P-NET NEWS

News letter for International P-NET User Organization ApS. **1/1995 August.**

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3rd P-NET Conference

The 3rd International Conference was held in Silkeborg Denmark on the 25th & 26th April 1995

The P-NET affliction

A new type of virus has developed. Read the affecting eye-witness report and feel the doctors powerlessness.

Dairy of events

A Dairy of events is listed where the Int. P-NET User Org. is deeply involved.

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P-NET within the European Standardization

A big step for P-NET towards international standardization. Voting period is currently in progress.

P-NET 3rd International P-NET Conference

by Chris Jenkins, Proces-Data (U.K.)

The 3rd International Conference was held in Silkeborg Denmark on the 25th & 26th April 1995
It was attended by some 35 delegates from Denmark, Germany, United Kingdom, Portugal and Canada.
A popular pre-conference tutorial took place for the uninitiated, and those who felt a refresher into the principles of the P-NET architecture was useful.
An exhibition of P-NET products, and demonstrations of the latest advances, also took place. Below is a synopsis of Papers Presented.

Figur 2

International Standardisation
John Johansen, representing the IPUO, explained the global position regarding fieldbus standardisation.
From an International point of view, the IEC (International Electrotechnical Commission) and ISA (Instrument Society of America) are co-operating in an attempt to formulate an International standard. The committees consist of IEC SC65 C WG6 and ISA SP50.
From the European perspective (CENELEC TC65), there are strong doubts as to the ultimate outcome of such standardisation, in both terms of timescale and compromisation. An extended explanation of the European Fieldbus situation is presented by Jörg Böttcher elsewhere in this issue.

New P-NET Channels

John Johansen described additions to the library of standard P-NET Channel types. For those not familiar with the concept of Channels, it was explained that a Channel is a predefined structure of data, usually of mixed data types, which applies to a single measurement or process. Thus one can have a standard Digital Channel which holds all information for a single digital input or output, including the I/O state, limits, configuration, errors, count, operating time, maintenance etc. The same applies to Analogue, PID, Printer and Weight Channels.

Therefore, P-NET interface modules consist of a number of addressable Channels. For example, manufacture A's Interface Module might consist of 4 digital channels 4 analogue channels and a PID channel. Manufacturer B may decide to market a module with a Weight Channel and 12 digital channels. Manufacture C produces a module with a printer channel. For the user, any of these modules can be regarded in the same way, since Standard Channel definitions are well documented and internationally controlled. All P-NET modules must always include another standard Channel - the Service Channel, which includes data associated with manufacturer, serial No, enables read/write, configures watchdog, etc. Finally, to ensure complete standardisation, a Channel consists of 16 addressable registers. A register is addressed using symbolic addressing, by *Softwire Numbers*, which means it doesn't matter how a particular manufacture chooses to deal with internal data storage, but to the outside world (via P-NET) data access is always consistent. What this standardised Channel concept provides is the ability to regard either the whole module or individual I/O channels as Objects, which is important when using modern program development techniques.

The new channels described included the Program Channel, enabling standardised program control of a programmable device via P-NET. The commands and program state information conform to instructions specified in the Manufacturing Message Specification (MMS).

Another new standard data structure, was the Communication Channel which enables P-NET and serial communication ports to be configured in a standard way.

The final channel type described was the Data Channel, which will prove to be very useful as a general purpose structure of mixed data types, timers and look-up tables. An example of use, would be in conjunction with a Calculator Channel, where temporary values or results of calculations could be stored.

Fieldbus Controller

Klaus Schleisiek-Kern of DELTA t in Germany (see picture), described an implementation of a single chip programmable fieldbus controller, the iX1 by SGS-Thomson. Work by DELTA t had produced a public domain version of the P-NET protocol, to enable the controller to be used as a single slave with a variety of input and output possibilities. Alternatively, in conjunction with a standard host microprocessor, the iX1 can realise a simple or complex P-NET master/slave node.

It has to be said that this hardware configuration has been designed with the intention of implementing other serial protocols as well as P-NET. However, a significant comment made was that the P-NET protocol was able to be implemented using less memory than other established fieldbus types, notwithstanding the benefits provided by the unique multi-net abilities of P-NET.

The P-NET Chip

Kurt Nissen of Proces-Data Denmark, gave an overview of the P-NET chip. The P-NET Chip (PNC) is intended to be used as a general purpose, intelligent interface between the serial communication environment (P-NET/IS16, RS232) and a host processor within a master or slave node. On the fieldbus side, there are two physical ports, one for P-NET or IS16 communication, and one intended for RS232 communication at various baud rates.

The P-NET port provides immediate access to an internally structured softwire table, enabling configuration of the ports for node address, electrical standard, baud rate etc. On the host side, the principle of data transfer is performed using 8 x 4 byte FIFO (First In First Out) memory. 4 FIFO's are used to transfer data from PNC to host, and the remaining 4 FIFO's are reserved for transfer from host to PNC. Receipt of data for the host, causes an interrupt signal to be generated by the PNC, stimulating time critical activity in the host. The configuration for the general purpose I/O port, is performed via P-NET softwire numbers.

In conclusion, Kurt explained that the pre- programmed chip took care of nearly all aspects of layer 2 communication (frame and packet processing), leaving the equipment manufacturer only to have to consider the specific application aspects of his sensor, actuator or measurement module.

