THE GROUP OF COMPANIES

ПРОТОН-ССС

www.proton-sss.ru

Subject catalogue

Telecommunication platform Proton-SSS

The group of companies Proton-SSS is the leader between innovation enterprises of The South Federal District of Russian Federation. It is one of three leading companies that develops and produces Russian telecommunication facilities and its software. The company has worked in the communication market for more than 10 years.

The main directions are:

- Exclusive development of telecommunication facilities and it's software.
- Independent manufacturing of telecommunication facilities or using the industry of adjacent enterprises.
- Licensed design of communication networks (projects developed by the company have passed the State testing). RDC SPETSSTROY-SVYAZ has a status of the General Designer.
- Licensing of the whole complex of assembling, starting-up and adjustment services on the Customer's objects.
- Research efforts and engineering development of perspective models of telecommunication facilities, technical and technological solutions for the New Generation Networks.
- Before-planning inspection (technical audit) of the communication objects to develop requirements specification for the design of the communication network.
- Technical maintenance of telecommunication facilities in the customer's objects.
- Training of the specialists of the Customer how to use and operate with all the range of Proton-SSS equipment in the Training and Consultation Centre of the company.

Production

The main production of the company is a telecommunication platform Proton-SSS. The telecommunication platform Proton-SSS is self-developed hardware-software complex with using electronic components that are produced by the leaders of telecommunication and computer market.

The organizational code for developers of construction documentation КЮГН (KUGN) has been approved according to the ГОСТ (GOST) 2.201 by the all-Russian scientific research institute for classification, terminology and information on standard and quality to define construction documentation which is developed by RDC SPETSSTROY-SVYAZ.

The Proton-SSS equipment has a State Presidential Committee certificate of conformity to the unauthorized access protection and lack of program tabs.

The company has the right to possess software according to the "Certificate of official registration of Computer program".

"Certificate of a trade mark (service mark) and "Patent on utility model" are issued to RDC SPETSSTROY-SVYAZ by the Federal agency of intellectual property, patents and trade marks.

Equipment of the telecommunication platform Proton-SSS has been certified by the Ministry of informational connection of the Russian Federation, has been tested and received certificates of conformity to the requirements of public corporation OAO RAO "UES of Russia" (РАО "ЕЭС»), Ministry of Internal Affairs. It was recommended for implementing in the Russian Railroads.

The company has received license of the Federal Security Service to develop protected means of connection, license of the Federal Industrial Agency to develop, manufacture and repair armament and defense technology.

RDC SPETSSTROY-SVYAZ has been included into the System of voluntary certification within Military Register Certification System (Voenny Registr) by the Department of Defense of the Russian Federation. Our enterprise accepts military equipment.

Productive capacity

The State instrument-making plant in Ryazan, electrotechnical plant of Losinoostrovsk, Federal State Unitary Establishment public corporation Almaz and public corporation Electroapparat in Rostov-on-Don, the plant Vektor in Ekaterinburg, instrument-making plant Omega of public corporation "National company "Kazachstan Engineering" manufacture telecommunication system Proton-SSS in commercial scale. Cumulative potential capacity of the enterprises is about 1000000 ports a year (1.5 billions of rubles a year).

Fields of application of the telecommunication platform Proton-SSS in modern operator and departmental communications networks.

Interdependent communication network of the Russian Federation (operator solutions)

Telecommunication platform Proton-SSS has been adapted to be included into already existing communication networks and those being built in Russia and CIS. The possibilities of the equipment can be extended by stages. The concept of multi-service network of NGN has been realized in the platform. There are services of IP-telephony, media-gateways, multi-service hosts (with integrated DSLAM), convergence of fixed and mobile communication networks.

There are the following functions realized in the telecommunication platform Proton-SSS:

- SS7 (MTP, ISUP-R),
- ISDN (2B+D, 30B+D),
- V5 interface,
- Transmission of voice data via data network with IP protocol (H.323 protocol, SIP, MEGACO/H.248),
- Secret Services,
- Connection to the public network via digital (1024 kbit/s, 2084 kbit/s) trunks.

Equipment can be used as:

- rural terminal exchange;
- rural Central Office;
- rural-city exchange;
- supporting exchange;
- local telephone exchange of city exchange;
- private-branch exchange;
- user traffic thickener;
- trunk-line board;
- special services unit.

Departmental technological and corporative communications network

Telecommunication platform Proton-SSS can be characterized as highly safe due to divided control and commutation, backing of the main functional modules (commutation fields, processors, power supply, controlling buses).

The platform supports common interface of distant monitoring and control both Proton-SSS equipment (commutation, transmission systems, subscriber access, media-gateways) and equipment of other Russian and foreign manufacturers.

It has security equipment against unauthorized access to information.

The equipment can be used as:

- central exchange of departmental connection;
- PBX;
- small departmental exchange;
- system of operative and dispatch communication;
- signaling converter;
- primary multiplexer;
- flexible multiplexer;
- media gateway;
- inter-network gateway;
- port-forming equipment;
- intelligent multi-service system.

The main advantages of telecommunication platform Proton-SSS are

- Profitable competitive price (Proton-SSS in the ratio price/quality corresponds to the best models of telecommunication facilities according to the opinion of the Association of Manufacturers of Carriers – AMC);
- Conformity to the requirements of the Russian departments;
- Exclusive self-developed (without using modules of foreign developers) software;
- Guaranteed information security of negotiations and steadiness of connection;
- In-built into facilities and software all specific (used only in Russia) internetting protocols which can barely be realized in other equipment or it takes big financial expenditure to realize it.
- High reliability of termination which is in schemata-based theorem and equipment construction;
- Certified network operational and maintenance system that affords to increase the efficiency of network management which may include facilities of other manufacturers; to abate costs to keep highly-qualified maintenance staff;
- Reduce expenses on development (building) telecommunication network in all stages (from inspection before planning to ready to work equipment) due to complex solution of the set tasks.
- Well-developed network of service centers on the territory of the Russian Federation that provides fast response on the difficulties appearing in the operational process.

Main customers

Telecommunication facilities Proton-SSS are successfully maintained in all regions of the Russian Federation, more than in 500 cities and settlements of Russia and the CIS (there are more than 600.000 ports).

Telecommunication platform Proton-SSS is used by several big system integrators .

We are developing business ties with the enterprises which are the part of the holding company Svyazinvest. We completed bilateral cooperation agreements with some subsidiaries of this operator. According to them the RDS SPETSSTROY-SVYAZ serves as an authorized system integrator.

Our commutation platforms are the basis of the departmental network of the Department of Justice in the Russian Federation. Proton-SSS is successfully maintained for a few years as the central exchange of the whole network in the headquarters of the Department of Justice.

Public corporation “Russian Railroads” uses a big amount of telecommunication systems, including the railways Gorkovskiy and North-Caucasus.

The network of interbasin connection of the inland water transport of the Transport Ministry Service is being built on the basis of the telecommunication platform Proton-SSS where RDC SPETSSTROY-SVYAZ is the general contractor of the project.

Power engineering specialists are also interested in our platforms. Departmental communication network of public corporation OAO RAO “UES of Russia” in several regions are built on the platform. These are Rostov, Volgograd, Smolensk, Bryansk, Volga regions and Yakuty, Krasnoyarsk Territory, Bashkiria. The equipment of Proton-SSS is installed in big nuclear power plants in Bilibinsk and Volgodonsk.

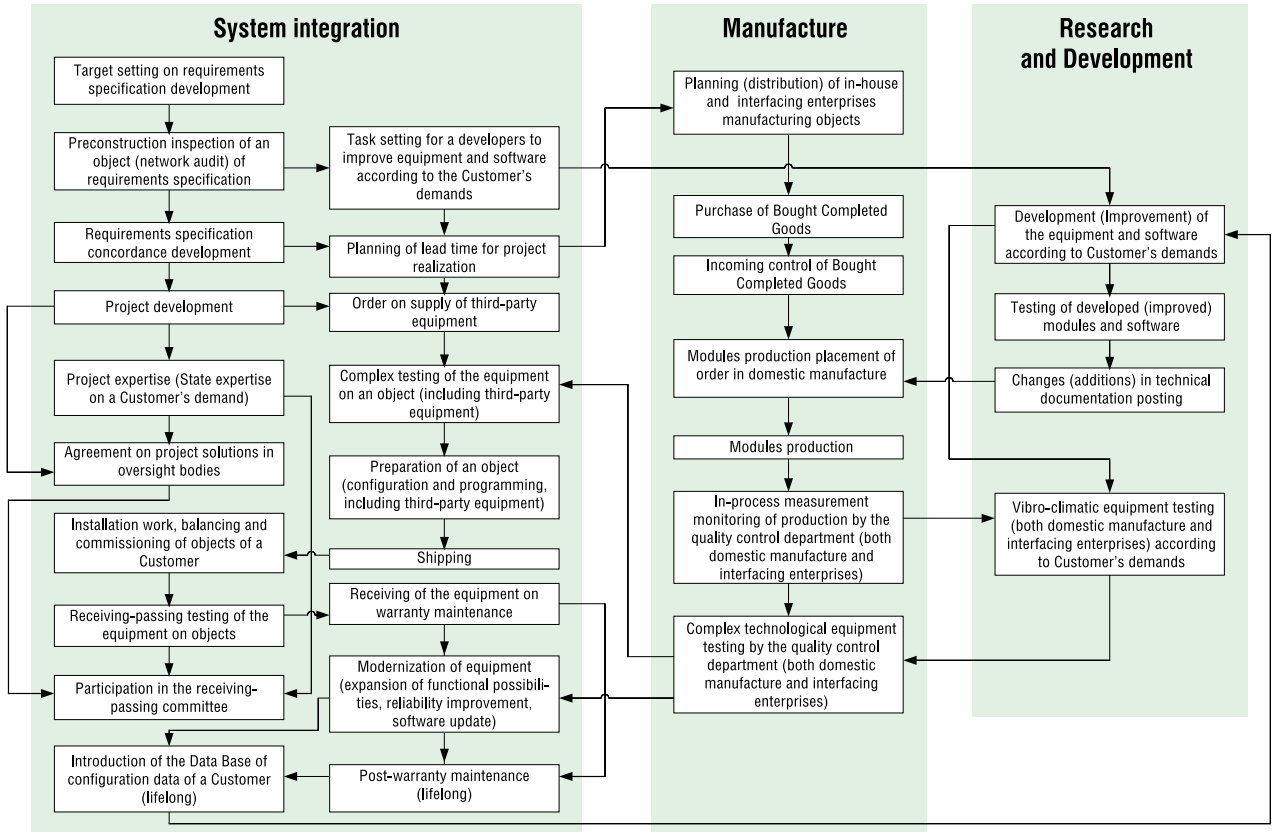
Different agencies of the Department of Defense in Russian Federation such as headquarters and regiments of the air force, signal office centers of naval bases and small fleet, local military commissariates know commutation platforms Proton-SSS as a high-quality product. Proton-SSS is used in the study process and research scientific work in educational institutions of High Military education, including Military Academy of Communication.

Net of offices of the Ministry of Internal Affairs in Chechen Republic is built on the telecommunication platform Proton-SSS.

A lot of communication statements use Proton-SSS equipment to realize a “Universal service” project.

We are fulfilling our obligations according to the federal program aimed at “Social development of villages up to 2010”.

Scheme of work package performance by the RDC SPETSSTROY-SVYAZ



Telecommunication system Proton-SSS

Telecommunication platform for modern operator and department communication networks

Field of application:

- supporting exchange;
- trunk-line board;
- rural-city exchange;
- terminal exchange;
- special services unit;
- local telephone exchange of city exchange;
- user traffic thickener;
- signaling converter;
- primary multiplexer;
- flexible multiplexer;
- media gateway;
- inter-network gateway.

It has been developed in order to suit all existing communication networks in Russia and CIS.

It provides modern communication network services (ISDN, Internet, data transfer, IP-telephony, wireless connection).

It can be characterized as a highly reliable unit because of its capabilities such as extended control and commutation, reservation of functional modules (switching fields, processors, power supply, control buses).

It supports an unified interface of distant monitoring and control of all the equipment under the brand Proton-SSS (commutation, transfer system, subscriber's access, media gateway).

Technical features	
General	
Capacity	Up to 30000 subscriber links and 5500 trunks
Switching field	360, 1680, 6720 channels (64 kbit/s), fully accessible, nonblocking, extensible
Specific load on subscribers links/trunks during the hour of the most load	Not less than 0.2/0.8 Erl
Synchronization	NSM (Network Synchronization module) of the 1st or 2nd level
Peripheral board	
The number of analog line (ISDN) digital system telephone sets (STS) of subscriber's links in PIU	15/8/30
The number of sets of analog trunks in PIU	15 of 2-wire; 6 of 3-wire; 8 of 4/6/8 -wire
Step of expansion of number of channels E1	1 or 4
Analog subscriber links	
	60 V/ 1800 Om, BORCHST; MB
Digital subscriber links	
	ISDN BRI – 2B+D, Uko/So; System telephone set – 2B+D, Upo
Digital network joints	
2048 kbit/s according to G.703/704	S2M interface, signaling SS7, EDSS1, Q.SIG Interface E1, signaling 1 CAS, 2 CAS (R1,5), R2
	Connection of the access equipment V5.2 (AN, LE)
1024 kbit/s	Signaling 1 CAS (PCM-15)
Analog network joints	
2-wire	In the subscriber's links of a counter exchange
3-wire	With a battery supply signaling and ANI (automatic number identification), pulsed shuttle (R1,5)
4-wire	Transmission system without CAS 1 high frequency 2600 Hz, 1 high frequency 2100 Hz, 2 high frequency 1200/1600 Hz, 2 high frequency 600/750 Hz
4/6/8-wire	E&M, 1 CAS of light rural code
Digital joints of data transfer	
	V.24/V.28; V.35/V.36; EIA-530/530A; RS-449; RS-232, RS-530A, X.21, V36; G.703/1 Codirectional/antidirectional (MAIN DIGITAL CHANNEL) Ethernet 10/100/1000 Base-T, 100Base-FX MMF, SMF, WDM
Stability to overvoltage and excess current in the telephone lines	
	According to the ITU-T K.20 recommendation
IP-telephony	
Interfaces	Ethernet 10/100/1000 Base-T, 100Base-FX MMF, SMF,V.35, E1
Protocols	H.323, SIP, MEGACO/H.248
shrinking algorithm	G.711, 723.1, 726, 729; GSM
Power supply	
Supply voltage	-60 V, -48 V (+/- 20 %) direct current; ~220 V (+10/-15 %) alternating current
Power consumption	Medium: 0.08-0.12 Wt/SL, peak: 0.4-0.6 Wt/SL
Control system	
	One-level/multilevel with SNMP, TAPI support
	On-line Call detail recording (CDR), monitoring
	System of maintenance and technical service with full diagnostics
	Centralized control system of distributed communications network
Service functions	
	Fully functional supplementary services including operative-dispatch communication, Caller ID; conference communication (up to 63 participants)
Construction	
The main module	Subrack 19", 6 U, 16 slots
Table-floor design	Cabinet 6 U, 500/300/300 mm, weigh not more than 15 kg
Case design	Case 19", 17-45 U
Connection of the cables to the module	Frontal to each board
Environment conditions	
Temperature	Working +10…+35° C; max working +1…+40° C
Relative humidity	20…80 %

Commutation modules of digital flows

Fully accessible digital flows and digital channels commutator is based on the intelligent platform of the Proton-SSS equipment

Field of application:

- long-distance (inter-city) host;
- tandems;
- cross-commutator;
- calls flow capacity concentrator;
- signalling converter.

