

INDUSTRIAL COMPUTER - NPE-GPRS/EDGE

Linux ARM9 32-bit RISC 180MHz 200MIPS CPU

- ▶ Built-in processor ARM9 RISC
- ▶ Built-in modem GSM/GPRS/EDGE
- ▶ Linux operating system 2.6.x
- ▶ Ethernet 10/100 BaseT
- ▶ RTC and SRAM with the power backup
- ▶ 2 x RS232, 1 x RS485
- ▶ 8 digital inputs
- ▶ Digital output
- ▶ Relay outputs
- ▶ Analogue inputs: 0..10V DC
- ▶ Analogue input: 0..70V AC
- ▶ 1 x Switch, user's LED
- ▶ Free Linux GNU C/C++/JAVA programming tools
- ▶ **Security Chip** system, protecting user's applications
- ▶ DIN rail mounting
- ▶ Customized versions for the individual needs

} Table 1



APPLICATION

Currently, the automation, telecommunication and supervision systems require the independent control or devices monitoring with the RS232 and RS-485 interfaces, or equipped with the standard interfaces, like the binary or analogue inputs-outputs. It becomes the real challenge, when it is necessary to use the autonomous solution, which enables the independent work with the devices with serial ports without loading the central computer. In such

situations the industrial computer NPE is the perfect solution, which may independently perform most of activities, e.g. change data through the serial ports, perform the data analysis in the real time, buffer the collected information, communicate through IP and GPRS/EDGE, visualize the process through the Web site and many other functions, according to the user's needs.

The table below shows all available versions of NPE computers. Each model may be equipped with GPRS or EDGE modem, and has the following number of inputs/outputs:

NPE industrial computers series – SELECTION GUIDE							
All versions available with options GPRS / EDGE / Modbus / SNMP							
Symbol	RS232	RS485	DI	DO	AI1	AI2	DOP
NPE-9100	2	1	8	6	0	0	0
NPE-9200	2	1	8	6	4	0	0
NPE-9201	2	1	8	6	3	1	0
NPE-9100R	2	1	8	2	0	0	2
NPE-9200R	2	1	8	2	4	0	2
NPE-9201R	2	1	8	2	3	1	2
Legend:							
AI1 - analogue inputs: 0..10V DC							
AI2 - analogue inputs: 0..70V AC							
DOP - relay outputs							

Table1

PRODUCT DESCRIPTION

NPE Computer along with other models from this family is the series of industrial built-in computers, characterized by: complete, ready platform (hardware + installed Linux operating system + freeware tools and programming libraries for C/C++/JAVA), adapted to the operation in difficult environment conditions (temperature range even form -25°C to +85°C) and high operational reliability.

The NPE computer is equipped with efficient processor RISC ARM9 180 MHz 200 MIPS with Linux operating system in version 2.6.x, preinstalled in the Flash memory, Ethernet 10/100 BaseT port, GSM/GPRS/EGPRS modem, two RS-232 ports, RS-485 port, analogue inputs, relay outputs, binary inputs and outputs, real time clock (RTC), and SRAM memory (256B) with power supply backup, SD cards reader and Watch Dog Timer (WDT) system, protecting from computer's hang-up.

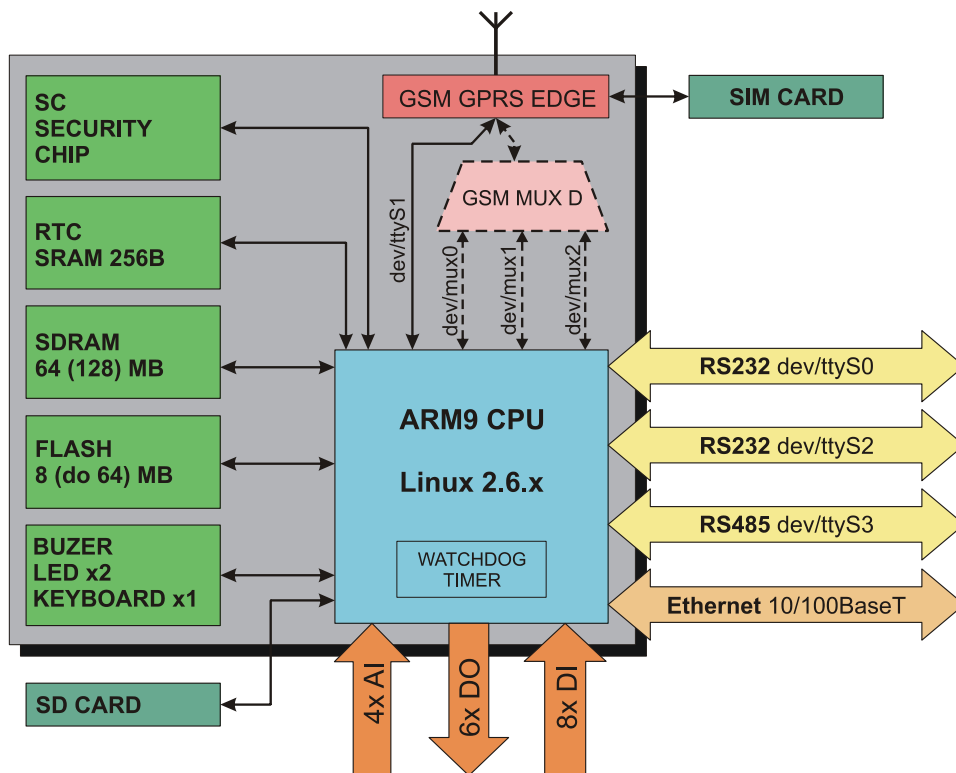
The NPE cover is especially adapted to the installation in difficult industrial conditions on the DIN bus, and assures quick and comfortable installation in the target location. The relatively small dimensions and the IP21 standard cover made of tough plastic ABS, no moving parts (fans, discs) assure the failure-free operation in the industrial