EMC

Søren Halling of the Teleprøve laboratory of Jutland Telephone provided the current picture regarding the European requirements for EMC (ElectroMagnetic Compatibility). It was explained that by the 1st day of 1996 all electrical products must carry the CE mark.

The purpose of the directives are intended to ensure that electronic equipment meets a minimum standard in terms of Emission - that is the level of interference that the product generates into the surrounding environment, and Immunity - that is the capability of the product to withstand levels of outside interference.
The intention is that implementation of such standards within electronic equipment, will remove technical trade barriers caused by different national EMC rules.

In order for the manufacture to gain the authority to stamp equipment with the CE logo, he must have the product tested by a competent body. Following successful completion, the equipment will be able to withstand electrostatic discharges, cope with external ElectroMagnetic interference, and not generate sufficient interference to affect other equipment. Such equipment will be less prone to faults and complaints, leading to greater customer satisfaction. Circuit designers will become more skilled in understanding the causes and influences of ElectroMagnetic phenomena. However, this may involve increased development time and could increase costs due to additional filtering, multi-layer PCB’s, metal cabinets etc.

P-NET in Hazardous Areas

Dr Rainer Decker of Die Masche Soft und Hardware, and previously with Ultrakust, gave a very informative paper, using a PC presentation package, on the implementation of P-NET equipment in the hazardous environment.

A brief overview of the environmental zones and classes was given together with certification methodologies. Dr. Decker explained that during the development phase of the Ultrakust 3002 Petroleum vehicle mounted equipment, practical implementations of an a P-NET IS16 chip were not available and therefore alternative methods of achieving the necessary safety standards had to be found. Disregarding Ex-d (explosion proof) requiring heavy metallic, and therefore expensive protection, it was explained that there are three other protection types, namely - Ex-I (intrinsically safe), Ex-e (enhanced security) and Ex-m (moulded), which could be considered. Each has it’s own advantages and disadvantages, so it was decided to use a mixture of all three.

As far as standard P-NET and power is concerned, this is transported via an Ex-e method using special terminations and rigid conduit. However, to cover situations where sensors need to be changed with power still applied, and/or within a potentially hazardous atmosphere, then intrinsic safety is the answer. To achieve this it is necessary to produce a "barrier" to limit the voltages and currents. To this end Ultrakust have designed a power supply module, which includes aspects of Ex-e, Ex-I and the moulding method, Ex-m. The P-NET controller and display also exhibit a mixture of the 3 protection types. Connection to intrinsically safe intelligent sensors, including temperature and incremental encoders, which use the P-NET protocol, is again via a sensor wiring box, which include the barrier modules. This provides an interface between Ex-I and Ex-e circuits. There was no doubt as to Dr Decker's preference for an IS-16 solution, but in the meantime, the solutions described where approved, and certain components were available to OEM’s.

Universal Interface for Connecting P-NET to other Fieldbus Bus Systems

Dr. Bernd Scholz of the University in Magdeburg, Germany presented a paper based on a research project called “Bus Interfaces”, supported by the German Ministry of Economic Affairs. See the extended article elsewhere in this issue.

Graphical Programming of P-NET Modules

Dr. Martin Wollschlaeger, also from the Otto-von-Guericke University in Magdeburg, Germany, introduced the concept of function blocks to delegates. See the extended article elsewhere in this issue.

Measured Data Acquisition with Controller or MS-Windows
Dr. J rg B ttcher (see picture), former Sales Manager for Industrial Controls at Ultrakust Electronic, Germany, described the structure of bus systems for process control and the acquisition of measurement data. He gave his view of the requirements for a fieldbus, which included the attributes of multi-master, multi-net, support all typical data classes, and services such as MMS.

He went on to illustrate a general purpose operational package provided by Ultrakust, based on a PD4000 controller, for data acquisition and display, and an associated printing facility package called Print_Pack, which consisted of software in the 4000 controller with an Ultrakust produced P-NET printer card mounted within an EPSON printer. The printout could produce both graphical, (in the form of a chart recorder) ,and text data. Dr. B ttcher also went on to describe the use of the P_Control development tool for P-NET systems, which, together with a PC P-NET card, can provide the mechanism to transfer measurement data into a Windows based application, such as Excel or InTouch. Windows data transfer was performed using DDE techniques.

Figur 4

HUGO and VIGO
Dr. Carsten Nùkleby of Proces-Data, who incidently organised the Conference programme, presented the results of work to produce an open and extensible communication and gateway package. HUGO is a complex communication kernel which operates within the Windows environment, and fully utilises the functionality of OLE automation. Whilst communication between Windows

applications has been possible, using techniques such as DDE (Dynamic Data Exchange) , communication with the external environment has tended to be slow and allied to simple serial communication. The object of HUGO is to allow fast protocols to communicate together using Windows background tasks, as well as allowing external variables to be displayed and controlled from within Windows applications. The idea behind HUGO, is to provide a common real time communication link between independent suppliers of equipment, allowing different companies to develop, compile, link and add single applications to a system, including network drivers. This is possible, because parts of HUGO are dynamically linked to the programs which make use of the procedures and functions found in HUGO2.