Dynamic calls routing without reload of exchange.
Signalling protocols converting.
Support of all kinds of traditional telephony signalling.
On-line monitoring of calls and connections.
Registration of connections.
Flexible multiplexer functions, with cross-communication of channels.
Reservation of basic functional modules.

Technical features	
Number of PSM dialed-up flows	16-56
Synchronization	NSM (Network synchronization module) od the 1st, 2nd and 4th level
Feeding voltage	-60 V (+/- 20%), -48 V (+/- 20%) of direct current
Max. power consumption	Up to 135 Wt
Digital network joints	
	2048 kbit/s accord. G.703/704; signaling SS7, EDSS1, QSIG; 1 CAS, 2 CAS (R1,5), R2
Joints for configuration and monitoring	
	RS232, Ethernet
Control	
	– monitoring, statistic, full diagnostics of the equipment; – local and remote
Additional opportunities	
	Work connection organisation via subsidiary analog channels. It might include: IP-telephony gateway (H.323, SIP, G.723, G.729), integrated server, Ethernet-commutator, Coupling Module Device (economical interface to plug in Proton-SSS equipment), multiplexor Ethernet/E1, PCM-15 (1024 kbit/s). Connecting to the secret services equipment.
Construction	
The main design module	Subrack 19”, 6 U, 7-13 slots
Types and position of connectors	8 connectors (RJ-45) on the face panels of 8*E1 Module Modernized blocks
Environment conditions	
Temperature	Working +10…+35° C; max working +1…+40° C
Relative humidity	20…80 %

Digital thickener for subscribers

Digital thickener for subscribers with V5.2 interface

Certificate of conformity “Svyaz” № ОС/1-К-79

Field of application:

• Outstation of exchange capacity with concentration in the public network and departmental nets.

It

Allows to build a subscriber’s net optimally.

Reduces maintenance charges.

Creates a possibility to introduce new services (ISDN, Internet, ADSL, TriplePlay, video on demand).

Extends functions and number capacity of any telecommunication systems of foreign manufacturer.

Is compatible with EWSD, NEAX-61, SI2000, AXE10, MD-110 platforms and others.

Technical features	
Types of Supported terminal devices	
	– telephones according to the ГОСТ 7153-85; – paystations via ОСТ 45.147-99; – data transfer devices (commutation according to the telephone algorhytm); – digital terminals 2B+D
Analog subscriber line	60 V/1800 Om, BORCHST
Digital subscriber line	ISDN BRI- 2B+D, Uko/So
Connection to PTN	
	Via digital connection lines E1 (G.703), Interaction according to the V5.2 protocol
Firmness to the overvoltage and Overcurrent on the lines of telephone nets	According to the ITU-T K.20 recommendation
Maintenance and technical Service system interface	RS232, Ethernet
Control	
	– monitoring, statistics, full diagnostics of equipment and connected subscribers line; – local and remote. Remote control is made via work channel organized in one or several channel intervals of E1 flow. One may transfer via work channel user data (interface Ethernet, IEEE 802.3a)
Power supply	
Feeding voltage	-60 V (+/- 20%), -48 V (+/- 20%) of direct current, ~220 V (+ 10/-15 %) of alternating current
Power consumption	Medium: 0,08-0,12 Wt/SL; peak: 0,4-0,6 Wt/SL
Construction	
	Subrack 19”, 6 U, 16 slots, Connection of cables to the module – from the front-side to each plate
Environment conditions	
Temperature	Working +10…+35° C; max working +5…+40° C
Relative humidity	20…80 %

PBX Proton-SSS

Telecommunication platform for department communications networks

Field of application:

- private-branch exchange;
- operative communication system;
- signaling converter;
- primary multiplexer;
- flexible multiplexer;
- media gateway;
- inter-network gateway;
- autoinformer.

It has been developed in order to suit all existing communications networks in Russia and CIS.

It provides modern communication network services (ISDN, Internet, data transfer, IP-telephony, wireless connection).

It can be characterized as a highly reliable unit because of its capabilities such as extended control and commutation, reservation of functional modules (switching fields, processors, power supply, control buses).

It supports an unified interface of distant monitoring and control of all the equipment under the brand Proton-SSS (commutation, transfer system, subscriber's access, media gateway).

It has a set of protection means against unauthorized access to information.

It is used as a digital commutator SODC.

Technical features	
General	
Capacity of SL and TL	Up to 1680 subscriber links and 1680 trunks
Switching field	360, 1680 (64 kbit/s), fully accessible, nonblocking, extensible
Specific load on subscriber link/ trunks during the Hour Of The Most Load	Not less than 0.25/0.95 Erl
Peripheral board	
The number of analog line (ISDN) digital subscriber's links in PIU System Telephone Set (STS)	15/8/30
The number of sets of analog trunks in PIU	15 of 2-wire; 6 of 3-wire; 8 of 4/6/8 -wire
Step of expansion number of channels E1	1 or 4
Analog subscriber link	
	60 V/ 1800 Om, BORCHST; MB
Digital subscriber link	
	ISDN BRI – 2B+D, Uko/So; System telephone set – 2B+D, Upo
Digital network joints	
2048 kbit/s according to G.703/704	S2M interface, signaling SS7, EDSS1, Q.SIG Interface E1, signaling 1 CAS, 2 CAS (R1,5), R2
	Connection of the access equipment V5.2 (AN, LE)
1024 kbit/s	Signaling 1 CAS (PCM-15)
Analog network joint	
2-wire	In the subscriber's line of a counter exchange
3-wire	With a battery supply signaling and ANI, pulsed shuttle (R1,5)
4-wire	Transmission system without CAS 1 high frequency 2600 Hz, 1 high frequency 2100 Hz, 2 high frequency 1200/1600 Hz, 2 high frequency 600/750 Hz
4/6/8-wire	E&M
Digital joint image channel of data transfer	
	V.24/V.28; V.35/V.36; EIA-530/530A; RS-449; RS-232, RS-530A, X.21, V36; G.703/1 Codirectional/antidirectional (MAIN DIGITAL CHANNEL) Ethernet 10/100/1000 Base-T, 100Base-FX MMF, SMF, WDM
Stability to overvoltage and excess current in the telephone lines	
	According to the ITU-T K.20 recommendation
IP-telephony	
Interfaces	Ethernet 10/100/1000 Base-T, 100Base-FX MMF, SMF,V.35, E1
Protocols	H.323, SIP, MEGACO/H.248
Shrinking algorithm	G.711, 723.1, 726, 729; GSM
Power supply	
Supply voltage	-60 V, -48 V (+/- 20 %) direct current; ~220 V (+10/-15 %) alternating current
Power consumption	Medium: 0.08-0.12 Wt/SL, peak: 0.4-0.6 Wt/SL
Control system	
	One-level/multilevel with SNMP, TAPI support
	On-line Call detail recording (CDR), on-line monitoring
	System of maintenance and technical service with full diagnostics
	Centralized control system of distributed communications network
Service functions	
	Fully functional SUPPLEMENTARY SERVICES including operative-dispatch communication, Caller ID; conference communication (up to 63 participants)
Construction	
The main module	Subrack 19", 6 U, 16 slots
Table-floor design	Cabinet 6 U, 500/300/300 mm, weigh not more than 15 kg
Case design	Case 19", 17-45 U
Connection of the cables to the module	Frontal to each board
Environment conditions	
Temperature	Working +10…+35° C; max working +1…+40° C
Relative humidity	20…80 %

System of operative communication and conference circuit based on telecommunication system Proton-SSS

Field of application

Program control panel of operative communication and conference circuit dispatcher console Prostor represents a new generation of multifunctional means of operative communication.

The control panel is designed to co-work with telecommunication system Proton-SSS and fulfills the functions of provision of operative telephone communication between all the control levels of civil, departmental and specialized institutions.

Composition of SODC Proton-SSS hardware-software complex with dispatcher console

The control panel in a complex with telecommunication system Proton-SSS affords to:

• organize operative communication both inside the same department and between departments of different levels;

• provide communication with distant subscribers and communication units within all kinds of connection lines used in RF;

• join communication equipment of the native or foreign origin via any analog or digital protocols used in RF;

• provide operative communication in the nets which use new IT;

• organize modern informational provision for WKS of dispatcher console supervisor:

– by means of function of incoming, outgoing and unanswered calls list that has been realized in dispatcher console;

– by means of database of a subscriber's system of operative-dispatcher connection (SODC) handbook;

– via connected database in the data domain which are asked by the costumer (the function "integrated hand-book");

• increase the efficiency of incoming calls by means of new informational services and services of digital voice processing;

– record the parts of conversation to the hard disk of PC by the program Dictaphone;

• make easier the supervisor's work and training of new control panel's functions;

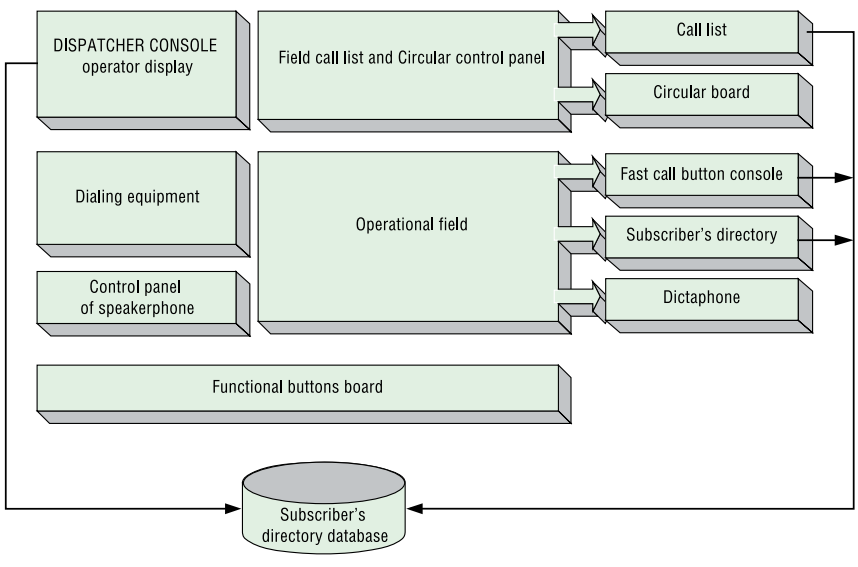
– make easier the selector conference control procedure shifting all the routine operations to the dispatcher console software;

– hold regular notification of telecommunication system's subscribers from the computer dispatcher console according to preliminary made lists; acoustic messages to subscribers may be made beforehand via the program Dictaphone;

• provide control and self-control means for the supervisor's work with the system of operative-dispatcher connection (SODC) control panel;

– register operator's talks in the files of digital sound format (wav, mp3).

The control panel affords to work at the same time 2 operators with individual settings and telephone numbers. Specially for these needs ergonomic workstation and control elements were made.



Program components of dispatcher console Prostor

The structure of system of operative-dispatcher connection (SODC) Proton-SSS with the dispatcher console Prostor

• modern telecommunication system Proton-SSS (it can be called as digital commutator system of operative-dispatcher connection (SODC)) of Almaz and Vektor series;

• computer (in common and industrial design);

• monitor with a sensor screen – one or two, 15" or 17" according to the customer's demands;

• adapters (one or two) to connect a PC to commutator (digital joint affords to take away dispatcher console from commutator to 6 km, analog-digital joint– to 140 m);

• a telephone receiver of a supervisor is on a special constructive plate – there may be one or two of them depending on the control panel model modifications;

• headset of a supervisor – according to the number of plates for the telephone receivers and in the case if a customer confirms the necessity of a headset use at the workplace of a supervisor;

• a special furniture form-factor with modifications made for one or two monitors, is defined according to the costumer's needs.

Connection to PTN and departmental nets

System of operative-dispatcher connection (SODC) Proton-SSS may be implemented successfully in all kind of nets (departmental and civil) which exist nowadays in Russia and all other the world. We reach such heights by a wide range of PIU and modules of system software supporting big number of signaling protocols and interfaces designed during the years of work experience by specialists of RDS SPETSSTROY-SVYAZ.

During commissioning all the peculiar characteristics of settings will be made by the parameter configuration of system commutator provision by means of a special configuration software service packet. As a result, one will not need to change anything during commissioning.

Peculiarities of SODC Proton-SSS with program dispatcher console Prostor

A big number of supported digital and analog joints which commutator SODC has, especially in the Almaz series.

The capacity of Proton-SSS commutators in the number of digital and analog ports is big one – from 1620 external trunks to 30000 ports.

Number of dispatcher consoles in Proton-SSS – 52 for commutators of Vektor series and 250 for commutators of Almaz series.

SODC Proton-SSS in the basic variant proposes 2 types of interfaces (digital and analog-digital) between commutator and dispatcher console. In the variant of digital interface one can bring a dispatcher console out of the commutator up to 6 km.

Supports protocols of IP-telephony.

A number of participants in a conference is up to 63 persons.

All the connections made in SODC are registered in a commutator and may be outloaded in any convenient format for a Customer, for example, SMDR.

Advantages of dispatcher console Prostor

• dispatcher console has multifunctional display which is able to view text, graphic pictures.

• The console display can view the text in the mother tongue of an operator. For these means the system of dictionaries to translate from the basic Russian text to any other languages, the code of which the operation system supports is used in the software dispatcher console Prostor.

• dispatcher console provides the configuration with one or two monitors.

