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REAL TIME ACQUISITON AND INTERNET TRANSFERING OF SIGNALS FROM TECHNICAL PLANTS

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Abstract - *This paper presents a technical solution for collecting information from different transducers placed in industrial equipment and for transmitting that information trough the Internet to remote users. The proposed solution contains novelty elements and it is useful for remote monitoring of industrial equipment, remote adjustment of working parameters, constructing a database with technical information etc.*

1. INTRODUCTION

These days the Internet was introduced to many universities, industrial plants, research laboratories from many countries, thus opening the way to mass communication together with the unlimited access to information. The Internet allows users to exchange data and information at unprecedented speed and with almost no effort and cost at all.

In the same time with the Internet boom mostly based on the continuous development of computer performance, another trend was brought in view: the transfer of hardware measuring systems to software that can do the same job. With the help of virtual instruments the user can combine hard and soft systems to create various test and measurement equipment for lab and industrial use.

A virtual instrument with the possibility to exchange data over the Internet is very useful when the monitored installation is placed remotely or when is a possibility of accidents, just to mention a few.

2. THEORETICAL APPROACH

To exchange data over the Internet or any kind of computer network there is a need of a server whom collects the data and a client which makes the link to the user.

Figure 1 presents a diagram of a data transmission trough the Internet. The signals from plant are measured with specified transducers, properly conditioned to achieve correct levels for the data acquisition device, acquired by the computer acting as data server, after that the data is transmitted trough the network interface card to the client computer where all the processing is done.

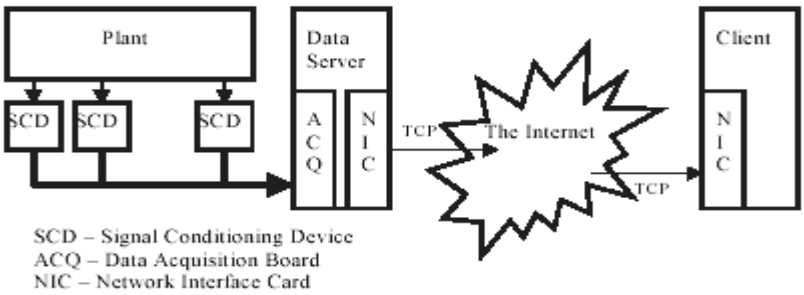

FIGURE 1. SCHEMATIC STRUCTURE OF INTERNET DATA TRANSMISSION

The Data Server is a standard computer that must have a connection to Internet trough a network, a data acquisition card who takes signals from the plant and runs a program capable to convert and encapsulate the data in TCP datagrams and then sent them via the network. In figures 2 and 3 are presented the front panel and block diagram of such program.