HUGO, as a communication application, consists of a user program called HUGO2, and HUGO2 Dispatch, which is a DLL (Dynamic Link Library), and is linked in accordance with the Windows DLL definition. One of the main tasks of HUGO2 is to ensure that HUGO2 Dispatch remains in PC memory. It was illustrated that HUGO2 Dispatch includes an Application List where communicating applications are defined and configured, such as P-NET, Novell, other Fieldbusses etc, a Controlcard section, which is used both to control the communication and for data exchange between applications, and finally, DLL Functions, which consist of two sets, one for controlling the use of Controlcards and the other applying to aspects of communication.

On the other hand, VIGO, (Virtual Interface for Global Objects), operates in conjunction with HUGO2, to enable Windows applications, which support OLE2, to declare an external object variable and thus communicate with network/fieldbus variables. An example of a means of developing a P-NET orientated Windows application, was Visual Basic, although other object orientated languages, supporting OLE2 could also be used.

The Visual Basic - P-NET Connection

Chris Jenkins of Proces-Data (UK), formally of FMA in England, gave an on-line presentation, written in Visual Basic, of how to develop a P-NET application. The paper described the basic controls available in Visual Basic and showed how to apply methods and properties to graphically represented objects in order to build up a Windows based user interface screen on a PC. He then went on to demonstrate the methodology for "connecting" screen objects and variables to P-NET. It was shown that firstly a OLE "VIGO" object is declared in VB, then the object identifier is included in an interface data convertor. The fact that the HUGO communication kernel included a P-NET driver, completes

the VB to P-NET connection. Mr. Jenkins showed that certain custom controls in VB could be used to control graph type screen objects, which in this demo indicated the state of two counters in a P-NET module. The fact that variables were within a OLE Automation Windows environment, meant that such P-NET data could be used by other standard Windows applications, such as spreadsheets and databases, which support OLE. The presenter was keen to convey that he had only become practically acquainted with Visual Basic some eight weeks previously.

It was later shown during the final exhibition session, that with a simple modification to the Information Data Convertor, the graphical P-NET variables could be shared between a system of PC's connected within a Novell network, showing the true gateway attributes of HUGO2.

IPH View

Ole Jensen and Frits Andersen of IPH Marine Automation, Denmark, elaborated on the previous paper by also demonstrating an object orientated graphical development package, this time written in Visual C++. This also fully utilised the object and communication facilities offered by HUGO and VIGO. Unlike the Visual Basic paper, IPH View specifically offered system designers and end users with a user friendly development PC Windows package, in the form of a system drawing tool. Mr Jensen showed that process control objects, such as tanks, could be drawn and labelled in various shapes and colours, and that the object variable (level) could be represented in text or as a coloured graphical fill. He also showed that level alarms could be represented by means of a colour change, together with a message contained in a permanent alarm window, which was a necessary pre-requisite for approval by marine insurance and safety authorities.

The user friendliness of a particular application was demonstrated, by showing that the main screen was a layout diagram of a ship. By clicking on various ship locations, called additional screens associated with that location, such as engine room operation or ballast tank status.

For those unfortunate enough not to be able to attend the conference, copies of the papers can be obtained from the IPUO headquarters or local section offices.

Visit to Proces-Data Offices.

The conference was concluded with a trip to the new extension to the Proces-Data offices in Silkeborg. It was immediately apparent that not only had the general high quality of the original offices been exceeded, but the attributes of P-NET had been put to full use. Apart from the security system, based on PD 4000 masters, which ensured entry and exit protection, it included facilities to ensure that lights and power where also automatically switched off during exit. In addition, facilities had been incorporated to auto dial a selection of remote telephones, where a selection of coded messages could be transferred, to indicate fire, movement or other environmental alarms. It was explained that P-NET was also being used to control lighting, heating and ventilation.

Lighting control was ingenious, firstly because the artificial lighting was provided by fluorescent tubes. This necessitated high frequency switch control, unlike that required for normal incandescent lights. Secondly, the level of light was automatically controlled by using light sensors, strategically positioned such, that the further into the centre of the office one moved away from the natural light of the windows, the brighter the artificial light. This gave a constant light environment.

Environmental heating control was also performed in an unusual way, where the normal thermostatic control of a radiator was able to be activated remotely (via P-NET of course), by controlling the heat dissipation of a locally mounted resistor. Thus if the temperature of an area was too high (measured by a simple resistance thermometer), the radiator resistor was heated and the thermostat switched off.

All windows had either light curtains or blinds fitted, which incorporated motorised control. The windows fitted with blinds (skylights) could also be positionally controlled. These aspects could either be adjusted manually, via a local P-NET controller, or indeed via staff PC’s, of which one each was provided, or controlled automatically via part of the building automation program. Therefore, if a member of staff wished to have more air, or less direct light from the sun, he or she could open a window or close the curtains. Any local heating would automatically be reduced and the local lighting increased if necessary to compensate for loss of natural light through the curtains. Tests were being performed to detect the advent of rain, so the skylights would automatically close during such circumstances. One profound fact realised, was that within a distributed multi-master, multi-net and parallel processing network, the measurement of one entity eg window open/shut could be used by a number of independent tasks such as temperature control, light control or building security.