objects as well as in various cabinets. Moreover, NPE computer may be optionally produced in versions with enhanced operational temperature range (-25°C...+85°C) and inner components of NPE such as SDRAM and FLASH ca be extant depending on user's needs. TechBase company offers the possibility of ordering the dedicated versions, equipped with non-standard interfaces and internal resources.

The computer NPE has been equipped with the Linux operating system in version 2.6.x. The programming method is almost identical as the software creation on the stationary computer, and includes three stages:

1. Program creation on the stationary computer.
2. Program compilation with the cross-compiler (included on the CD C/C++ compiler, enhanced with the libraries for the NPE – NPE Tool Kit input-output interfaces operation).
3. Copying of the compiled application to the FTP server, built in the computer NPE, or use the NFS service in the Linux system.

The NPE computer architecture is shown in the block diagram below:



Special attention must be paid to the possibility of GSM/GPRS/EDGE modem communication port multiplexer with use of GSMMUXD program. It gives the possibility of using many modem services at the same time, e.g. communication through GPRS/EDGE (PPP), sending and receiving SMS messages, GSM network or modem parameters control with use of AT commands, and each service operates on different serial port dev/mux0, dev/mux1 or dev/mux2, made available after GSMMUXD startup, although only one serial port dev/ttyS1 is physically used.

TECHNICAL PARAMETERS

Type: NPE
System

- CPU ARM9 32-bit RISC CPU, 180 MHz, 200 MIPS
- 64 MB SDRAM (128¹ MB optional)
- User FLASH memory 16 MB (up to 1¹ GB optional)
- Card reader SD x1
- Linux operating system version 2.6.x
- RTC, 240 byte SRAM, Watch Dog Timer

GSM modem (depending on GPRS or EDGE option)

EDGE:

- GSM/GPRS/EDGE 900/1800/1900 MHz tribanda
- GPRS max. 85.6 kbps (downlink)
- EDGE max. 236.8 kbps (downlink)
- Consistent with GSM phase 2/2+
 - Class 4 (2W @ 900 MHz)
 - Class 1 (1W @1800/1900 MHz)
- Antenna connector: female connector SMA

GPRS:

- GSM/GPRS 900/1800/1900 MHz tribanda
- GPRS max. 85.6 kbps (downlink)
- Consistent with GSM phase 2/2+
 - Class 4 (2W @ 900 MHz)
 - Class 1 (1W @1800/1900 MHz)
- Antenna connector: female connector SMA

Interface Ethernet

- Ethernet 10/100 Mbps (RJ45 connector)
- 1.5 KV magnetic isolation protection

Serial ports

- 2 x RS-232, 1 x RS485.
- Built-in protection 15 KV ESD
- Data bits: 5, 6, 7, 8
- Stop bits: 1, 1.5, 2
- Parity: None, Even, Odd, Space, Mark
- Baud rate: 50 bps to 921.6 Kbps

LED controls, keyboard, inputs-outputs

- LED: power supply x 1, system ready x 1, user x 1, GSM x 2
- LAN 100M/Link x 2 (integrated with RJ45 socket)
- 1 x mono-stable Switch (front panel access)
- Digital inputs 30V dc max.
- Digital relay inputs 30V dc, maximum load capacity 100 mA each
- Analogue input:
 - AI1: 0..10V DC- AI2: 0..70V AC
- Relay outputs 230Vac 1A