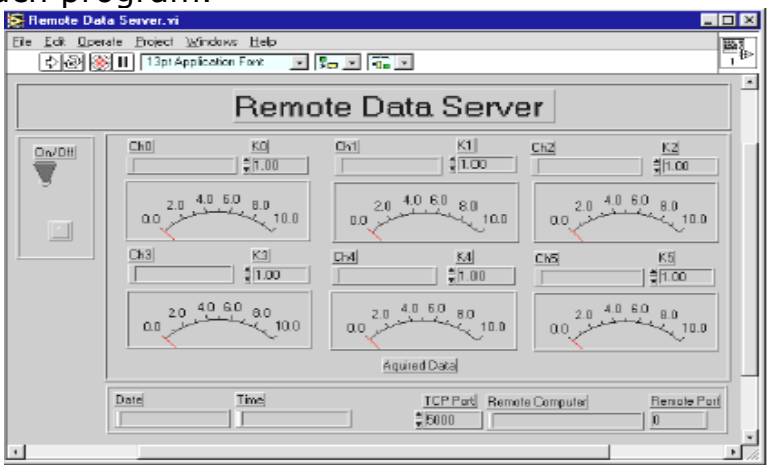

FIGURE 2. FRONT PANEL OF DATA SERVER PROGRAM

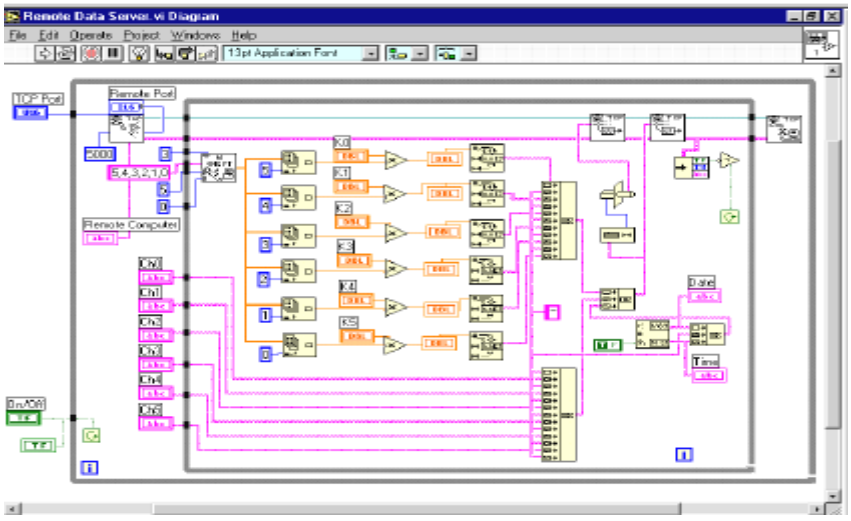

FIGURE 3. BLOCK DIAGRAM OF DATA SERVER

The data transmitted from the server is captured and processed by one or more client computers that must have a connection to Internet and runs a program capable to take the data from the server and use it. In figures 4 and 5 are shown a front panel and a block diagram of such client program.

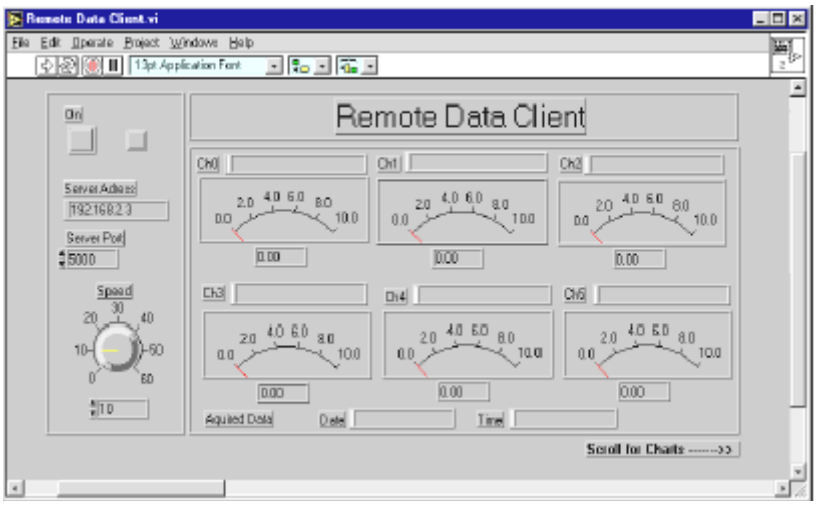

FIGURE 4. FRONT PANEL OF DATA CLIENT

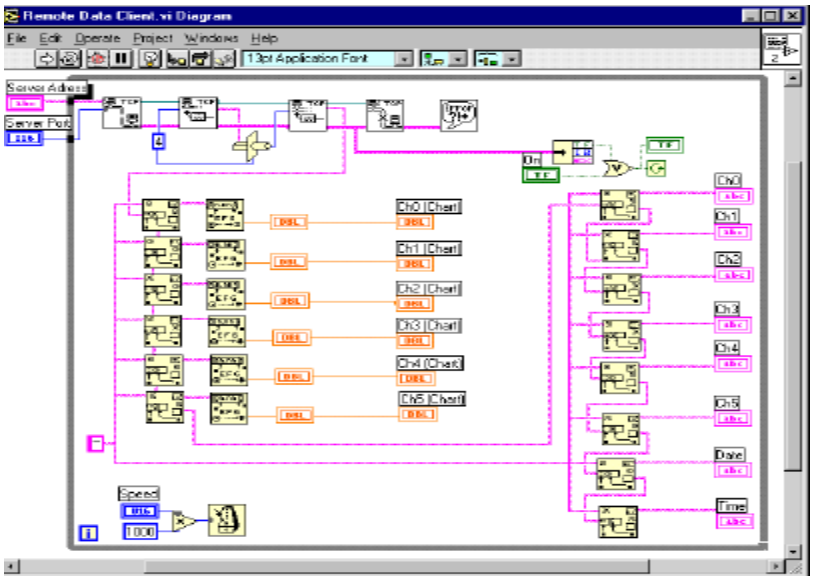

FIGURE 5. BLOCK DIAGRAM OF DATA CLIENT PROGRAM

The client program connects to the data server every 10 seconds, reads the data being transmitted, decode it from the TCP datagram and displays it on the instruments and the history charts.