Continuing the environmentally friendly aspects of energy conservation, the heating system was described, which was derived from the town centrally generated hot water supply. This was pumped from the plant via insulated pipework but isolated from the building system via a heat exchanger. Building water pressure was controlled via a variable speed pump, - yes you've guessed it, within a control loop using parameters transported by P-NET.

Continuing the tour, Proces-Data staff included a visit to the EMC laboratory. This was a room entirely isolated from the normal environment by means of an earthed copper lining. Even the included window incorporated a copper grid. The purpose of the lab was to test all electronic equipment designs before being submitted for independent EMC testing. The lab included test equipment for generating electrostatic discharges, spectrum analysis etc. The screening effectiveness of the room was measured and showed that attenuation was in the order of -60dB.

Figur 5

In conclusion, there was no doubt that the vast majority of delegates found the conference informative, educational and generally socially enjoyable. Being the 3rd Conference held since the formation of the IPUO, many notable achievements have been made in increasing the number of P-NET products, membership and enhanced standards.

The P-NET Affliction

by Chris Jenkins

It was so very noticeable, during periods between papers, and especially during and following the Conference Dinner, that some sort of disease had afflicted most delegates attending the Conference. At first I thought that this must be due to some bug in the hotel swimming pool, or perhaps in the tasty Smørrebrød. The affliction presented itself in the form of a sort of nervous complaint, culminating in a constant nodding of the head, a tendency to utter "P-NET" in every other sentence, together with a involuntary inclination to smile. There didn't seem to be any kind of physical fever, except perhaps an observation of beads of perspiration running down the forehead of the Supervisor of the IPUO, whilst thumping out that well known Sinatra standard, "Hugo your way and Vigo mine", on the keys of the Hotel piano.

Since there were a number of doctors in the house, I approached one, but quickly ascertained that he would be no help at all. All I got was a smile and a nodding head, and the comment "P-NET, es ist sehr gut, ja?". I started to panic, and approached someone who is involved in setting Danish standards, as I was sure he would know what to do. He immediately presented me with what I thought was a dose of preventative medication, or at least the antidote. This came in the form of some kind of yellow foaming liquid. I drank this as quickly as I could, and soon, a most surprising thing happened. Although I had taken the medicine, it seemed that the delegates themselves had changed. Again I approached another of the many doctors present, smiled and found myself saying "Have you found the use of P-NET an intellectually stimulating, commercially viable and robustly profitable concept?". It seemed quite normal to me now, for my new found friend to reply with a Portuguese accent, (smiling and nodding vigorously), "You bet your sweet ass, I do fella!" - or was it perhaps a Canadian accent? Language didn't seem to be a barrier anymore, and I suddenly realised that I myself had contracted the dreaded P-NET affliction!

Although utterly incurable, I discovered that night that there is a medical procedure which can be invoked, which utilises an international standard language called Music. This doesn't necessarily alleviate the symptoms. On the contrary, it tends to give one the feeling of trying to spread the disease into a worldwide epidemic. This is what I heard, which achieved much relief and comfort from such a bearable VIGO, I mean virus.

Universal Interface for Connecting P-NET to other Field Bus Systems

by Dr.-Ing. Bernd Scholz Otto-von-Guericke-University Magdeburg

A various number of different and incompatible serial bus systems is to be found in hierarchical industrial communication systems. They are the result of a wide range of partly conflicting requirements. Some of them are specialised for a high speed transmission of simple sensor/actor data, whereas others are all purpose systems using the full OSI reference model. In most cases not only the bus protocols, but also the applications differ from each other, so that the only conversion of the bus protocol would have no effect. **Fig. 1** shows some variants of coupling serial bus systems in a conventional way (A...C) and by means of a bus interface (D). In many cases the use of a bus interface would perform better results and simplify software design.

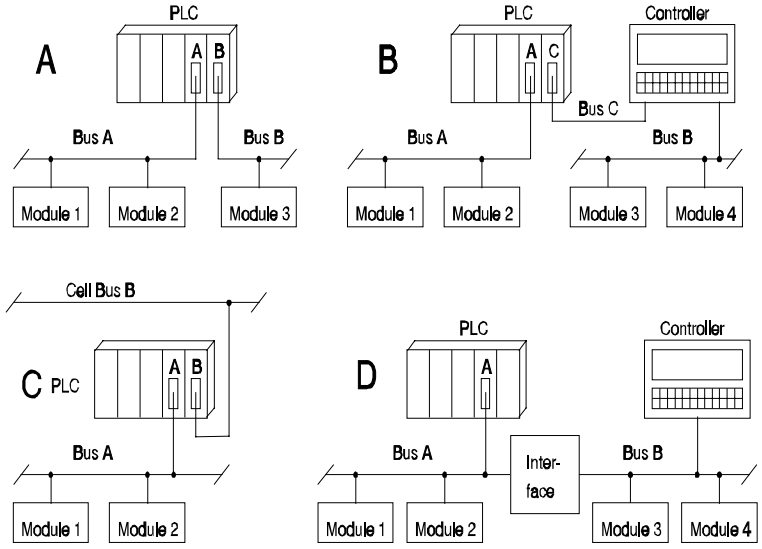

Figure 1: Variants of using and connecting serial bus systems
A: Independent bus systems, connection by PLC software
B: Connection by an additional serial/parallel bus C
C: Building up hierarchical systems
D: Coupling by a bus interface

The global function principle of the universal bus interface consists on the mapping of one bus system (or a part of it) to a virtual field device of the other. A a virtual field device presents an abstract and uniform device image (see **Fig. 2**). It may be a part of the real existing device as well as a summing up of

several devices. In this way no direct communication between both busses (or applications) is necessary, i.e., one bus (or application) is not to be seen for the other. This guaranties the observance of bus standards and profiles.