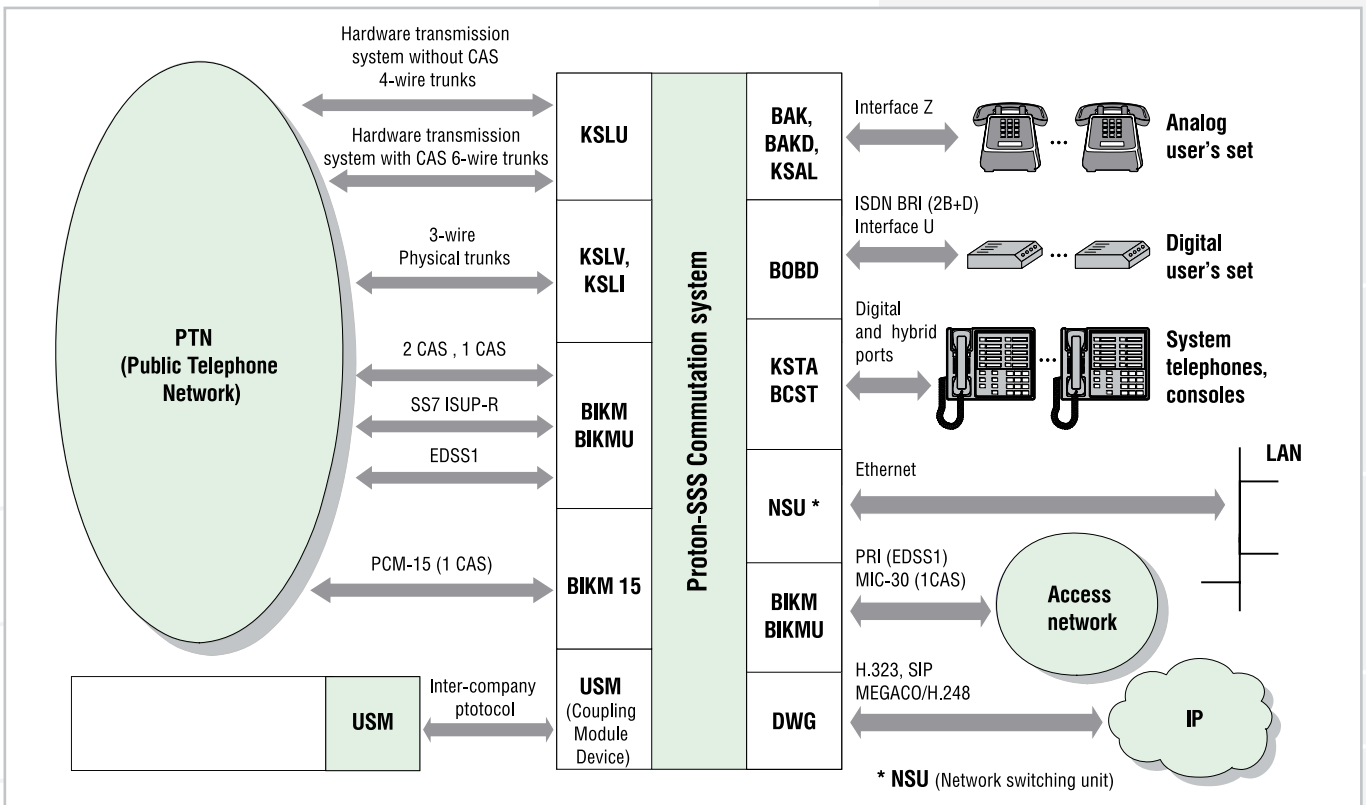
• dispatcher console is integrated with database of directory for SODC subscribers.

• There is a function of "integrated directory" that affords to visualize the Help data from other data bases which are presented by a Costumer.

• A number of buttons of direct call is unlimited in dispatcher console. The number can be chosen in installation-specific settings – the buttons here are program ones and accessible from the sensor display.

• Digital speech registration

• Function of mp3-dictophone for each operator of dispatcher console.



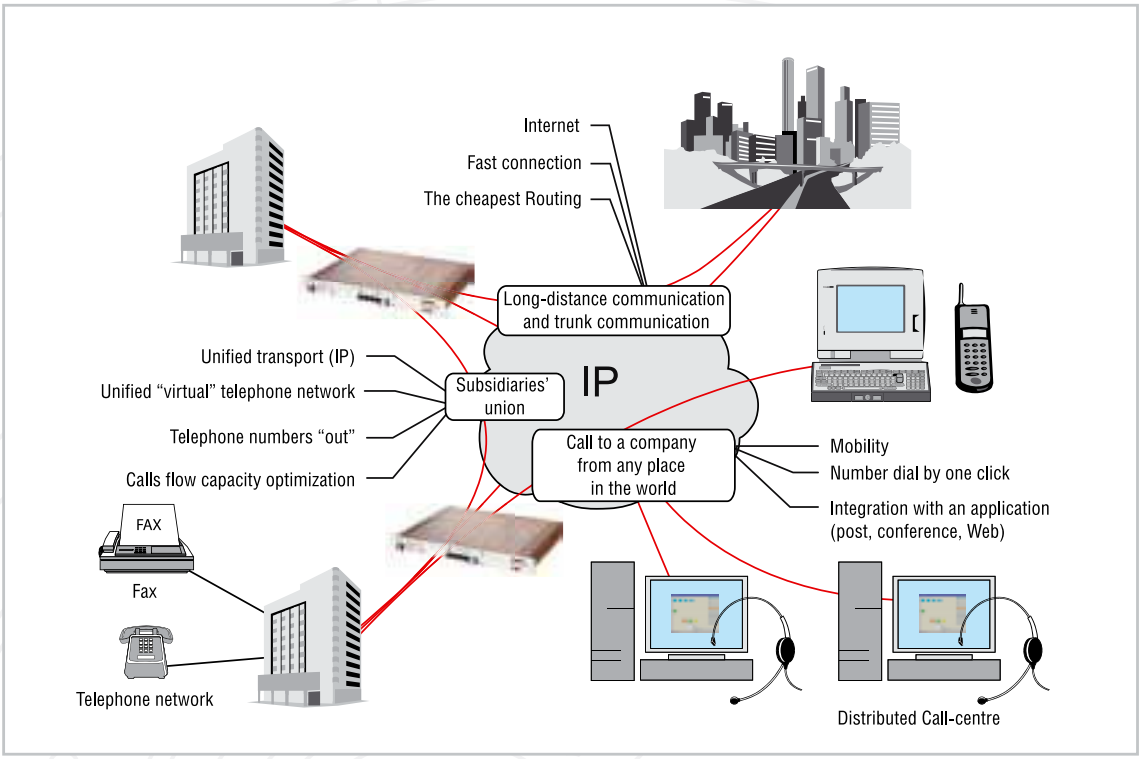
Joints which are supported by the commutator SODS Proton-SSS

VoIP-gateways Proton-SSS

VoIP-gateways Proton-SSS of SPETSSTROY-SVYAZ company are the key elements to realize convergent speech calls flow capacity within IP-nets of operators, corporation and department networks.

Field of application:

- integration of telephone nets' segments;
- connection of different terminals (IP-adapters, H.323/SIP-telephones, SIP-agents) to the nets with commutation channels;
- provision of corporative telephony from any place in the world without supplementary expenses;
- telephone services in IP-nets;
- expansion of the operational sphere of IP-nets' services which are connected with call making on a telephone net;
- building of distributed call-centers.



VoIP-gateways Proton-SSS provide:

- speech transfer via IP nets and afford to organize efficient, scaled telephone connection integrated with different services (redirection, conversion and call retention, voice mail, call-centers and others);
- turning on to the local network and Internet via interfaces: Ethernet 10BaseT, FastEthernet, E1, and other synchronized physical interfaces of exchange Proton-SSS;
- interaction between gateways and other kinds of VoIP-equipment via different IP-telephony protocols: H.323, SIP and their extensions;
- compatiability with a wide range of VoIP-equipment: other IP-gates, IP-telephones, program telephones, softswitches, IP-PBX, gatekeepers, SIP-servers;
- functions of a gatekeeper and a SIP-server, flexible calls routing and transformation of telephone numbers depending on the quality of IP-net, number of a caller and a destination subscriber. The unique parameters of voice processing may be chosen for every destination;
- choice of different compression kodaks for compression independently on each channel. The choice is made automatically or by a gateway adjustment. The needed band of IP-channel is optimized;
- support of high-quality connection by means of intellectual speech and QoS mechanisms processing.

To save calls flow capacity you can use an algorithm of recognition of pauses between words and other means.

VoIP-gateways support:

- detection and transfer of fax-modem information:
  – “transparently” over G.711;
  – Via T.38 protocol that is compatiable with VoIP-equipment of known providers;
- Tonal dialing DTMF (transfer of DTMF is possible by OUT-Band H.245 and RTPevent methods);
- Adaptive algorithm of IP-net quality reducing compensation via taking voice packages.

Jitter accumulation buffers afford to switch into different channels including sputnik ones;

- transfer connection information by means of a gateway to a billing system via Radius protocol.

The check of the number of a calling subscriber, his paying capacity depending on the chosen destination (code) are made. There is a possibility of a call limiting if the credit has been exceeded.

Construction

VoIP-gateway Proton-SSS has been industrially made. It might be implemented in un-serviced rooms in the poles of 19” or into walls. You can chose the optimal construction to use the gateway as a part digital telecommunication system Proton-SSS as an interface card in a station cartridge.

Module gateway construction affords to increase gradually capacity (a number of organized channels) and gateway’s functions. The basic model of a gateway of a minimal price provides up to 12 connections at the same time and all kinds of software functions. If you want to implement additional sub-modules you can do it on your own according to the recommendations given in user instruction book.

Conducting and monitoring

You will not spend much time or money because of the excellent maintenance qualities of the telephone nets based on Proton-SSS gateways. You can make a remote connection to gateways by a local network or Internet. The gateway has everything needed. Your computer should only have a browser for configuration and monitoring via web-interface. You can get connected by authorizing, inserting the user name and a password. Web-interface via any browser (Internet Explorer, Opera, Mozzila, Forefox) in any operational system (Windows, Linux) can afford you to adjust and fulfill gateway monitoring and you system of IP-telephony.

Widened system of gateway and IP-net diagnostics is realized in a gateway. A gateway log will show the reason of a failure or a problem. IP-net testing means will help to define the “problem” segment and VoIP-equipment that interacts with a gateway.

The functions of saving and configuration download via Web-interface are realized in a gateway. It helps to work easily and conveniently with different gateway settings via testing of VoIP net.

The gateway might be additionally operated by a means of technical service of Proton-SSS via SNMP protocol.

Technical features	
Interfaces	
Network interface	10/100 Base-T Ethernet RJ-45 (from 2)
Interface with Public connection networks	RJ-45
Number of channels	1-2 E1 (6-12 channels of a basic configuration, 60 – with sub-modules)
Indicators	The state and activity of channels, flow capacity, synchronization mistakes, IP-net state
Voice/modem/fax	
Possibility of protocol transfer via IP	VAD, CNG Echo-compensation G.165-G.168 Volume regulation of received and transferred calls Fax-modem detector and switching in a PCM mode (G.711) or FaxRelay Dynamic adjusted/adapted size of entry buffer to compensate a time gitter Setting of a number of voice frames
Voice compression	G.711a-law, G.711mu-law, G.723.1-5,3 kbit/s, G.723.1- 6,4 kbit/s, G.726, G.729, compatible with G.729A, B, AB, GSM Independent kodaks for each channel
Faxes via IP	– Via detecting the switching to G.711 – Fax via IP group 3 fax transfers up to 14,4 kbit/s – Support of T.38 UDP Real Time Fax protocol
Modem via IP	V.21-V.92 Speed up to 48 kbit/s (via G.711)
Signalling and protocols	
Protocols in PTN	ISDN PRI: ETSI DTMF CAS MF-R1, MFC-R2, SS7 (in development)
VoIP protocols	H.323 versions 2,3,4 with gatekeeper functions SIP versions 2 MEGACO / H.248 Transfer of DTMF In-Band, Out-band: H.245, RTP event (RFC2833)
Calls conduction	
Routing	Via CallerID, CalledID, E.165, local numeration plans, via IP-addresses, URL, domen names, SIP-names Transformation of CalledNumber, transformation of CallerID Classification according to the destinations Unique voice processing parameters for each destination Up to 32 SIP-proxy Alternative routing via IP and Public Connection Networks
Service	Connection conduct (redirection, transfer, etc.), credit and call limit, IVR, service application (in development)
Connection to the billing system	By means of Radius (prepaid/postpaid billing) protocol
Service support	
Configuration	Telnet/ssh, Web, SNMP
Monitoring	Light diodes, Telnet/ssh, Web, SNMP, log file and events analyzer
Alarm messages	Light diodes, syslog, SNMP
Renewing of SW	FTP
Diagnostics	By the start, on demand, access to the IP-net

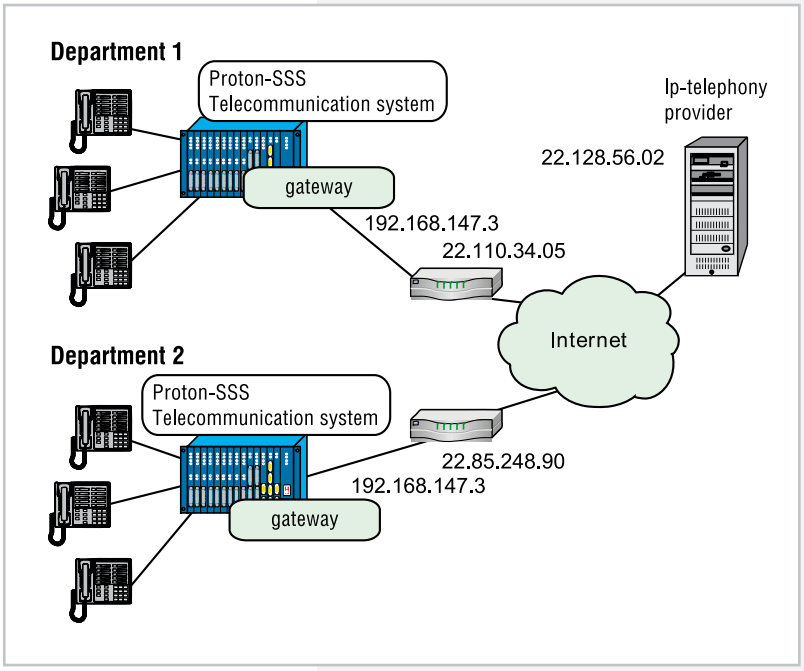
Integration of telephone nets via VoIP-gateways

“Installation” of telephone lines and numbers between far-away telephone nets

IP-transport in any leaseheld or common-access channels (Internet, ADSL) help to solve the problem of lack or no direct access (by means of a cable, optics, radioline) between offices and departments. Some telephone nets might be united by means of VoIP-gateways Proton-SSS.

Different variants of the gateway functioning are used. There is “point-point” (two gateways with one another), “a lot of points” (a lot of gateways work with one another without a central module). Gateways “install” channels, connecting to the telephone line **via different interfaces (E1, BRI, FXS, FXO, 2/4/6-wire tone frequency) with different types of signaling system (ISDN, subscriber, signaling of analog connection lines).**

Standard signaling H.323, SIP are used for interaction between gateways. It guarantees connection to your telephone net as well as gateways Proton-SSS of any standard equipment of IP-telephony.



“Installation” of a city telephone line (city number) to another office or department is made by means of gateways.

The united telephone net of every department with a unified number plan (virtual telephone net).

