# CAN BUS GATEWAY FOR DATA ACQUISITION AND CONTROL

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*Abstract*

The new controller, used for CAN bus based automation, is described. Controller (CANGW) is developed in the BINP and wide used for data acquisition and power sources control. The main features of CANGW are: Linux 2.4 kernel, available SDK, Ethernet and CAN interfaces.

## INTRODUCTION

The presented device (CANGW) is gateway between telemetric buses (CAN, RS485) and Ethernet based data transmission networks. The offered application scheme is illustrated in figure.
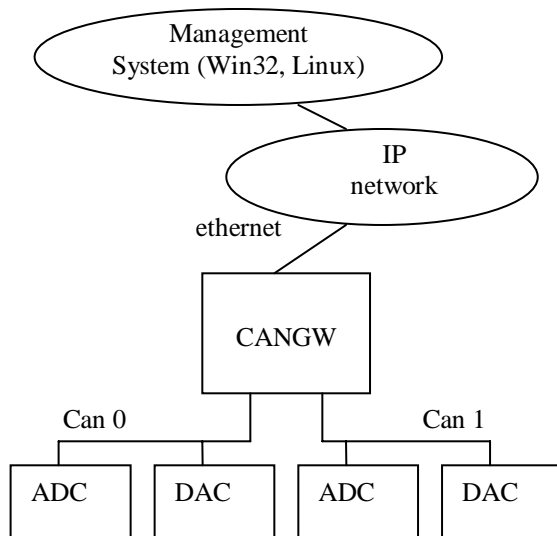


There are two alternative application schemes of the gateway. The first is remote CAN interface. The second is programmable logical controller (PLC).

In the first case gateway acts as TCP server and retransmits packets between IP net and CAN line. Client is any workstation in the IP net. Client software resides in the workstation and connects to the server with help of CAN library. Library shadows the client – server exchange complexity from user. So, application software works with library calls like with local CAN interface.

Some times it is not practical to transport all data from sensors. It is more convenient to process sensors information in the CAN gateway. There is possibility to develop C and C++ programs for the embedded gateway system. Some known SCADA systems can be easily adopted for gateway, for example EPICS [1].

## HARDWARE DESCRIPTION

Gateway is powered by FreeScale RISC processor MPC852 with approximately 48 MIPS. There are 32 megabytes of SDRAM memory and 4 megabytes of flash with the data compression capability. Ethernet interface is used for local area network attaching and it has RJ45 socket on the rear gateway panel. RS232 port can be used for low speed data transmission.

Sensors network can be attached to two CAN interfaces (CAN version 2.0b). CAN ports are serviced by SJA1000 controllers with data rate up to 1 Mbit/s.

## SOFTWARE

Embedded software of CANGW is based on Linux kernel 2.4.x and set of utilities. The two variants of gateway usage are following:

1. Software platform and programmable logical controller. The application programs are loaded and activated in the gateway. CAN ports can be accessed through CAN interface driver by means of /dev/canXX special devices.
2. Gateway between CAN lines and data transmission networks. In this variant the device function like remote CAN interface.

There are following features of the CANGW embedded software:

- Linux 2.4
- CAN server
- CAN driver (read, write, select, ioctl)
- Telnet server and client
- FTP server
- Rdate (time synchronization with help of NTP protocol)

## APPLICATIONS

At the moment, CANGW is wide used for power sources control in the Budker Institute of Nuclear Physics. In some application schemes CANGW is successfully used as EPICS IOC.

## REFERENCES

[1] Experimental Physics and Industrial Control System http://www.aps.anl.gov/epics/