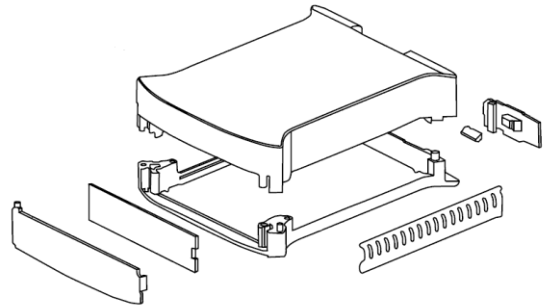
¹ Available as option on individual order.

Power supply

- Voltage 9 ~ 36Vdc.
- Optionally available expanded supply voltage range 9 ~ 48 Vdc
- Power input:
 - without GSM modem: 5W max.
 - with GSM modem: 12W max.

Environment Conditions, storage, housing

- Working temperature:
 - Standard temperature range:
 - without GSM modem: -10 ~ 75°C
 - with GSM modem: -10 ~ 60°C
 - Extended temperature range:
 - without GSM modem: -35 ~ 85°C
 - with GSM modem: -25 ~ 60°C
- Storage temperature: -40 ~ 85°C
- Humidity: 5 ~ 95% RH (without condensation).
- Housing: ABS, DIN bus installation
- Dimensions (width x depth x height)
 - without GSM modem: 35 x 120 x 101 mm
 - with GSM modem: 45 x 120 x 101 mm
- Weight:
 - without GSM modem: 350g
 - with GSM modem: 450g

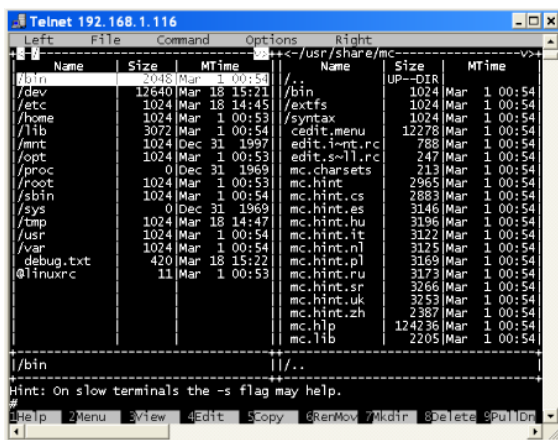


SOFTWARE

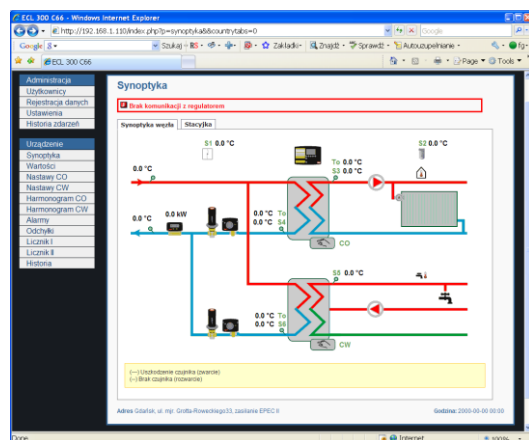
NPE is delivered with many ready programs, e.g. FTP daemon, SMTP mail client daemon, DHCP daemon, PPP daemon, TELNET daemon, APACHE Web Server daemon, JAVA virtual machine, SQL Light database, SNMP daemon, SSHD daemon (Secured Shell Server), IPTABLES service (Firewall Service Manager), MIDNIGHT COMMANDER manager and many others. It allows the programmer to make use of advanced and reliable applications, supporting the project, and to focus only on his application development.

The Linux 2.6.x system, preinstalled in NPE, has built-in operation of the following file systems: JFFS2, EXT2/EXT3, VFAT/FAT, NFS and protocols: IPV4, ICMP, ARP, DHCP, NTP, TCP, UDP, FTP, Telnet, HTTP, PPP, PPPoE, CHAP, PAP, SMTP, SNMP V1/V3, SSL, SSH 1/2.

The unique feature of NPE computer is built-in **Security Chip (SC)** system, which due to unique for every NPE device serial number allows for protecting the software from copying or moving to another NPE, according to author's will. Access to the S.C. function is realized through the NPE Tool Kit library.



MIDNIGHT COMMANDER in TELNET window



WWW interface sample - APACHE

² Extend power voltage range is available on individual order
³ Extend temperature range is available on individual order