If you connect all mini-exchanges and PBX with their own range of telephone numbers by means of gateways you will get a virtual telephone net with a unified number plan. You will not have to use indices or dial twice anymore! Your stuff in any department will use common telephone directory with common abbreviations (for example, numbers which contain 3 digits only). To call a colleague from any department you will have to dial one and the same number.

Integration of telephone connection and other telematic services (post, conferences, Web).

If you connect IP-telephony gateways to your telephone net you might transfer telephone connection to the IP-protocols area as one of the services provided and unite telephone call with other kinds of telematic services. In one post box you can have voice, electronic post, fax, paging and video. The access to the post box and Web-pages is operated via telephone. Application server that connects all the services is connected by a Proton-SSS gateway.

Number dial by one click.

The call should be in one click of a mouse in a contact of address book as there can be different IP-program telephones operated via standard protocols of IP-telephony H.323 and SIP in one net with a gateway. You can set a button on a page of your Web-site. If you click on it the user can start calling from a colleague, for example from technical service, to himself.

Building of a Call-center based on a IP-telephony and gateway of IP-telephony Proton-SSS

You can solve the problem of operators and equipment if you use IP-telephony technologies to build Call-centers. You can settle the equipment next to kernels (where there are lines of input and output affording to operate without channel equipment), and operators – in the IP-telephony access points. You can connect operators via Internet as well. Besides, if you build a Call-center based on IP-technology you may use all the advantages of IP-telephony: economy and scalability, united communication net infrastructure and reducing of operating expenses. Workplace of an operator is a computer or a telephone.

Using gateway Proton-SSS you may use one of the schemes of call-centers organization, including the one compatible with your exchange:

- Call-center connected to exchange;
- “Before” exchange (the existing telephone infrastructure is used);
- “After” exchange (you do not have to invest into exchange anymore).

Maintenance and service system

Field of application:

- operative service of territorially divided connection networks;
- conduction by functioning of subscriber's and departmental telecommunication networks;
- distant monitoring of any net.

Maintenance and service system provides an operator with the functions of administration, configuration of objects within the network equipment Proton-SSS, technical means of other manufacturers and their conduction.

"Operator module"

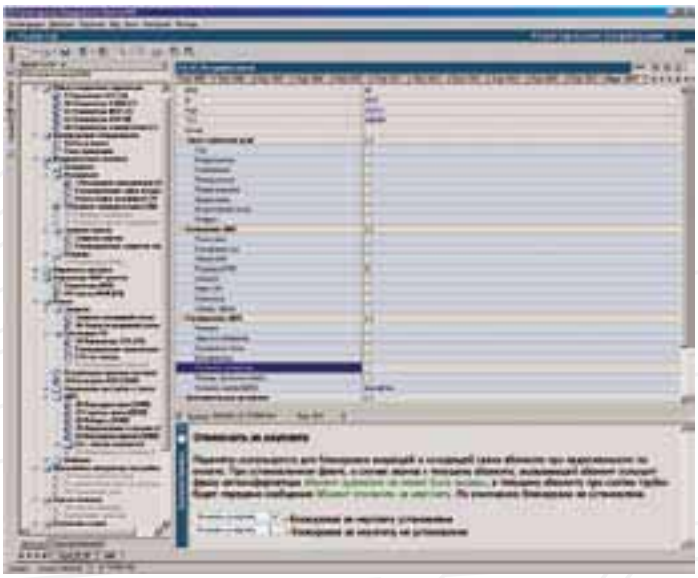
Packet "Operator module" realizes the functions of maintenance and service system and provides a user with:

- convenient interface that is aimed at maximal network and every net element effectiveness;
- on-line lurking of object's status;
- access right control, passwords, possibility of adjustments of other ways to access;
- distant operation's control including loading software equipment;
- visual reflection of the network served on the geographical map, possibility of looking at the contemporary place of a net element, appeal, configuration, testing, receiving of statistics data, diagnostics and treatment.

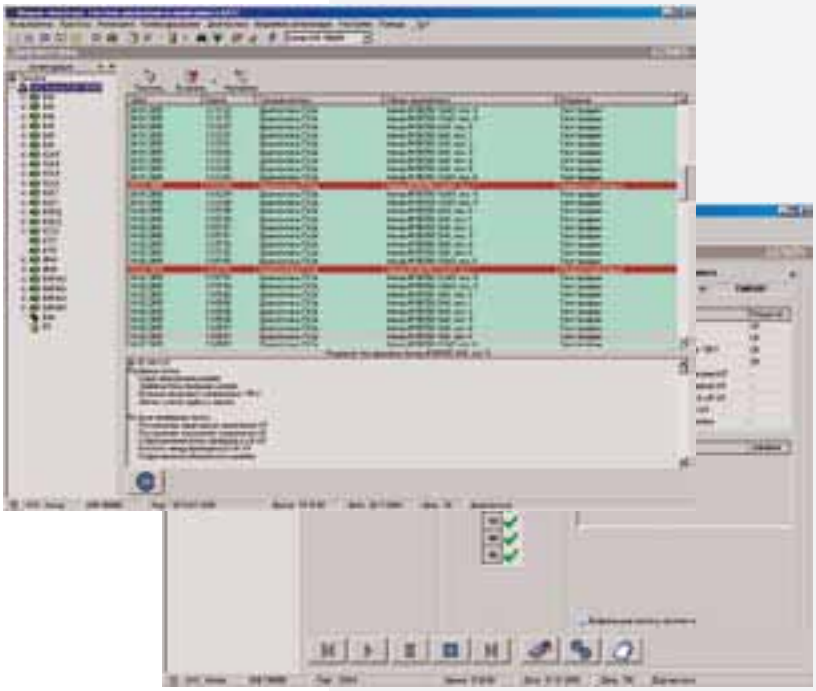
Monitoring centre allows to control on-line the status of station equipment and subscriber's terminal. All the objects of a telecommunication system are reflected visually. Object's indicators point at their status. If a subscriber is actively connected one will see connected subscriber's status. Pop-up context window has all the information about the object: index, number and status.

Configuration function is aimed at adjustment of station parameters, destination parameters, individual adjustment of exchange's ports, connection routes conduction.

All the parameters are joined into the meaningful groups – tags. While choosing a group needed operator sees the list of parameters included. It makes the user work easier during the configuration.

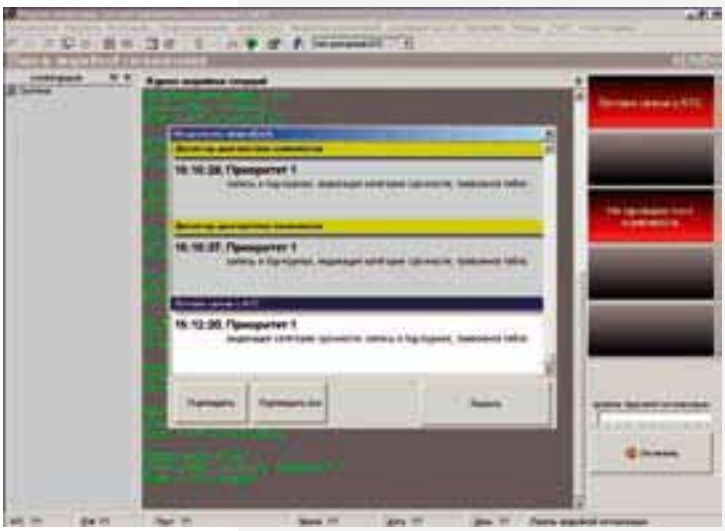


Diagnostics subsystem is made for automatization of the faults search. Diagnostics includes defining errors in subscriber's packs and packs of connection lines by means of special tests which are input by the user. Diagnostics may be started for some subscriber's packs or for the connection lines, for PIU or for the exchange's modules. Program displays the testing process and results. All the results are stored in the log file on the disk.

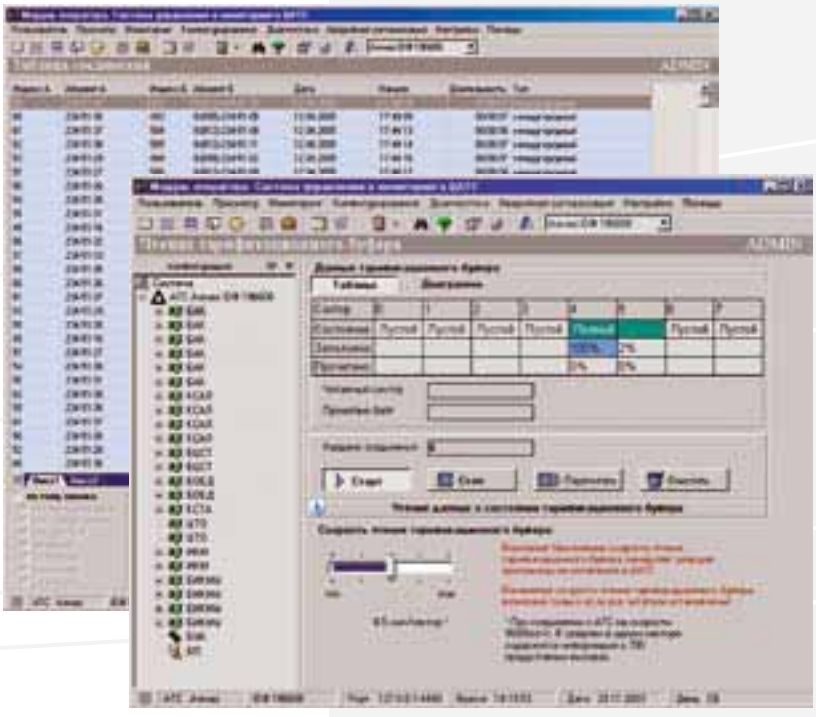


There is an application in the program – alarm signal panel – which is made for **operative control of debugging**. It includes any types of signaling to the operator: from classical (alarm indicator panel, urgency indicators, acustic signalling) up to modern intellectual (voice notification on the phone, pager or electronic post message).

There is an alarm log file and a possibility of message filtering according to the parameters of message urgency, alarm message type, net element identificator, etc.

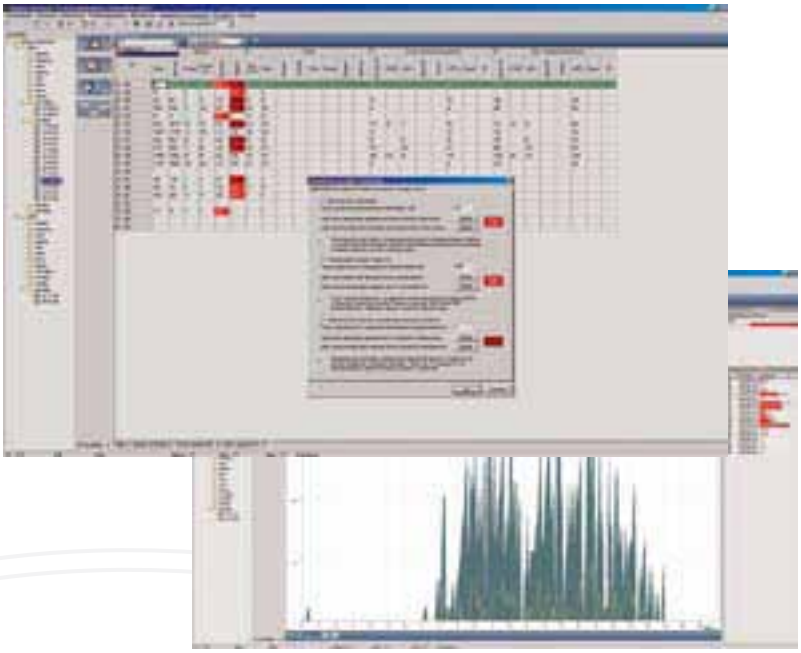


An important function of "Operator's module" is pickup of information concerning rates from the buffer telecommunication system, it's accumulation in the data base in the hard disc with an aim to process by the package of programs for the counting of the telephone connections cost TARIF-SSS. There is a possibility of preview of the data read from telecommunication system and it's selection (for the time span or by the number) to the print in the operator's module.



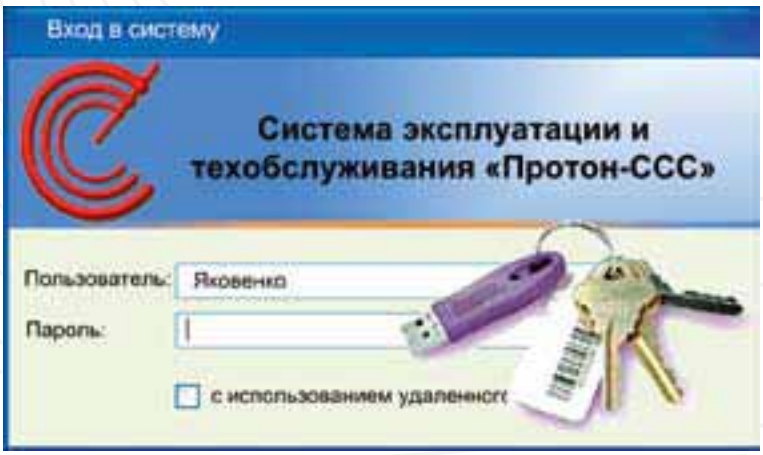
Call registering and statistics subsystem and also the support of dynamic configuration of exchange afford to realize the function of flow calls capacity control.

Statistical reports may be represented as a table or graphic, exported to any text format.



The Level of Control is supported by the geoinformation system which affords to keep trace of the real geographic position of the equipment in Russian Federation, regions, administrative units. It provides a system operator with an interface to move to the level of net element control.

Access rights control subsystem provides multilevel user access authorization, setting/changing of passwords and policies of access. It affords to distribute users into such classes as a system administrator, safety administrator, privileged user, a user. All the actions of a user are registered in the log file. The user information is saved on the small USB HASP-keys making the unauthorized access to the system harder as the apparatus saving of passwords and names gets down the possibility of breaking the system access.