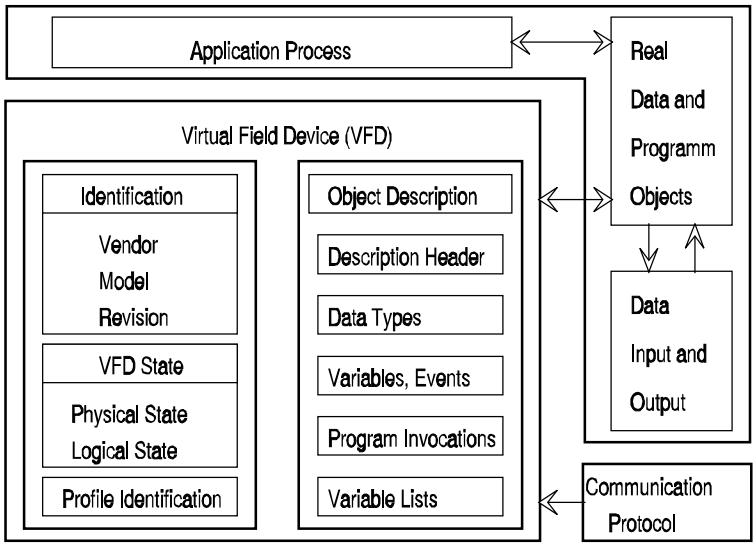

Figure 2: Structure of a virtual field device from the view of the communication protocol

To satisfy special application requirements, there can exist more than one virtual field device in one bus interface. Incompatibilities between both bus systems are resolved by means of additional project-depending parameters. Since the concept does not use any bus specific specialities, it can (and had been) applied to different bus systems.

One of the bus interface realisations was worked out in hard- and software for coupling of P-NET to PROFIBUS, whereby P-NET serves as a subsystem of PROFIBUS. The bus interface works as a PROFIBUS slave and a P-NET master. The P-NET gateway functionality is not implemented. Each virtual field device includes an object description (**Fig. 3**), containing the object parameters, e.g. object name, data type, data length and access rights, and in addition the access code for P-NET (module reference, softwire number and offset). The module description contains all application depending parameters like node address or initialization data. The PROFIBUS services Read, Write, Domain Upload and Domain Download are mapped to the P-NET services Load, Store, Long Load and Long Store.

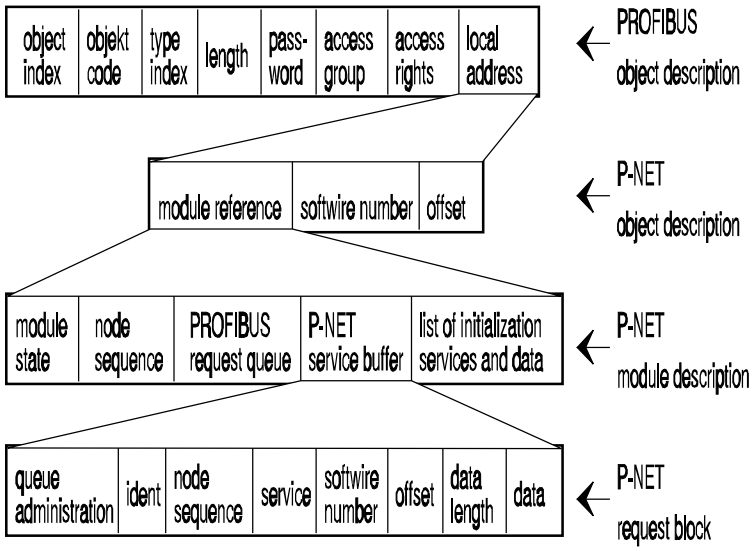

Figure 3: Conversion of a PROFIBUS service to a P-NET service

For correct working of P-NET systems without additional master devices, the bus interface has to configure both system and modules. These so-called start up functions first distribute the node numbers of all masters, gateways and slaves. If the result of the subsequent system consistency check is o.k., the modules are configured for their specific application. The existence and error state of all modules are continuously checked, and configuration is repeated if necessary. The configuration function also includes remote P-NET networks.

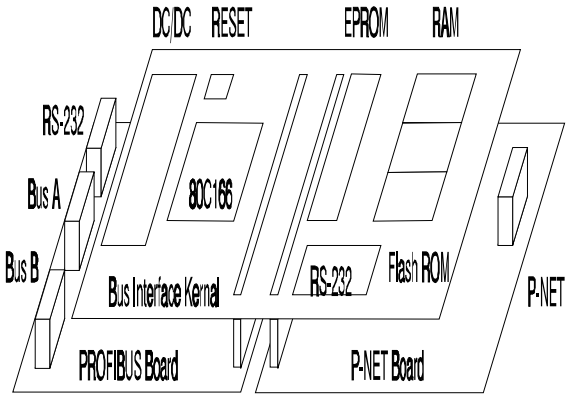

Figure 4: Hardware components of the bus interface PROFIBUS <-> P-NET/ CAN

The modular interface hardware (**Fig. 4**) consists of a kernel, based on the 16 bit controller SAB80C166, a fast PROFIBUS controller, the power supply, and the physical drivers for PROFIBUS and P-NET. Beside the P-NET protocol, the kernel processes the PROFIBUS layer 7, service and data conversation, and system configuration. The project depending parameters can be loaded on

runtime by means of an additional RS-232 port. Project is stored in an background EEPROM and does not occupy any data space.