Both the server and client programs are made in Lab VIEW, a graphical programming language from National Instruments.

3. EXPERIMENTAL RESULTS

Experimental results are made in the Power Drives Laboratory form Eftimie Murgu University. The industrial plant is a 25kW synchronous generator delivering power to some local consumers. Acquired data is for phase current, phase voltage, rotation speed, cooling air temperature, ambient temperature and bearing temperature.

The computer acting as server is an Intel Pentium, 32MB of RAM fitted with a PCI-MIO-16E-1 data acquisition card from National Instruments. The data acquired on 6 channels is transmitted trough a local Ethernet network. Client computer is a dual processor Intel

Pentium Xeon. Figure 6 shows the client screen and figure 7 the history charts recorded.

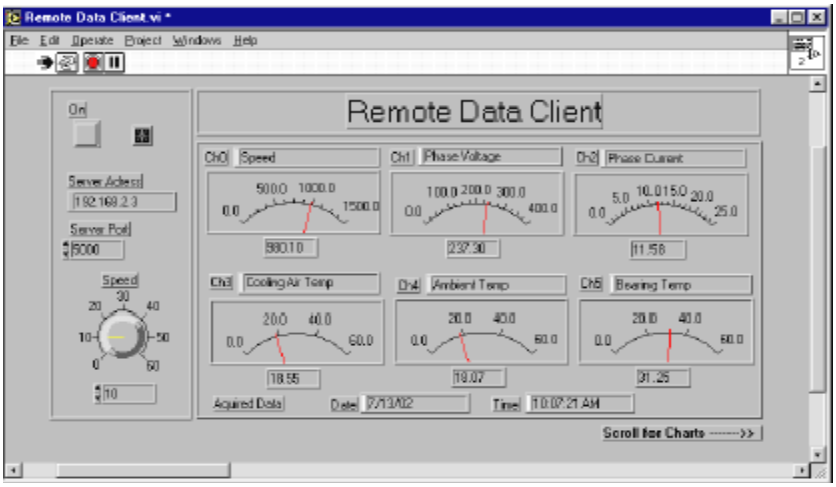

FIGURE 6. CLIENT SCREENSHOT

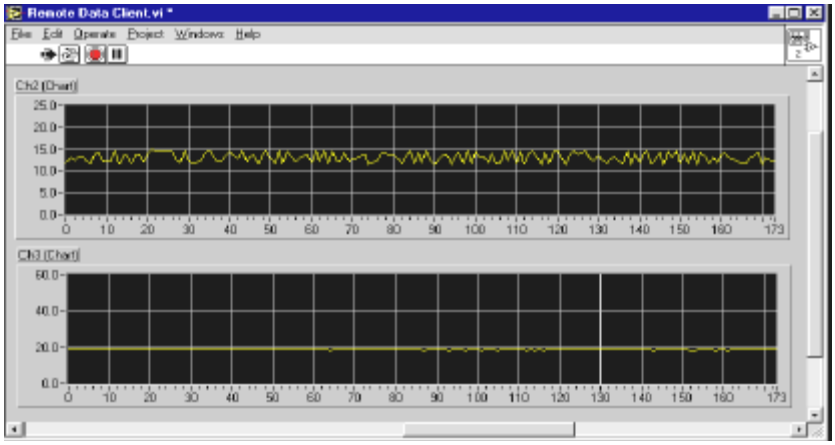

FIGURE 7. HISTORY CHARTS FOR PHASE CURRENT (UP) AND COOLING AIR (DOWN)

4. CONCLUSIONS

The Internet has opened lots of opportunities and new uses of personal computers and workstations all over the industrial world. Scientists and engineers realized the huge potential the Internet has to offer for research, publishing, remote controlling and management.

The presented application can be useful for monitoring remote industrial plants, for long times and low rate of change of the signals. Also it can be used for environmental data recording at meteorological sites. With some modifications it can be turned into a two-way communication bridge which can send commands to the plant for process control.

REFERENCES

[1.] National Instruments - *LabVIEW. Basic Data Acquisition Manual,* National Instruments Corp., Austin, Texax, USA, 1998

[2.] National Instruments *-LabVIEW. Function and VIReference Manual,* National Instruments Corp., Austin, Texax, USA, 1998