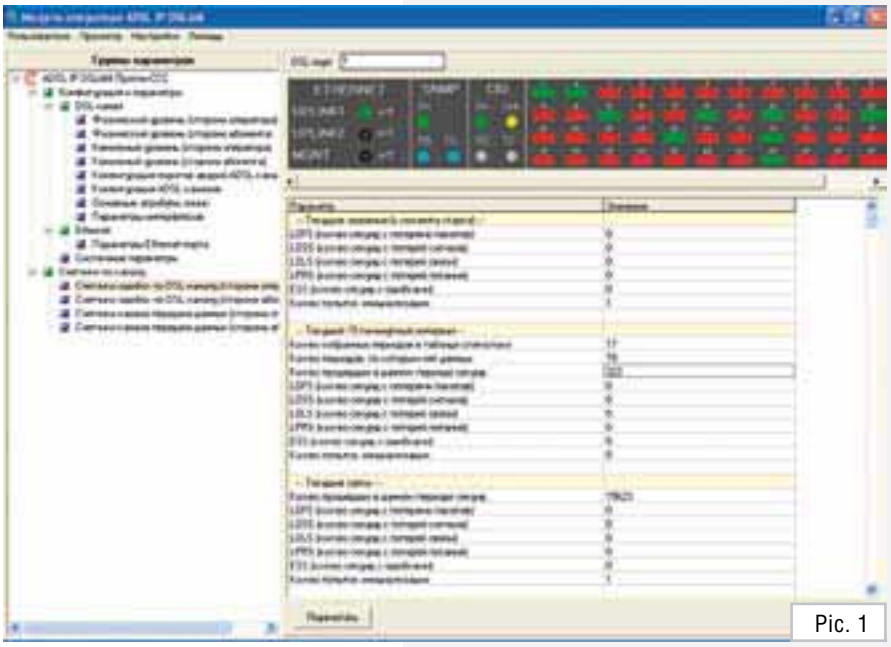


Operator module DSLAM

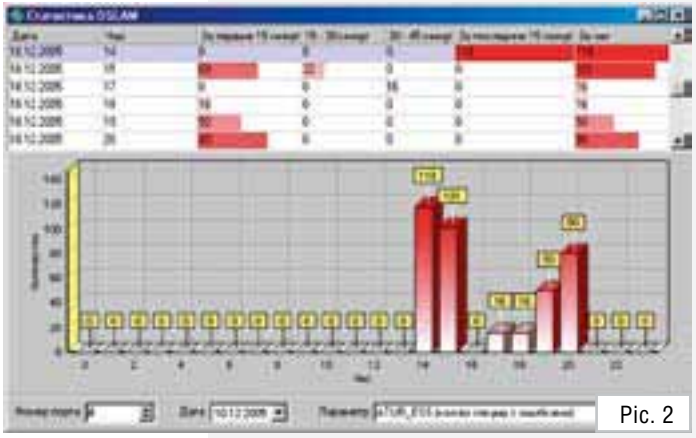
Program product “Operator module DSLAM” has been developed for adjustments and provision of stability while working with DSL-access equipment. It affords to registrate and view statistical data amassed during the equipment working process.

If you use the program it’ll give you the following opportunities (Pic. 1, Pic. 2):

- view and change profiles of ports configuration;
- record of configurations in the equipment and save of copies of configurations in the files of the PC hard disc;
- control of the equipment working mode (reloading and confirmation of the changed equipment parameters);
- get and view statistical information how the equipment functions.



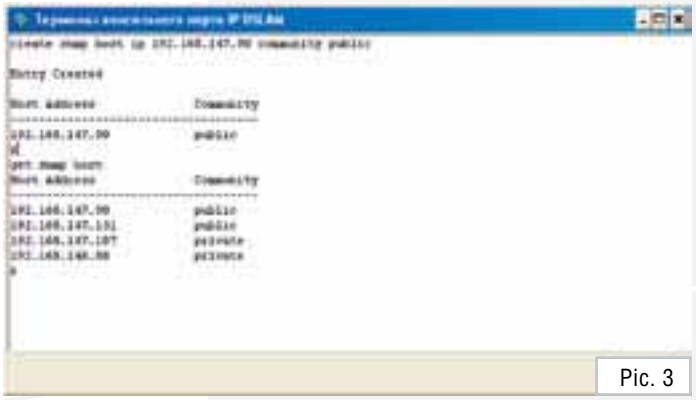
Pic. 1



Pic. 2

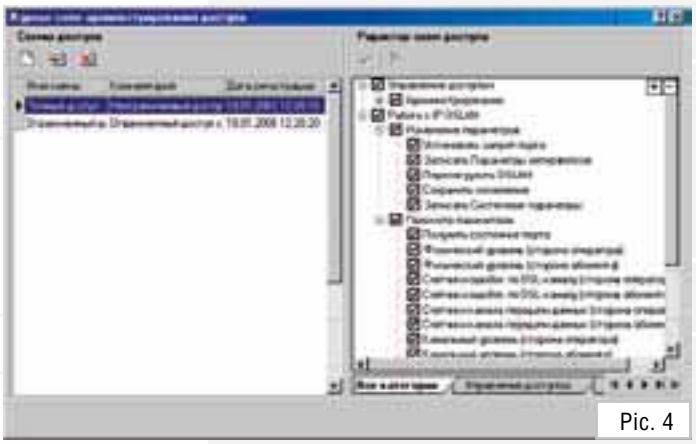
Interaction of the software with equipment is via the net protocol SNMP.

It is possible to control by means of inbuilt console port of the device with the help of the terminal realized in the software. It affords to process the operations of DSLAM adjustment and control in the console mode (Pic. 3).



Pic. 3

The Program Product processing safety Policy is built upon user log records and their groups, and also at the setting access rights for them. Safety Policy control is realized by means of the service of access administration. The service affords to create any number of user log files, groups and schemes of access rights (Pic. 4). The access rights are attached not to the program device on the whole but to its functions. Thus you may limit the number of users which have free access to such system functions as reload, connection adjustments change. Administrator can create individual system configuration for each user by means of forbidding or letting the access to definite system functions.



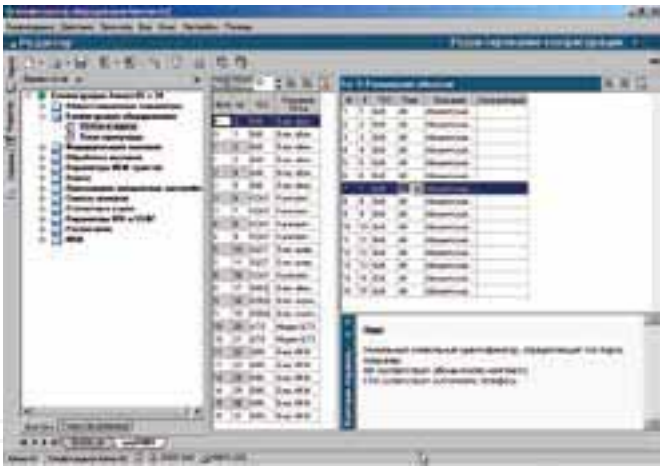
Pic. 4

Equipment configurator Proton-SSS

Program product Equipment configurator Proton-SSS has been developed for any type of equipment configuration that is made under the Proton-SSS brand. The configuration process is in the changing of the parameters system (configuration) which defines the equipment working mode.

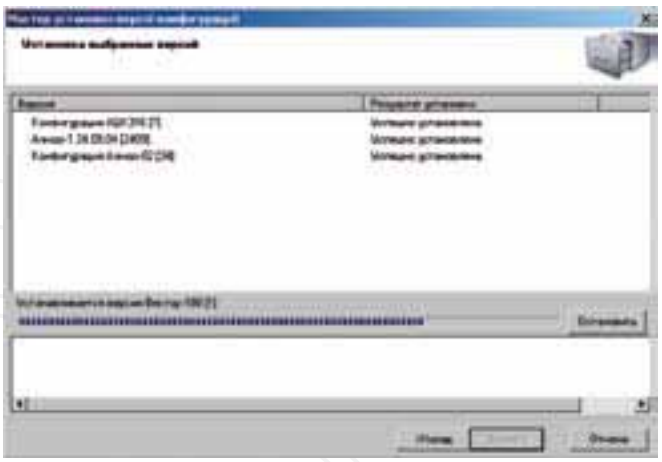
The configuration files which are written on the hard disc of software are used as a means of the configuration source. To work with configurations which are saved in the equipment memory the program supports different means of the connection to it: via COM-ports, LAN or modem.

All the configurations developed earlier with the DOS-version of the configuration program (Program Loader85.exe) are supported. While the configuration is opening there is a check of the data correctness and if necessary its renewing. The log file is written while the configuration adjustments are inserted.

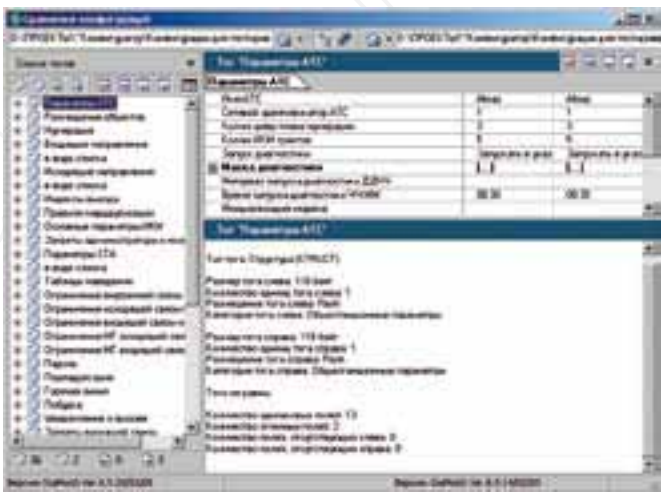


The built-in Help option on all the configuration parameters affords to get quickly the information concerning the destination and appropriate definitions of the edited configuration parameter.

The program can work simultaneously with several configurations. It's possible to copy and move the data from one configuration via buffer to another. The data exchange may be held between configuration of the equipment of different types.



The in-built comparison service affords to find the differences both in the structure of the compared configurations and in the definitions of the configured parameters. The service helps to find quickly the error in the configuration created by means of its comparison to the example configuration. It's possible to compare the configuration of the different equipment.

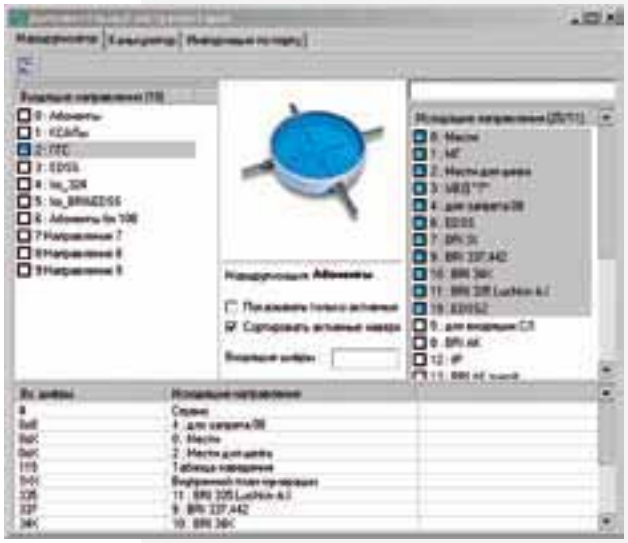


There are instruments built in the program which make the configuration easier:

- router – to check the correctness of the routing adjustments;
- calculator to make mathematical calculations (for example, calculator affords to find quickly the port's station index by its telephone number or comments to the number);
- information concerning a port – to view and edit all the configuration parameters of each port.

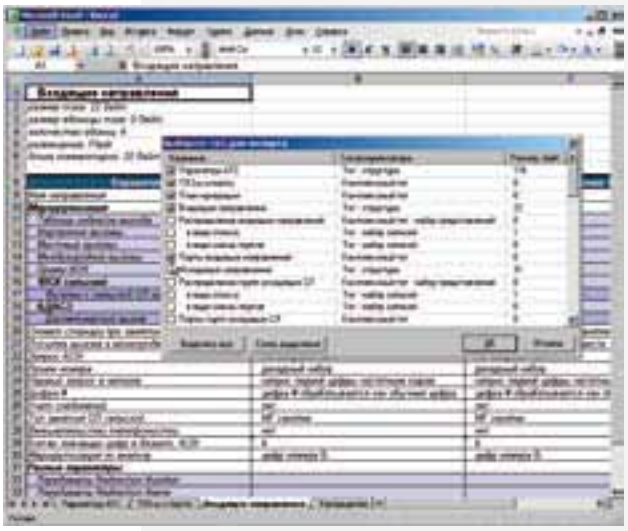
Export of the whole configuration or its tags into a file of MS Excel format provides documentation of all the changes in configuration, record and a possibility to view the configuration on other PC where the software Equipment configurator Proton-SSS is installed. If you view configurations in the Excel format it'll give you a full image of configuration, makes easier its analysis.

In-built service of automatical saving affords a user not to save constantly configuration with an aim of saving the data if software or PC might go wrong. Automatic saving of all open configurations which are fulfilled by the service affords to escape the data loss during different system and program errors.



The program provides configuration save both in the file on a hard disc and distant PC via FTP-protocol. It's possible to write the configuration into equipment and also to write configuration into equipment with creating a reserve copy on the hard disc of a local PC.

The program affords to write not only the configuration, but also system software of Proton-SSS software (Software of central and signal processors, EPLD insertion).



Integrated supportive maintenance means make the process of communication between a user and a developer easier especially in the case of software problems. This means afford to:

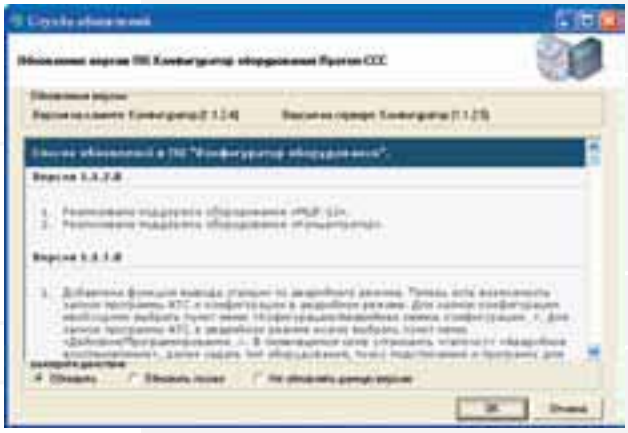
- generate and send the reports about the program status;
- create and send to a developer letters with the description of the problem;
- send configuration copies and its versions.

The user should not posses special skills or knowledge in order to install the program as there is a specially made installation utility. With its help all the components of the program necessary for the work are installed. Besides program installation the installation utility has been developed for the service operations within already installed program and can:

- change the program components range;
- restore the damaged components;
- delete all the components of the program from the computer.

There is no need to re-install the Program Equipment configurator Proton-SSS to support new type of equipment. It's enough to get from the manufacturer the version packet of equipment of that type and install it by means of the Configurator program. The size of versions is so small that you can receive it via e-post or download from the manufacturer's website.

If you use Configurator software in the several PCs, united into network you do not have to re-install the program on each PC receiving a new version. To renew a program you will have to merely re-install the program on the server of the LAN. The in-built service of the renewing will renew automatically the program components on all the others Pc when first started. Then the Renewing service will afford to renew the program directly form the website of Proton-SSS.



There is a box with a CD of the program distributive and user guide in the whole package.

The program package to count the price of the TARIF-SSS telephone connection

Field of application:

- the connection operator;
- departmental network;
- hotel;
- camping zone;
- office.

There is count of the calls flow capacity and price of connection of telecommunication system Proton-SSS and of the other manufacturers.