The bus interface was developed and tested in a configuration according to **fig. 5.** One PROFIBUS access to a P-NET variable takes about 10 ms (2 bytes data, no gateway), respectively 15 ms (2 bytes data, 1 gateway). About 64 KByte are required for program code.

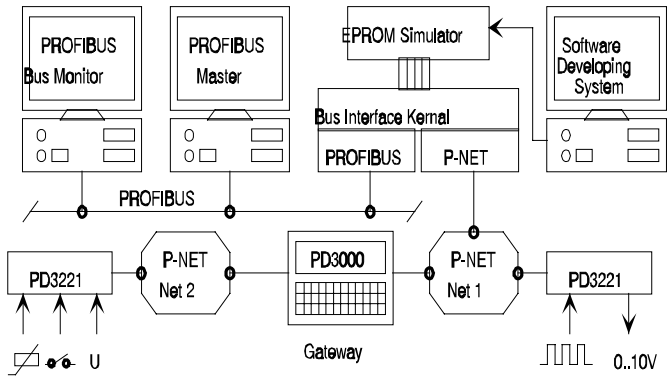

Figure 5: Developing and testing system for the bus interface PROFIBUS <-> P-NET

This paper is based on the research project "Bus Interfaces" that is promoted by the 'Deutsche Forschungsgesellschaft für die Anwendung der Mikroelektronik e.V.' (German Research Association for Application of Micro Electronics). It is supported by the Ministry for Economic Affairs and is registered under the reference number AIF 9439B.

P-NET within the European Standardization

(Transl. from the German *P-NET lokal*, reduced by the Editor) by Jörg Böttcher / b+

Till yet P-NET has not been the bus system characterized by extensive standardization activities within the international standardization committees. For many years P-NET has been a standard supported by the users and defined from practice which has shown its functionality by many applications. Within the user organization the standard has been well accepted and has been able to be easily implemented by the members. On the international level P-NET has been discussed first of all within market specific working groups. Youngest example is the choice of P-NET by the British Institute of Petroleum

(BIP) as standard for the communication between tank truck and landside in the oil industry. All leading European oil companies are members of the BIP. But: in spite of the fact that the BIP is well accepted in its market it's not an official standardization committee.

What's the international situation in the standardization. First of all the International Electrotechnical Commission (IEC) has to be named. In its working group IEC SC 65C WG6 delegates from the whole world have been working on the international fieldbus standard for many years. In spite of the fact that for the physical layer (bus cable, signal levels, bit coding etc.) a standard with the title IEC 1158-2 was published in December 1993 - and also as European standard by CENELEC and German standard by DKE - for the bus specifications of the higher protocol levels (medium access control, error recognition, application layer etc.) no end of the discussion can be seen. Very often within the last years few thousands pages of papers have been published as CDs (Committee Draft) or DIS (Draft International Standard) but cancelled a little bit later and copletely changed in contents. The political struggle of several fieldbus players (WorldFIP, Profibus, ISP, FF etc.), of course, has not been making the standardization work easier. Even the specifications of the IEC 1158-2 can not be found on the market today; one reason is that they are not compatible with existing standards on this level like RS-485. Seen from today one can say that in the near future no final fieldbus standard will be published.

Therefore there was a decision on the European level by CENELEC to define a fixed standard for Europe at least. For this the group TC 65 CX was founded e.g. with Ole Cramer Nielsen (Proces Data), John Johansen (Proces Data) and Jörg Böttcher (b+) as delegates of their national committees. This group decided not to define a new standard but to integrate a minimum number of fieldbusses, characterized by being used in more than one country within Europe and in a higher number of installations, within a common standard. Based on a catalogue of criterias containing among other things requirements like the existence of a national standard or pre-standard and the using not only for special applications candidates have been analyzed for their qualification. Finally there was the decision - supported by the absolute majority of delegates - to select the three systems FIP, Profibus and P-NET.

Because of referencing to existing standards (P-NET for example has the status of a national pre-standard in Denmark), no new line of fieldbus protocol has been to be invented. It has been enough to take the existing texts of the three busses without technical changes besides writing of a new introduction. Result of this work is the prEN 50170, an European pre-standard published by

CENELEC in March of this year; the national committees will vote on this paper till 30th of September. Among 18 CENELEC countries at a maximum three can vote against, then the European standard finally will become valid in the beginning of October. Besides UK voted against an own European way it seems to be sure that the other countries will vote for or at least abstent. The European fieldbus standard therefore will be reality in this autumn with a high probability.

The special point: After publishing the European standard national standards dealing with the same scope must be cancelled within a well defined time period. As date for this the 1st of December, 1996 is under discussion. For example in Germany the DIN 19245 (Profibus) must be cancelled then.

