central Processor Module;
- Multi-card, fault-tolerant Central Processor Module

A single, common operating system provides a uniform software platform for call processing, operational maintenance, system assurance and the various end-user applications included in the SIP@Net system software.

Freely configurable I/O ports enable the central connection of external applications, such as Microsoft Communicator; manage-



ment systems, call logging devices, maintenance terminals, contact centre supervisors or remote service/management centres.

The initial system configuration and subsequent software upgrades of a iS3000 are performed by downloading the system software and user data from an Operational Maintenance PC.

Single-card Central Processor Module

The heart of the Central Processor Modules is the CPU3000 card. This central card contains a 32-Mb Dynamic Random Access Memory (DRAM) module for the storage of dynamic data and the execution of software packages. A 32 Mb non-volatile Flash EPROM memory (SIMMs) is also included on the central card. This EPROM memory is used to store software packages and other data that need protection against power failures.

As an extra option, an Accelerator Module (AM) can be added to the CPU3000 card to increase processing speed.

The CPU3000 card has a 10baseT Ethernet connector for: CTI applications; signalling in IP networks and to IP phones; and for up- and downloading - via File Transfer Protocol (FTP) - system files, such as Operational Maintenance execution Alarming, MyOffice@Net applications and call record information.

Fault-tolerant Central Processor Module

The fault-tolerant Central Processor Module ensures maximum system availability. Four identical Central Control Slices (CCS) operate in parallel, according to Philips' patented (4/2) concept. The four processors synchronously execute the same instructions and these are continuously verified by an automatic error recovery algorithm.

This algorithm is implemented in the hardware and ensures that a single- or double-bit fault, and even a fault that has affected an entire instruction, is detected and recovered without any loss of system continuity. This continuous process of hardware verification ensures that memory faults, processor faults or even the breakdown of an entire CCS are ruled out instantaneously, without the need for complex diagnostic software.

IP-switching Module (In-System Gateway)

The IP-enabling functions for trunks and extensions are made available through In-System Gateways (ISG), of which a maximum of 10 is available per system. The ISG is part of the IP-enabling concept, allowing the establishment of VoIP media channels between an iS3000 Series system and IP terminals, the IP DECT infrastructure or the SOPHO IP server. It also allows the establishment of system-to-system media-channels (IP trunks). For a connection to non-SOPHO systems the ISG offers SIP and H.323 based interfaces.

Each ISG requires one slot/unit group and the ISG offers 10 IP channels as standard. Up to 30 channels per ISG are possible and each ISG offers a 10/100baseT Ethernet interface. The ISG supports voice compression according to G.711 and G.729A, T38 fax support for iS3000 networks and has an on-board power supply. A maximum of 1,000 IP extensions is possible per system.

Peripheral Module

The Peripheral Module houses the plug-in boards that provide the interface with end-user equipment. One unit group shares 32 time-slots on the switching network, via a dedicated 2Mbits/s backplane bus. A few special positions have access to a full 2Mbits/s group. Different types of plug-in board can be freely mixed across the available positions. A plug-in board can be inserted in a free position without disconnecting the power or restarting the system.

Plug-in boards

A wide variety of plug-in boards is available to interface an iS3000 system with all major types of analogue, digital or IP extensions, along with business phones, IP phones, public trunks, private tie-lines, IP trunks, cordless handsets, integrated announcers, operator consoles, voice processing systems, front-end office equipment and conference units. Each plug-in board has been carefully designed to support a maximum number of circuits (between four and 32, depending on the interface type and the complexity of the wiring scheme). Multifunctional plug-in boards are provided to facilitate and optimise system configuration. This applies in particular to the 2B+D ISDN card, which can be set in different modes: extension, trunk or tie line.

The In-System IP Gateway card controls the IP interfacing for simultaneous IP extension, IP trunk, IP DECT or IP server use.

Housing

The 19-inch housing of the iS3000 enables the system to integrate smoothly in present-day IT environments. The 19-inch module is designed in such a way that it can be mounted in 19-inch server racks, as well as be accommodated in a floor-standing or wall-mountable fashion.



The environment of the system should adhere to the ETS 300012 class 3.2 standard, which applies to partly temperature-controlled locations. This means that heating, cooling, forced ventilation and humidification of the equipment room are not mandatory.

MDF cabinet

The iS3000 single consists of a maximum of four 19-inch Peripheral Modules placed on top of each other. This stack can be placed inside a 19-inch rack or as a floor-standing configuration.

In case of floor-standing, a base unit with adjustable feet ensures stable floor-standing.

Wall mounting for one 19-inch module is offered by means of a special wall mounting bracket.

Interconnection from system cards to external cabling is available in the following variants:

- A special iS3000 patch panel with 24x RJ45 connectors and SOPHO connectors for fast mounting
- A traditional Sofycom-based MDF in 19-inch outline with 240/240 internal /external connections
- A traditional Sofycom-based MDF for wall mounting with 400/400 internal /external connections
- A traditional Sofycom based freestanding MDF with 1664/2080 internal /external connections

Interfaces

The following is an overview of the wide variety of interface types supported by the different plug-in boards for the SOPHO iS3000.