The package design is made ergonomically as a notpad of full-screen tabs. You can change a tab via hot – keys or a navigator. The connection information is provided by few alternative ways reflecting different aspects of the work of connection operator. There are also screen and print forms of main statictics modes. To make the comprehension easier different log file lines have different colors. A user can adjust the colors range.

The centre of the package takes the record count which has been developed using original algorithms that provide a high count speed: more than 200 000 of the records in a minute on a standard computer.

There are in the package:

- the possibility of the simultaneous work with the tariff plans of several connection operators and round-up of the price count in 6 ways (each second, each minute, etc.);
- the usage of any indexes needed to go to the City Telephone System or Automatic Trunk Station (ATS) and also the choice of the tariff plans for operator according to the exit index;
- connection tariffing counting the connection price depending on the part of the day, holidays, weekends and geographic destination;
- the possibility to use the masks of outgoing connection, subscribers ANI and physical numbers for the station objects to designate the specific tariffs while counting;
- support of the mixed numeration (for example, numbers which have 5- and 6- digits come alongside with each other);
- support of arbitrary number of time zones (tariffing of the connections over distance which cross several time zones);
- use of tax rates when counting the connection price;
- free time credits for tariffing all kinds of connection;
- control functions of the whole status of database files, database self-diagnostics and automatized procedures of restoring database after error;
- organization call detail recording (CDR) information to support connection tariffing in the network with alternative system of destination codes which is different from the traditional DEF-system.

There are standard packages of Tarif-SSS:

- Tarif-SSS (base variant);
- Tarif-SSS/ Office;
- Tarif-SSS/Hotel;
- Tarif-SSS/Pro.

The package can have a unique modification if asked by a customer.

An example of connection's log-file with search service on

Tarif-SSS of all configuration types has the functions of detailed analysis of the dialed number if the geographic destination is defined correctly (up to the city or village where the connection will take place).

During analysis of every record the price and type of the connection are defined automatically (internal, city incoming or outgoing, etc).

The count of the connection price is led at first place through the directory of regional tariffs if there is no information about the city or village in the database. It makes the counting procedure faster.

If there is no name of a city or village in the automatic mode you can use Connection information utility and insert control parameters manually.

If you can not count the connection price in automatic mode there will be a record in the log file about the uncounted connections. The Log file might be seen and it affords to use of mass operations to the inserted connections.

The Search Log File utility affords to move quickly to the record needed or to the group of records according to different search conditions: requested city or country, connection operator, services that may be used, subscriber number, dialed number. Thus received information might be represented in specific view types, for example, grouped by destination, or printed/ exported to the Office application.

For the operators of exchange the transit connections are tariffed in the package Tarif-SSS/Pro. Also the lists of connection are formed for the connected exchange, counts for connected exchange are written out, paid incoming connection is tariffed. There is the possibility of automatic preparation of the statistic reports and resumes. There are a registration function, subscriber's calculation, leading several types of paying periods, attachment and count of the services provided to the subscriber, support of accumulative subscribers accounts. Also you can have normative information for the subscriber's categories. There is a visual centre for the operator's package which views the information about subscribers registered in the system.

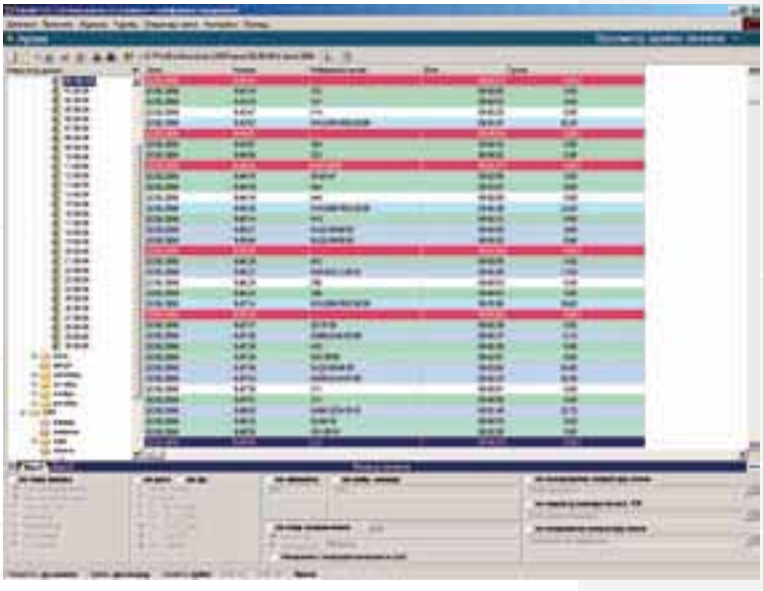
There are a room number fond for guests and telephone numbers connected with rooms for the hotels and camping zones in the package Tarif-SSS/ Hotel. There is a convenient visual centre of the building administrator with the main financial operations with the client's accounts and information about guests. The package supports calls tariffing in advance with the adjusted interval of the check of the money on a client's account and also the ways of canceling the access to the connection services as the money paid in advance by a client got off.

There is a possibility to print out different kinds of reports in the package of Tarif-SSS: from a mere call receipt to reports form by the subscribers group or results of complicated search. The function of the table export has been made for the integration with Office applications.

There is a contrast printing mode to make everything clear.

The program affords to form accounts according to the reporting period terms.

The powerful archive service makes the work with big number of data easier. Besides the manual archiving of tariffed data you can use automatic mode – by day or by the fixed period. Interface of the archive service is optimized to work with big number of archive files.



The window of archiving service

Additional technical solutions of telecommunication system expansion

DSLAM Proton-SSS

Solutions based on DSLAM Proton-SSS

DSLAM is an Ethernet conducted commutator of the 2nd level with Uplink interface of Ethernet. The Downlink interfaces are made as subscriber's ADSL ends.

DSLAM gives to the service providers unique opportunities to bring highly-operational DSL services of next generation for the business affairs and home use. Using DSLAM service providers may organize high-speed transfer of data and video for clients.

DSLAM is a part of NGN-solution for the DSL-service providers. The equipment can work with a wide range of subscriber's equipment (Customer Premise Equipment, CPE) such as ADSL – modems and routers.

As we use the latest technologies ADSL/ADSL2/ADSL2+, DSLM gives an economic solution for providers to offer for subscribers of different services functions of conduction of bandwidth, priority of calls flow capacity and safety of data flow.

DSLAM supports VLAN 802.1q based on the mark of the full isolation of calls flow capacity of different users and productivity increase in ADSL-net.

Technical features	
Interfaces DSLAM 24/28	24/28 ADSL/ADSL2/ADSL2+ ports (2 RJ-21 Telco-50)
	24/28 ports of splitter (2 RJ-21 Telco-50)
	2 ports 10/100/1000 BASE-T or 1 port 1000BASE-T or 1 port 1000BASE-LX
	1 port 10/100 BASE-TX
	1 console port RS-232
Possibility of Protocol conduction	8 VC for each DSL port
	128 MAC-addresses for each DSL port
	2K multicast MAC-addresses
	512 VLAN (any number up to 4096)
	Adjusted size of packets: from 64 bytes to 1542 bytes
Interfaces ADSL/ADSL2/ ADSL+	The speed of downstream from 32 kbit/s to 24 Mbit/s
	The speed of upstream from 32 kbit / sec to 1 Mbit/s
	Compatibility with standards: ITU G.992.1 (G DMT), G DMT.bis, ITU G.992.2 (G Lite), ANSI T1.413 issue 2, ITU G.994.1 (G.hs) for ADSL, G.992.3 for ADSL2, G.992.5 for ADSL2+
	Maximal transfer distance: 6 km
Control	GUI EMS based on Microsoft NT/SNMP
	Local RS-232 CLI and remote Ethernet SNMP/Telnet control
	Remote in-band SNMP/Telnet control
Software Renovation	Via TFTP
Protocols	STP, IGMP snooping, GMRP, GVRP, LACP, LACP marker, SNMP/UDP/IP/MAC/Ethernet
Overall Dimensions	472x66x295 mm (widthxlenghtxdepth)
Power Supply	- 38,4 … - 72 V of direct current; ~ 220 V (+10/-15 %) of alternating current
Power consumption	Not more than 150 Wt

Equipment of secondary trunking

Multiplexor of secondary trunking with functions of electrical or fiber optic baseband transmission path

Corresponds to the certificate Svyaz (“Связь“) № ОС/1-СП-1011

Field of application:

- building of digital interexchange on local, rural and departmental communication network;
- multiplexing of digital flows.

Presence of electrical or optical interfaces of group flow E2.

Local and remote control and monitoring.

Presence of service communication channel.

Joint of external equipment and external sensors (including alarm signaling system).

Possibility of transfer E1 flows via the same fiber optic.

Technical features	
Optical junction	
	Operating wave length 1310/1550 nm; Type of a radiator single-mode/multi-mode; The connected type FC-PC,SC
Electrical junction	
	4 joints E1 in accord with G.703/6; G.704/5, G.823 ITU-T, connector type RJ45; 1 joint E2 in accord with G.703/7; G.742, G.823 ITU-T, connector type BNC
Monitoring and control	
Remote	According to the requirements РД.45.100-2000
Local	Interfaces RS-232 and Ethernet
Service communication channel	
	It doesn’t take time intervals of multiplexer channels E1
Signalling	
	Relay of urgent/non-urgent alert According to the requirements РД.45.100-2000 4 connected groups of relay-indicators
Power supply	
Supply voltage	-60 V, -48 V (+/- 20 %) direct current; ~ 220 V (+10/-15 %) alternating current
Power consumption	Not more than 10 Wt
Construction	
The main module	Subrack 19”, 1 U
Table-floor design	Case 19”, 1 U
Environment conditions	
Temperature	Working +10…+35° C; max working +5…+40° C
Relative humidity	20…80 %

Integrated server

Field of application:

- Telecommunication system Proton-SSS control;
- Call detail recording (CDR) Server;
- Net data base (Network Attached Storage – NAS);
- Maintenance system and servicing server telecommunication network and telecommunication equipment.

There are: – doubled reserved feed with a hot exchange possibility – KVM Switch (Keyboard Video Mouse Switch) – passive cooling by the convection mode (without fans) for the reliability, readiness and service convenience (RAS).

An integrated server is an indispensable part of the modern commutation platform Proton-SSS because of it's power supply with a hot exchange possibility, a wide range of process sub-modules, maintenance and servicing convenience.

Technical features
Central processing unit AMD (32 digits)
RAM capacity up to 1024 MB
VGA adapter for connection to the CRT/LCD monitor
2 in-built adapters of local network Ethernet 10/100
2 hard discs (HDD) with a capacity up to 250 Gb
Compact Flash card (CF) with a capacity up to 4 Gb
2 USB 2.0 ports
2 consecutive ports with an RS-232 interface
1 parallel port with an LPT interface
1 port for connection of a manipulator of a "mouse" type
1 port for a keyboard connection (keyboard ps/2)

Multiplexer bridge ETHERNET/E1

Submodule in the telecommunication system Proton-SSS structure

Field of application:

- Territorially distributed LAN, united by data links imposed on telephone networks.

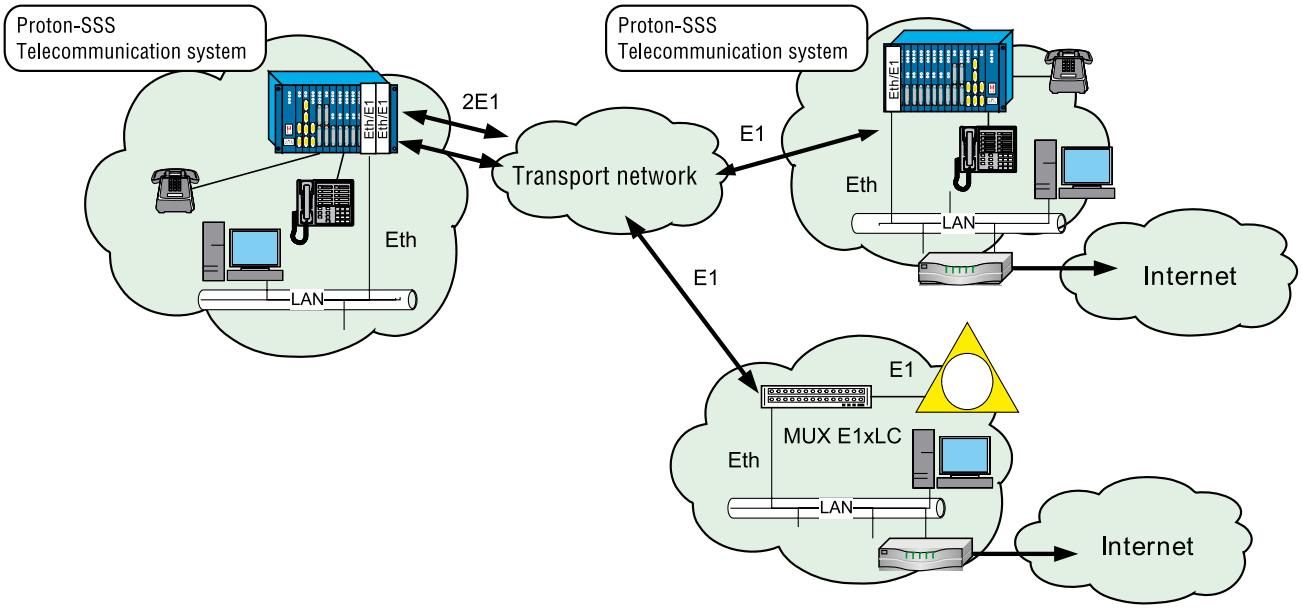
It

Allows to combine physically the voice and data transfer in one E1 channel.

The data transfer is carried out either by reducing the number of time-slots in a flow or by the voice compression.

Allows to transfer up to 4 voice channels in one time-slot.

Technical features
Data channel traffic – from 24 to 1920 kbit/s;
Voice compression – accord. to ITU G. 726 (40, 32, 24, 16 kbit/s);
Optional choice of packed Image Channel and an individual task of compression ratio;
Interface of an 10BASE-T net connection (half-duplex operation);
Ethernet frame filter (256 MAC-addresses);
Constructive design – standard sub-module for BCO (Digital Interfaces module) and for BCO8 (8*E1 module);
Monitoring and control – Proton-SSS control system.



Controlled LAN commutators

Field of application:

- organizing LAN;
- VLAN support.