What's important now for P-NET manufacturers ? First of all it will easier in finding arguments when being at the customer in the future. Till yet one have had a system being brilliant from a technical and economical point of view but not being well-known by the customers. Starting in October every P-NET manufacturer and systems integrator can sell the „European Fieldbus“ to his customers. Which of the three busses one finally wants to take can be let the decision of the customer. Important for our argumentation: With P-NET „it's easier and cheaper, of course“, and coupling to other busses (Profibus, FIP) can be easily done when needed. A further point being important especially for companies exporting in countries with many governmental companies: announcements by governmental departments must have regard to existing European standards. For the fieldbus area this will be the EN 50170. According to experience most combines follow this method.

The User Organization will have a close look on this development and actively support this. We are planning for our members material supporting sales argumentation at the customer (e.g. PC-show) and a more detailled report on all things belonging to the standardization of fieldbusses and the fieldbus market. Questions from the members are welcome and we will try to answer them in a detailed way.

The German magazine Markt & Technik published the results of a discussion between experts in the field of fieldbusses and standardization in edition 25 from 16th of June, 1995. One statement was:
„Now the standardization of Profibus, FIP and P-NET within the EN 50170 is nearly finished. The voting on this standard follows a special rapid procedure and has even been started.“
(Dr. Manfred Patz, managing director Softing GmbH, Munich and chairman of DKE UK 951.3, the German fieldbus standardization committee).

P-NET Graphical programming of P-NET modules

by Dr.-Ing. Martin Wollschlaeger
Otto-von-Guericke-University Magdeburg

Like in other bus systems, P-NET modules have to be configured in order to meet the specific needs of the technical processes which are being automated using a P-NET system. These configuration tasks can be done in two different ways, both based on the internal organisation of the modules - masters or slaves. While slave modules like PD 3221, PD 1611 and others may be configured by writing into registers, master modules can be programmed using process pascal. Although there is an increasing number of development tools for process pascal, the user has to know about the programming language and has to have at least some experiences in programming.

In many cases these prerequisites seem to be a problem for the customer of a bus system. He just wants to use the system for solving his automation problems and does not want to learn programming languages.

For that reason a configuration tool is developed for "programming" P-NET modules using a graphical based environment. The main idea of that configuration strategy is to implement pre-programmed software modules for universal use. These modules represent function blocks according to the international standard IEC 1131. The function blocks consist of (process pascal) source code with special comments for graphic development tools. Although the major number of function blocks should be developed by the bus system's developer - he has the experiences in programming the modules and knows the wishes of the customers - a user of the system is able to write and implement his own function blocks, too.

The function blocks usually represent automation functions for global use, like analogue or digital inputs and outputs, PID-calculators, sequence controllers, fuzzy algorithms, timer functions and so on. They can be devided into two parts - external and internal function blocks. External blocks refer to hardware functions like analogue input channels, digital output channels or PID calculators implemented in P-NET-(slave-) modules. Internal function blocks are software modules implemented in either controllers (a process pascal program) or slave modules (e.g. calculator channel in a PD 3221).

Now the configuration of the P-NET system can be done by connecting function blocks together. In this way the customer builds up the logical and functional

structure of his specific automation system. And he does it by connecting graphical symbols with a mouse under MS Windows! Thus the customer can construct his complete automation system off-line on the desktop. He can specify internal values of function blocks, e.g. parameters of calculators, limit switches etc. When he has finished, he can use another very helpful option of the configuration tool. This option is the automatic generation of the software, that has to be implemented in controllers and slave modules!

This automatic software generation is performed by building up a process pascal source code, which includes the function blocks' source codes, automatic defined variables and constants and initialisation routines. The source code can be saved to file and can be compiled and downloaded without leaving the graphical environment. The basic technology of that generating process is the implementation of an internal library structure. This library contains the function blocks and additional descriptions (graphical images, number and type of used parameters etc.). That means, this library is easy to expand, either by the developer or by the customer.

Screen capture of the graphical configuration tool

Using the described tool and techniques the configuration of a P-NET system turns into graphical construction tasks. In this way the customer only has to know about his specific automation functions and not about internal things of P-NET modules nor programming techniques. However, he can build up his own special function blocks, if those offered by the system's developer are of less efficiency or do not meet his needs in any other way. At any time of the

configuration process the customer can interrupt it and do further steps in a traditional way.
As a conclusion, on the one hand the customer can configure his system in a standardised, convenient environment, and on the other hand he does not need to know internal details of the system's components. The use of the described tool will save development time and therefore the costs for software development will decrease. In addition, documentation features are implemented, so that the documentation of the configured system is easy to create.

The system's developer has the described advantages, too. It becomes more easy for him to react to the customers' needs. Transparency and modularity of the bus system and its components increase, his efforts in creating specific configured systems, their technical support and documentation will decrease.

Special P-NET activities for the German speaking market

by Jörg Böttcher

Since beginning of July b+ Prof. Dr.-Ing. Jörg Böttcher Engineering Consultants, Deggendorf (Germany) manages the P-NET activities in the German speaking market including Germany, Austria and Switzerland. b+ is a consulting office founded by Jörg Böttcher having the position of a manager industrial controls at Ultrakust before. In parallel he is a professor at the university of the armed forces in Munich allowing effective research and development cooperations.