Analogue extensions:

- Tone/pulse dialling
- Earth, flash, dial one recall

Digital extensions:

- B+D Uko (2-wire, 2B1Q)
- 2B+D Upn (2-wire, Philips)
- 2B+D S0 (4-wire, ISDN TBR3)

IP extensions:

- 10/100 Mbit/s Ethernet
- TCP/IP
- G.711 A-law, G.729A, AB
- QoS (802.1Q/p, ToS)
- SIP (RFC 3261)

Cordless extensions:

- DECT (GAP standard)
- WLAN (SIP standard)

Analogue trunks:

- Subscriber signalling
- DDI/DDO via pulse, MFC, DTMF
- Polarity detection
- Metering (50Hz, 12/16 kHz)
- Power failure switch (ESU)

Digital trunks:

- Euro ISDN:
 - ISDN Basic rate TBR3 (2B+D)
 - ISDN Primary rate TBR4 (30B+D)
- Channel Associated (CAS –2Mb/s):
 - MFC

IP trunks:

- 10/100 Mbit/s Ethernet
- TCP/IP, H.323, T.38
- G.711 A-law, μ -law, G.729A, AB
- ECMA 333
- QoS (802.1Q/p, ToS)
- SIP (RFC 3261)

Analogue tie lines:

- CEPT-L1
- E&M (2/4 wire)
- Loop disconnect
- Local battery

Digital tie-lines:

- 2B+D or 30B+D with:
 - BT DPNSS
 - ETSI QSIG

CSTA interface:

10Mb Ethernet TCP/IP connection (ECMA-179 Services CSTA phase 1).

Expert Services

The SOPHO iS3000 Series is fully supported by our Expert Services. This extensive portfolio of services provides the insight and support needed to get the most out of equipment and applications. The services offered comprise advice, design, customisation, integration, training, maintenance, continuous optimisation and Business Partner services.

Technical data

Power supply

The 19-inch based SOPHO iS3000 single processor, SOPHO iS3000 redundant processor can be powered directly from the mains. An optional battery back-up system or Uninterrupted Power Supply (UPS) can be installed to ensure continuous operation in the event of a power failure.

Mains:

- 100...240 Volt AC, 47...63 Hz
- Safety class I (EN 60950-1)
- Battery: 42 - 60V DC

Power consumption

3 Volt CMOS technology keeps power consumption at an extremely low level. Typical power consumption figures are:

- 70 W for each 19-inch PM shelf
- 0.7 W for each analogue extension
- 180 W for iS3000 fault tolerant 19-inch module

For digital extensions, these figures depend on the terminals connected. Each digital port supplies power to one or more ISDN terminals, in accordance with the ETS300012 standard (max. 4 W).

Performance

- iS3000 single:
 - 45,000 Busy Hour Call Attempts
 - 90,000 Busy Hour Call Attempts with Accelerator Module
- iS3000 fault-tolerant versions: 100,000 Busy Hour Call Attempts

Performance figures depend on the system configuration and software release.

Traffic

- iS3000 single: 600 Erlang
- iS3000 fault tolerant 3,000 Erlang

Transmission

Pulse Code Mode (PCM) coding in accordance with A-Law CCITT G711/712.

Switching

Non-blocking Time Division Multiplex (TDM) switching matrix, using 64 Kbits/s time-slots.

System capacity

	Single processor	Fault tolerant processor
Max. no. of 19-inch shelves	4	31
Max. no. of Remote Peripheral Modules	4	15
Max. no. of ports ¹⁾	1216	10000 ²⁾
Max. no. of cordless DECT handsets (0.2 Erlang) ^{1) 3)}	2560	2560
Max. no. of IP ports (0.2 Erlang)	1000	1000
Max. no. of trunks and/or tie-lines	600	2500
Max. no. of IP trunks	300	300
Max. no. of operators	8	31

1) the actual number of (usable) ports/subscriptions is determined by the installed software license.

2) max. 65,000 ports in a distributed ISPBX arrangement of up to 14 nodes.

3) up to 16,000 subscriptions are possible, depending on the traffic load.

Cabinet/MDF specification

Cabinet type	19-inch shelf	19-inch patch panel	19-inch MDF	Wall MDF	Floor MDF
Height	400 mm (9U)	44 mm (1U)	400 mm (9U)	740 mm	1960-2040 mm
Width	483 mm	483 mm	483 mm	440 mm	950 mm
Depth	408 mm (excl. cover) 468 mm (incl cover)	71 mm	107 mm	440 mm	525 mm
Weight fully equipped	28 kg	1 kg	2 kg	20 kg	95-115 kg
Capacity	11 slots	24 RJ45	240/240	400/400	1664/2080

System availability

State-of-the-art technology is used in order to reduce to an absolute minimum the number of system cards that can cause a failure. The fault-tolerant architecture has the capability of tolerating a card and/or link failure without any loss of system continuity.

- iS3000 fault tolerant: >99.999%
- iS3000 single: >99.97%

Mean Time Between (Fatal) Failure:

- iS3000 fault tolerant: > 250 years
- iS3000 single: > 7.5 years

The above figures assume a mean time to repair of two days.

Interface compliance

The SOPHO iS3000 Series complies with European Directives 73/23/EEC (Safety), 89/336/EEC (EMC), 1999/5/EC (R&TTE) and the Council Recommendation 1999/519/EC (EMF).

Telecommunication Interfaces in compliance with:

- ISDN Basic Rate: TBR3
- ISDN Primary Rate: TBR4
- DECT: EN 301 406 (TBR6), TBR10, TBR22
- PSPDN X25: TBR2
- 64 kbit/s digital unrestricted leased lines: TBR14

Electro Magnetic Compatibility

- EN301 489-06
- EN55024
- EN55022
- EN61000
- EN61000-3-3

Safety

- EN60950-1
- EN50360
- EN50385
- EN50371
- Council Recommendation 1999/519/EC

Environmental conditions

- Conforming to ETS300019
 - storage class 1.2
 - transportation class 2.3
 - stationary use class 3.1
- Temperature: -5° C to 45° C
- Humidity: 10% to 85%
- Compliant with EU directive 2002/95/EC (RoHS) and 2002/96/EC (WEEE)

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