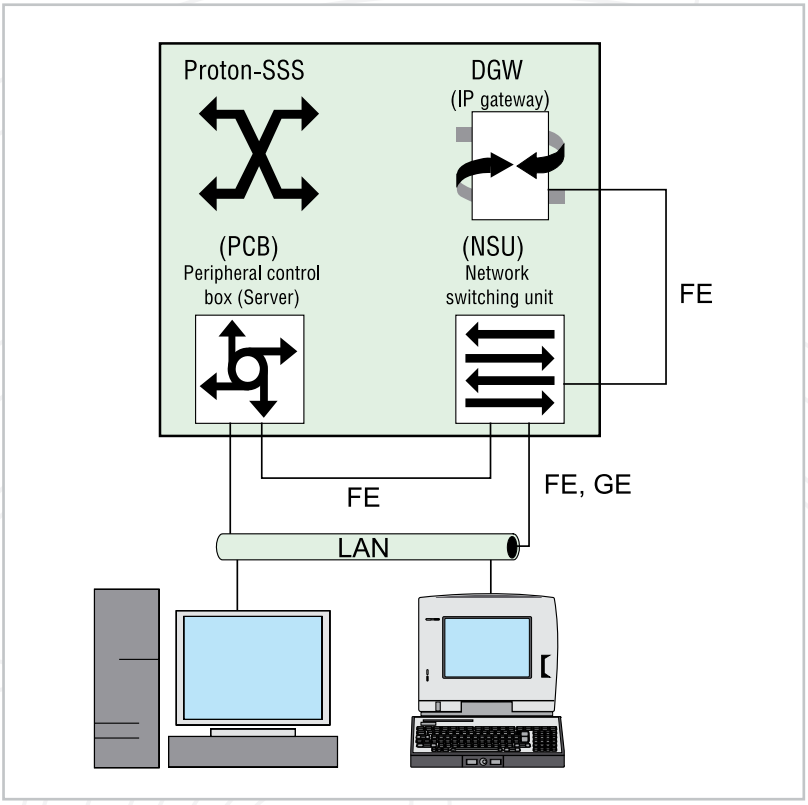
A highly productive commutation of the 2nd level.

Developed functions of the access level.

The transmission band control.

A wide range of supported transceivers SFP (SMF, MMF, WDM, etc.).

Provide with stacks.



Technical features		
	Block of network (LAN) commutator (BSC)	Block of network (LAN) commutator (BSC-01)
Standards and functions	IEEE 802.3 10BASE-T Ethernet (copper twisted pair) IEEE 802.3u 100BASE-TX Fast Ethernet (copper twisted pair) ANSI/IEEE 802.3 NWay auto-definition of speed and mode of work IEEE 802.3x flow control Port mirroring 802.1d Spanning Tree	IEEE 802.3 10BASE-T Ethernet (copper twisted pair) IEEE 802.3u 100BASE-TX Fast Ethernet (copper twisted pair) IEEE 802.3u 100BASE-TX Fast Ethernet (single-mode or multi-mode fiber optics) ANSI/IEEE 802.3 NWay auto-definition of speed and mode of work IEEE 802.3x flow control Port mirroring 802.1d Spanning Tree
Number of ports	10/8 ports 10BASE-T/100BASE-TX	8 ports 10/100BASE/TX Fast Ethernet 1 port 1000BASE-T 1 slot SFP or 1 port 100BASE-FX for multi-mode (MMF) or single-mode (SMF) optic cable, SC connector Console port RS-232

Transfer area interface	Auto-definition of MDI/MDI-X on all the ports for a twisted pair	
Indicators	On port: transmission (Link/act), 10/100 To the device: Feeding/ CPU	Power to the device Console Link/Activity Speed Indicator to each port
Network security	Study of MAC-addresses Dynamic: automatic updating Statistic: defined by the user Max. number of notes in the statistic table: 60	RADIUS autentification Port Security function: 10 notes of MAC-addresses (max) Control of 802.1x access based on ports Control of 802.1x access based on MAC-addresses Bandwidth control: Speed limits: Up to 2 Mbit/s: 64 kbit/s Up to 100 Mbit/s: 1 Mbit/s More than 100 Mbit/s: 8 Mbit/s calls flow capacity segmentation
VLAN	IEEE 802.1Q Tagged VLAN VLAN based on ports Max. number of VLAN - 40	IEEE 802.1Q Tagged VLAN Max. number of VLAN - 255
Quality of service QoS	Priority lines IEEE 802.1p Maximal number of lines: 2	Priority lines 802.1p 4 Priority lines QoS based on ports
2nd level functions	IGMP Snooping v2	IGMP Snooping 802.1D Spanning tree 802.1w Rapid Spanning Tree 802.3ad Link Aggregation: 8 ports in each group, 3 groups in one device Ports mirroring Control of broadcast storm
Control and tuning	Web-control interface CLI command line interface Telnet SNMP v.1 DHCP client Web-interface of calls flow capacity monitoring (statistics data) Telecommunication Networks and Telecommunication Equipment Proton-SSS	Stack control by one IP-address Web-interface Telnet TFTP SNMP v.1 SNMP v.2c SNMP v.3 4 groups of RMON Boot/DHCP-client SNTP SYSLOG Telecommunication Networks and Telecommunication Equipment Proton-SSS
Physical parameters and maintenance conditions		
Power consumption	9 Wt (max)	10.7 Wt (max)
Power supply	Design for the implementing into the box 19” telecommunication system Proton-SSS – from the power supply device station feeder Design for the implementing into the 19” post and on-table – built-in feeder, from 100 to 140 V of alternating current and 18-72 V of direct current	
Working temperature range	+10…+35° C	

Component parts of the telecommunication system

BRKZ (Master block of cross expansion)

BRKZ (Master block of cross expansion) is intended for forming inter-module group highway between control module and add-on module of telecommunication system Proton-SSS. BRKZ can work in set with other BRKZ, BRKI (Slave block of cross expansion), MUSM (Coupling module), BIKM4 (Signaling submodule for 4*E1 module), BIKMU (Signaling submodule (CAS, EDSS-1, QSIG, SS7, V24/28) for 1*E1 module). BRKZ also can work with equipment of other exchanges which form primary digital group highways according to the GOST (ГОСТ) 26886-86, ITU-T G.703.

BRKZ supports PBX system of reservation.

BRKZ can be made as BRKZ-01, BRKZ-02.

Technical features

Speed of Internal Group Highway (IGH) signal transmission	2048, 8192 kbit/s
Max number of IGH	8
Max number of Inter-Module Group Highway (IMGH)	
BRKZ	2 (electric)
BRKZ-01	8 (electric)
BRKZ-02	1 (optic)
Speed of IMGH signal transmission	
BRKZ, BRKZ-01	2048 or 8448 kbit/s
BRKZ-02	2048 or 16896 kbit/s
Max power consumption under rated load	
BRKZ	3.3 Wt
BRKZ-01	5.5 Wt
BRKZ-02	4.5 Wt

BRKI (Slave block of cross expansion)

BRKI (Slave block of cross expansion) is intended for forming inter-module group highway between control module and add-on module of telecommunication system Proton-SSS. BRKI can work in set with BRKZ, MUSM (Coupling module), BIKM4 (Signaling submodule for 4*E1 module), BIKMU (Signaling submodule (CAS, EDSS-1, QSIG, SS7, V24/28) for 1*E1 module). BRKZ also can work with equipment of other exchanges which form primary digital group highways according to the GOST (ГОСТ) 26886-86, ITU-T G.703.

BRKI can be made as BRKI-01, BRKI-02, BRKI-03.

Technical features

Speed of IGH signal transmission	2048 kbit/s
Max number of IGH	
BRKI, BRKI-02, BRKI-03	8
BRKI-01	32
Max number of IMGH	
BRKI, BRKI-03	2 (electric)
BRKI-01	8 (electric)
BRKI-02	1 (optic)
Speed of IMGH signal transmission	
BRKI, BRKI-01, BRKI-03	2048 or 8448 kbit/s
BRKI-02	2048 or 16896 kbit/s
Max power consumption under rated load	
BRKI	4 Wt
BRKI-01	6.5 Wt
BRKI-02	5 Wt

BUKM (Modularized Commutation management module – 586)

BUKM (Modularized Commutation management module – 586) fulfills fully accessible all-to-all commutation up to 2048 digital circuits out of 64 inter-station group highways. BUKM is installed into control module and add-on module of telecommunication system Proton-SSS. It has the following functions:

- control of linear terminations;
- processing of telecommunication signals;
- routing of calls;
- commutation of calls;
- tariffication of connections;
- time and statistic data calculation;
- processing and conversion of signaling;
- control and diagnostics of telecommunication system Proton-SSS equipment;
- interaction with the maintenance centre.

BUKM is a base circuit board on which electronic modules of PC104 standards are installed:

- module of central processor MSM586SEN (or MOPSlcdGX1);
- 2 modules of signaling processor MSP (Signaling Processor Module) 85 (or MSP (Signaling Processor Module) 65);
- Module of Central Commutator (Switching module) KM64;
- Coupling module MUSM;
- Synchronization module MUG.

Module of signaling processor MSP (Signaling Processor Module) 85:

- functions as a controller of linear terminations;
- fulfils low level functions instead of the module of Central Processor Module (MCP);
- can be used as host for conference communication;
- uses protocol with error correcting;

Signaling Processor module MSP65:

- functions as a multifrequency receiver: digital filters, receivers, detectors on 32 channels (frequency register signaling, DTMF, automatic number identifier, etc.) are realized there;
- can function as autoinformer and acoustic signals generator (forms acoustic signals combinations, phrases of autoinformer in every stage of connection and while functioning as supplementary service);

Central Commutator Module KM64:

- functions as a commutator of switching field;
- realizes full-accessible unblocked plugging chart 64x64 with telephone load 1 Erl;
- provides commutation of telecommunication signals with the speed up to 64 kbit/s;

MUSM (Coupling module) is intended for forming up to 4 inter-module group highways (with the speed 2048 or 8448 kbit/s) between control module and add-on module of telecommunication system Proton-SSS.

MUG (Generator Controling module) provides main functions of a net clocking unit.

MUG provides the work of telecommunication system in the following modes:

- free-running sweep;
- synchronization initialization;
- synchronous operation with synchronization from received clock signals;
- keeping (storing) of the latest synchronization frequency value when clock signals are switched off.

MCP MSM586 (MOPSlcdGX1) generates control signals for BUKM and telecommunication system.

BUP

BUP is installed into add-on module of telecommunication system Proton-SSS. It fulfills the following functions:

- processing of telecommunication signals;
- routing of calls;
- commutation of calls;
- tariffication of connections;
- time and statistic data calculation;
- processing and conversion of signaling;
- IP-telephony gateway;
- In-built server;
- interaction with the maintenance centre.

BUP is a base printed circuit board on which electronic modules of PC104 standards are installed:

- module of central processor MSM586SEN (or MCP 386, MOPSIcdGX1);
- 2 modules of signaling processor MSP (SIGNALING PROCESSOR MODULE)85 (or MSP (SIGNALING PROCESSOR MODULE)65);
- Module of central commutator KM64 (or KMA16);

MCI 1 (Digital Interfaces module)

MCI 1 is intended for forming main digital circuits interface at 64 kbit/s (with signals transfer speed of $64x(1\pm100x10^{-6})$ kbit/s).

MCI 1 can work in 2 modes:

- Codirectional joint interface at 64 kbit/s;
- Antidirectional joint interface at 64 kbit/s.

In the mode Codirectional joint interface at 64 kbit/s MCI 1 can form up to 2 interfaces at 64 kbit/s.

In the mode Antidirectional joint interface at 64 kbit/s MCI 1 forms 1 interface at 64 kbit/s and may work both as DCE and DTE.

MCI 1 is installed on BCI (Digital Interfaces block).

Technical features

	Codirectional joint interface at 64 kbit/s	Antidirectional joint interface at 64 kbit/s
Type of signal transmission	Modification of pseudo-ternary signal with alternation of pulse direction, transfer of binary symbol as a unit of 4 bits	Modification of pseudo-ternary signal with alternation of pulse direction (AMI signal), transfer of binary symbol as a unit of 4 bits
Nominal speed of symbol transmission	256 kbaud	
Nominal form of impulses	Square	
Measuring loading resistance	(120+/- 1,2) Om	
Output resistance	(120+/-24) Om	
Impulse pattern	Corresponds to the ITU-T G.703 recommendation for impulse shield on codirectional joint at 64 kbit/s	Corresponds to the ITU-T G.703 recommendation for impulse shield on antidirectional joint at 64 kbit/s
Min joint signal amplitude on input MCI 1	Minus 3 dB	
Reflection attenuation on input MCI 1	Not less than 18 dB	
Joint circuit	Pair of symmetrical cables with surge impedance – 120 Om	4 pairs of symmetrical cables with surge impedance – 120 Om
Power consumption under rated load	Not more than 1.5 Wt	

MCI 2

MCI 2 is intended for forming signals with one of the following interfaces: RS-232, V.35, V.36, X.21, RS-530, RS-530A, RS-449.

MCI 2 can work as both DCE and DTE.

Technical features

Speed of signal transfer	
For RS-232 interface	64 kbit/s or 128 kbit/s
For interfaces V.35, V.36, X.21, RS-530, RS-530A, RS-449	From 64 kbit/s to 1984 kbit/s
Power consumption under rated load	Not more than 2 Wt

MCI 2 is installed on BCI.

BIKMU (Signaling submodule (CAS, EDSS-1, QSIG, SS7, V24/28) for 1*E1 module), BIKM4 (Signaling submodule for 4*E1 module), BIKM15 (Signaling submodule for 15*E1 module)

BIKMU is intended for organization of primary digital transfer channel with the speed of signal transfer 2048x(1 +/- 50x10^{-6}) kbit/s.

BIKMU-01 is used in a set with equipment for secret services and affords to connect to a telecommunication system 2 modems to make 2 channels of secret services data exchange. Modems are connected to BIKMU-01 according to the recommendation of V.24 ITU-T. Secret services channel of data exchange corresponds to the recommendation of X.25 ITU-T.

BIKMU-03 has signalling processor that affords making frequency processing of telephone signalling.

BIKM4 is intended for organization of 4 primary digital transfer channels with the speed of signal transfer 2048x(1 +/- 50x10^{-6}) kbit/s.

BIKM15 is intended for organization of digital transfer channel with the speed of signal transfer 1024x(1 +/- 50x10^{-6}) kbit/s.

BIKM15 is intended for splicing with digital equipment of the following types: IVA-15, ZONA-15, KEDR-15, etc.

BIKM15 can be made as BIKM15-01.

BIKMU, BIKM4, BIKM15 are installed on BCO (Digital Interfaces module) and BCO8M (8*E1 module modernized).

Technical features

	BIKMU and BIKM4	BIKM15	BIKM15-01
Speed of signal transfer	2048x(1 +/- 50x10^{-6}) kbit/s	1024x(1 +/- 50x10^{-6}) kbit/s	
Signal used	AMI, HDB-3	NRZ	HDB-3, AMI
Supported types of signaling	EDSS-1, QSIG, SS7, R2, V5.2, 1 CAS, 2 CAS (decade dialling, pulsed shuttle, pulse packet)	R2, 1 CAS, 2 CAS (decade dialling, pulsed shuttle, pulse packet)	
Measuring loading resistance	(120+/- 1,2) Om	(120+/- 1,2) Om	
Output resistance	(120+/-24) Om	(120+/-2 4) Om	
Min joint signal amplitude on input	Minus 6 dB	Minus 6 dB	
Reflection attenuation on input	Not less than 18 dB	Not less than 18 dB	
Joint circuit	Pair of symmetrical cables with surge impedance – 120 Om		
Power consumption under rated load	Not more than 1.5 Wt		

KSLU (8*4, 6, 8-wire universal subscriber lines FXO interface (with no line-diagnostic functionality)

KSLU is intended for connecting 8 trunks of signaling protocol through 2 signal channels. It's possible to connect 4-, 6- and 8- wire physical line as a trunk.