Some of the P-NET activities b+ is planning for the second half of 1995:
- press releases with actual informations
- mailings to the members within above countries
- acquiring new members
- organizing of fieldbus courses with special look on P-NET
- contributing to conferences with lectures about P-NET
- P-NET presentations at conferences and - if wished - at customers of the members
- contributing to several standardization committees
- preparation of a PC show about P-NET for being distributed to the members for advertising

In this year all activities are stressing the importance of the outcoming European fieldbus standard EN 50170 for P-NET. EN 50170 will be the vehicle increasing the P-NET business of all members.

The above mentioned mailings include the distribution of „P-NET lokal“ with actual informations especially about P-NET activities and the fieldbus business in the German speaking market written in German language. P-NET lokal is distributed automatically to all members in Germany, Austria and Switzerland. All other members can directly ask IPUO Headquarters for a copy.

Additionally members - and others - can order
- P-NET training courses for their customers
- coloured overhead foils about P-NET used for example at the customer
- proposals how to built up a special system

etc.

In general b+ offers
- consulting services especially for marketing and sales support (mailings, press releases, market studies, scan service, training courses, ...)
- research & development services in cooperation with the university (especially dealing with systems for industrial automation and comm.).

Contact address: b+ Prof. Dr.-Ing. Jörg Böttcher Engineering Consultants, Haslacher Str. 93, D-94469 Deggendorf, phone & fax ++49 991 340 897.

P-NET stand on the iNet'95 in Karlsruhe

by Jörg Böttcher / John Johansen

From 20th till 22nd of June, 1995, the iNet '95 took place in Karlsruhe, Germany. The iNet is a small but well-known trade fair specialized on network technology for industrial automation. The International P-NET User Organization ApS contributed with a stand which - by the way - was placed directly in the neighborhood of the Profibus stand.

Reason for contributing to the conference was the need for being present at this mirror of the German fieldbus market. Some of the technical magazines sending editors to the iNet even has been published small articles about this. In most discussions we - John Johansen and Jörg Böttcher - were asked for technical basics about P-NET and the outcoming European fieldbus standard. About thirty companies or institutes visiting the stand asked us for detailled written information which has been done yet. We are also planning to have a stand at the iNet '96 (18th till 20th of June, 1996, Karlsruhe). Companies which want to join the stand team and show products should contact John Johansen or Jörg Böttcher before end of this year.

Editorial.

A Common European Fieldbus Standard, these words have been said thousands of times during the last few months. Not only by the P-NET people, but also by the other parties in the EN50170, that is Profibus and WorldFIP. Of course these words have been said in both a positive as well as in a negative context, but the general impression is that the support from both the standardisation bodies and from the users is strongly positive. See also the other article regarding the users point of view, characteristic etc. of the EN50170.

The third International P-NET Conference focused on three main items: P-NET interface chips, software tools and applications. The Conference included also a small tutorial, where the main characteristics of the P-NET standard were highlighted. Both the Conference and the tutorial was very well attended andit was obvious that there certainly is both a need and a request for more insight into the protocol specifications.

The Internatinal P-NET User Organization has always been involved in various exhibitions, trade fairs and conferences concerning bus-systems, protocols and related hardware. These activities have increased concurrently with the increasing interest for Fieldbus, and of course the tremendous supply that is available for all the parties who are working in this area. Including the users. We in the IPUO will continue in following and attending what we find is relevant and try to keep you informed. The next big events are the FeT ’95, a two day Fieldbus Conference in Vienna in September, and the INTERKAMA trade fair in Düsseldorf in October. Hope to see you in Vienna or in Düsseldorf.

P-NET NEWS

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P-NET Interkama 95'

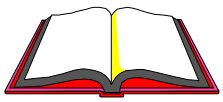
Call for participants.

The International P-NET User Organization has again applied for stand area at the biggest Worlds biggest Trade Fair for Automation. The exhibition takes place in Düsseldorf in Germany from 30th October to 4th November.

The stand will be a Multi-Vendor stand (hall 4, stand 4E25, 36m^2) showing equipment from several Vendors and Users of the P-NET Fieldbus. All practical arrangements with the general stand construction and organizational contact to the Trade Committee is handled by the IPUO headquarter.

In order to exhibit as much as possible, and of course to reduce the costs for each participant, we would like to encourage all members of the International P-NET User Organization to take actively part in this Trade Fair.
The time schedule is very squeezed, so please contact one of the following as soon as possible:

IPUO Headquarter	phone: +45 87 200 396	fax: +45 87 300 397
IPUO Germany	phone: +49 991 340 897	fax: +49 991 340 897
IPUO England	phone: +44 1491 825 025	fax: +44 1491 833937



Diary of Events

The International P-NET User Organisation will be actively involved in the following conferences and exhibitions. For further information on attendance or involvement, please contact IPUO headquarters or your local branch office.

HI-Messe '95, Denmark	Exhibition	12th - 16th September
FeT '95, Austria	Conference & Exhibition	26th - 27th September
Fieldbus'95, England	Conference	24th October
Interkama, Germany	Exhibition	30th October - 4th November
Fieldcomms '95 England	Exhibition, Tutorial and Conference	7th - 8th November