KSLU doesn't have protection elements of a trunk.

KSLU-01 has protection element of a trunk.

Technical features

Rating value of relative input signal level	0 dBr
Rating value of relative output signal level	Minus 7 dBr
Compensating attenuation of differentiation system, not less than	24 dB
Reflection attenuation, not less than	18 dB
Stability margin, not less than	6 dB
Asymmetry attenuation, not less than	46 dB
Max power consumption under rated load	0,7 Wt

KSTA (10*System phones and 5* Consoles module)

KSTA is intended for connecting 10 phone systems of the company LG GK-36EXE/R and 5 extension consoles of the company LG GK-DSS/E to telecommunication system.

Connection of phone systems and extension consoles is made through subscriber links – single 4-wire lines.

Technical features

Rating value of relative input level	0 dBr
Rating value of relative output level	Minus 7 dBr
Compensating attenuation of differentiation system, not less than	24 dB
Reflection attenuation, not less than	18 dB
Stability margin, not less than	6 dB
Asymmetry attenuation, not less than	46 dB
Digital control signal amplitude	1 V
Max power consumption under rated load	Not more than 39 Wt

KSLV (6*3-wire incoming subscriber lines FXO interface)

KSLV is intended for connecting 6 incoming 3-wire analog trunks and 3-wire interurban trunks.

KSLV has protection element of a trunk.

KSLV-01 is made to connect 3-wire trunks of ORGRES network.

Technical features

Rating value of relative input signal level	0 dBr
Rating value of relative output signal level:	
KSLV	Minus 7 dBr
KSLV-01	Minus 3.5 dBr
Compensating attenuation of differentiation system, not less than	24 dB
Reflection attenuation, not less than	18 dB
Stability margin, not less than	6 dB
Asymmetry attenuation, not less than	46 dB
KSLV max power consumption under rated load	10.5 Wt

KSLI (6*3-wires outgoing subscriber lines FXO interface)

KSLI is intended for connecting 6 incoming 3-wire analog trunks.

KSLI has protection elements.

KSLI-01 is made to connect 3-wire interurban trunks.

KSLI-02 is made to connect 3-wire trunks of ORGRES network.

Technical features

Rating value of relative input signal level	0 dBr
Rating value of relative output signal level:	
KSLI, KSLI-01	Minus 7 dBr
KSLI-02	Minus 3.5 dBr
Compensating attenuation of differentiation system, not less than	24 dB
Reflection attenuation, not less than	18 dB
Stability margin, not less than	6 dB
Asymmetry attenuation, not less than	46 dB
KSLI max power consumption under rated load	2 Wt

KSAL (4*2-wires subscriber lines FXO interface and 8 subscriber lines FXS interface, Local Battery option (with line-diagnostic))

KSAL is made to:

• connect 8 terminal subscriber's telephone devices through a trunk to telecommunication system Proton-SSS;

• connect 4 subscriber's connective telephone links to telecommunication system Proton-SSS;

KSAL has elements of protection and diagnostics of a subscriber's link.

KSAL-01 doesn't have elements of diagnostics of a subscriber's link.

KSAL-02 is made to connect as subscriber's connective telephone links of a trunk with a local battery. It has elements of protection and diagnostics of a subscriber's link.

KSAL-03 is made to connect as subscriber's connective telephone links of a trunk with a local battery. It doesn't have elements of protection and diagnostics of a subscriber's link.

Technical features

Rating value of relative input signal level	0 dBr
Rating value of relative output signal level of a user's set	Minus 7 dBr
Rating value of relative output signal level of a subscriber's trunk set	Minus 1 dBr
Compensating attenuation of differentiation system, not less than	24 dB
Reflection attenuation, not less than	18 dB
Stability margin, not less than	6 dB
Asymmetry attenuation, not less than	46 dB
KSLI max power consumption under rated load	8 Wt

KSLA (15*2-wires subscriber lines FXO interface)

KSLA is intended for connecting up to 15 subscriber's trunks to the telecommunication system.

Technical features

Rating value of relative input signal level	0 dBr
Rating value of relative output signal level	Minus 1 dBr
Compensating attenuation of differentiation system, not less than	24 dB
Reflection attenuation, not less than	18 dB
Stability margin, not less than	6 dB
Asymmetry attenuation, not less than	46 dB
KSLA Max power consumption under rated load	0.7 Wt

BCO8M (8*E1 module modernized)

BCO8M is made to:

- install up to 4 electronics packages which generate signals of digital telecommunication networks;
- connect to electronics packages up to 8 inter-station group highways;
- connect to electronics packages up to 8 digital trunks.

The following electronics packages can be installed on the BCO8M: BIKMU, BIKM4, BIKM15, USM, Eth/E1.

BCO8M has a joint to connect a PC of maintenance centre with RS232 interface, galvanic isolation and a multiplexer.

BCO8M provides for electronics packages being installed:

- connection of digital trunk;
- stability to overvoltage impact and excess current through a trunk;
- connection of inter-station group highways;
- connection of signals of RS232 interface;
- indication of work modes;
- reservation of inter-station group highways and synchronization signals;
- automatic control of joint action;
- power supply.

BCST (Digital System Phones module (up to 30 System Phones or Consoles)

BCST is intended for connecting LKD-30DS, LDP-7016D System Telephone Sets (STS) and LKD-DSS, LDP-7048DSS extension consoles of the LG company to the telecommunication system.

Line interface of BCST corresponds to the Upo interface with home access (2B+D).

BCST has 30 ports to connect up to 30 System Telephone Sets and extension consoles.

BCST-01 has 15 ports to connect System Telephone Sets and extension consoles.

Connection of System Telephone Sets and extension consoles to the telecommunication system Proton-SSS is made through 2-wire physical lines.

Technical features

2 B-channels with data throughput	64 kbit/s
D-channel with data throughput	16 kbit/s
Input resistance	(120+/-24) Om
Output resistance	(120+/-24) Om
Pulse amplitude	(0.65 +/- 0.07) volt
Rated pulse duration	2.6 mcrs
Rated frame duration	96.35 mcrs
Rated spacing interval between spacing pulses	15.625 mcrs
Max power consumption in the lack of load	
BCST	3.5 Wt
BCST-01	2.5 Wt

BSTM – Unit of System Telephones Mitel

BSTM is intended for connecting Superset 4150, Superset 4025 System Telephone Sets and Superset PKM 48 extension consoles to the telecommunication system.

BSTM has 30 ports to connect System Telephone Sets.

BSTM-01 has 15 ports to connect System Telephone Sets.

It's possible to connect up to 2 consoles to each System Telephone Set.

Line interface of BSTM corresponds to the interface with home access (B+D) and echo suppression.

Connection of System Telephone Sets to the telecommunication system Proton-SSS is made through a subscriber link: 2-wire physical lines.

Technical features

B-channel with data throughput	64 kbit/s
D-channel with data throughput	16 kbit/s
Operating distance without a recuperator, with a cable core 0.5 mm	Up to 3 km
Subscriber link power supply	48 volt
STS feed current, not more than	20 mA
Max power consumption in the lack of load	
BSTM	3.5 Wt
BSTM-01	2.5 Wt

BCI (Digital Interfaces block)

BCI is made to:

- install up to 2 electronics packages which generate signals of digital telecommunication networks;
- connect to electronics packages 1 inter-station group highway;
- organization of 2 digital circuits of data transfer and connection to electronics packages up to 4 digital trunks.

MCI 1 and MCI 2 electronics packages are installed on BCI.

BCI provides for electronics packages being installed:

- connection of digital trunks;
- connection of inter-station group highway;
- reservation of inter-station group highway and synchronization signals (if there is the function available);
- indication of work modes;
- power supply.

BCI has RS232 technical connector with optic decoupling which provide galvanic isolation between circuits up to 1500 volt.

BCO (Digital Interfaces module)

BCO is made to:

- install up to 4 electronics packages which generate signals of digital telecommunication networks;
- connect to electronics packages up to 4 inter-station group highways;
- connect to electronics packages up to 4 digital trunks.

The following electronics packages can be installed on BCO: BIKMU, BIKM4, BIKM15, Eth/E1.

BCO provides for electronics packages being installed:

- connection of digital trunks;
- stability to overvoltage impact and excess current through a trunk;
- connection of inter-station group highways;
- connection of signals of RS232 interface;
- indication of work modes;
- power supply.

BAK (15*Subscriber lines FXS interface (with line diagnostic functionality) module)

BAK is intended for connecting up to 15 terminal telephone devices to the telecommunication system Proton-SSS through a subscriber link.

User's sets BAK have diagnostics and protection elements of a subscriber link.

BAK-01 doesn't have diagnostics elements of a subscriber link.

BAK-02 supports reservation of a control module and a commutation module. It is installed into the bearing structure with cross boards which support reservation system of main modules of telecommunication system Proton-SSS.

Technical features

Rating value of relative input signal level	0 dBr
Rating value of relative output signal level	Minus 7 dBr
Compensating attenuation of differentiation system, not less than	24 dB
Reflection attenuation, not less than	18 dB
Stability margin, not less than	6 dB
Asymmetry attenuation, not less than	46 dB
BAK max power consumption under rated load	14 Wt

BAKD (10*Subscriber lines FXS interface (with reversal battery and line diagnostic functionality) module)

BAKD is made to:

- Connection of 10 terminal telephone devices through a subscriber link to the telecommunication system;
- Diagnostics of user's sets which are part of the telecommunication system Proton-SSS;
- Diagnostics of subscriber links connected to user's sets of the telecommunication system Proton-SSS.

User's sets BAKD afford to connect monetary telephones with tariff clocks of 16 KHz frequency and tariff clocks of a changed pole to the telecommunication system Proton-SSS.

User's sets BAKD have diagnostics and protection elements of a subscriber link.

There is a diagnostics module with an a-law code cofidec in the basis of BAKD.

BAKD-01 has a diagnostics module with a linear encoding law cofidec.

BAKD-02 supports reservation of a control module and a commutation module. It has a diagnostics module with an a -law code cofidec.

Technical features

Rating value of relative input signal level	0 dBr
Rating value of relative output signal level	Minus 7 dBr
Compensating attenuation of differentiation system, not less than	24 dB
Reflection attenuation, not less than	18 dB
Stability margin, not less than	6 dB
Asymmetry attenuation, not less than	46 dB
Max power consumption under rated load	4 Wt

Power supply

There are the following power supply devices used in the telecommunication system Proton-SSS:

- IBP 220 (AC Power supply 220 V) is a power supply device from circuit with alternating rated voltage of 220 volt;
- IBP 60 (DC Power supply -60 V) is a power supply device from circuit with rated voltage of minus 60 volt;
- IBP 48 (DC Power supply -48 V) is a power supply device from circuit with rated voltage of minus 48 volt;
- IBP 24 (DC Power supply -24 V) is a power supply device from circuit with rated voltage of minus 24 volt;
- IPR (Redundant DC Power supply -60 volt) is a power supply device from circuit with rated voltage of minus 60 volt with the support of power supply device reservation;
- IPR48 is a power supply device from circuit with rated voltage of 48 volt and with the support of power supply device reservation.

There is light indication which shows if output voltage is being formed and alarm indication in power supply devices.

Power supply devices provide:

- smooth feeding of tension formed while switching on;
- protection against short circuit on output;
- automatic switch off if there is voltage deviation out of permissible limit.

Technical features

IBP 220 power supply voltage	Alternating with a rating value 220 volt, frequency 50 Hz (extreme deviation of voltage value is from 187 to 242 volt, frequency fluctuation: 2.5 Hz)
IBP 60, IPR power supply voltage	Direct (- 60+/-12) volt
IBP 48, IPR48 power supply voltage	Direct (- 48.0+/-7.2) volt
IBP 24 power supply voltage	Direct (- 24.0 +/- 3.6) volt
Max output power	300 Wt
Coefficient of efficiency of max output power	Not less than 80 %
Output voltage	
	5.20 volt +/- 0.05 volt with max output power 50 Wt
	12.0 volt +/- 0.5 volt with max output power 25 Wt
	- 12.0 volt +/- 0.5 volt with max output power 25 Wt
	- 60 volt +/- 1 volt with max output power 180 Wt
	Alternating voltage of a subscriber call ~95 volt with max output power 30 Wt (for IBP 24, IBP 48, IBP 60, IBP 220)
Pulsation of output voltage	Not more than 30 microvolt

Table of contents

THE GROUP OF COMPANIES
ПРОТОН-ССС

SUPPLY

Proton-SSS Group of companies
Parent enterprise RDC Spetsstroy-Svuaz
2, Shevchenko street, Taganrog, Rostov region, 347922, Russia Tel./fax: (8634) 310-908, e-mail: sale@proton-sss.ru, http://proton-sss.ru
RDC Spetsstroy-Svuaz representative office in Moscow
Building 1, 13, street Sharikopodshipnikovskaya, Moscow, 115088, Russia Tel.: (495)675 – 91-93, Tel./fax: (495) 675 – 9194, mobile: +7 – 901 – 517 – 16 -59, in Moscow: 107 – 16 – 59 e-mail: dpr@proton-sss.ru, http://proton-sss.ru
Ltd. Almaz-SSS (Moscow) system integrator
Building 1, 4, street Novopeschanaya, Moscow, 101000, Russia Tel./fax: (495) 157-40-14, 157 – 17 – 37, e-mail: office@almaz-sss.ru, http://almaz-sss.ru
Ltd. UTEK (Rostov-on-Don) system integrator
91, Voroshilovskiy avenue, Rostov-on-Don, Russia Tel.: (863) 243 – 91-51, e-mail: utek@donpac.ru
Trisoft software company
Office 713, 6, lane Gogolevskiy, Taganrog, Rostov region, 347900, Russia Tel./fax: +7 (8634) 315 – 320, e-mail: director@proton-sss.ru
Ltd. Proton-T
6 A, boulevard Stroiteley, Tambov, 392000, Russia Tel: +7 – 902 – 729 – 06 – 20, e-mail: tambov@proton-sss.ru
Ltd. Proton-SSS exclusive exporter
2, Shevchenko street, Taganrog, Rostov region, 347922, Russia Tel/fax: +7 (8634) 315 – 442, 314 – 064, e-mail: eet_division@proton-sss.ru, http://proton-sss.ru