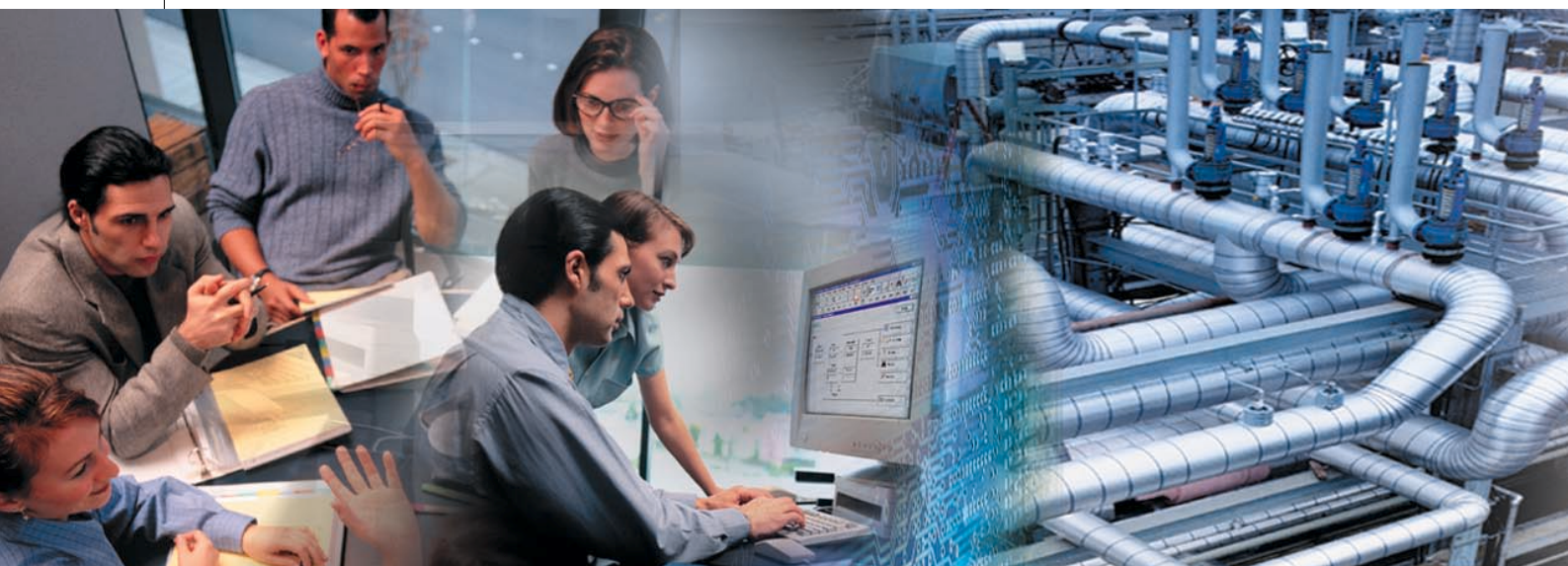




FOUNDATION™ fieldbus

Industrial
Automation

Protocol Software and Services



We bring "FOUNDATION™ fieldbus" to your Process Control System and your Field Device

The "FOUNDATION™ fieldbus" is a fieldbus standard primarily designed for the demands of process control engineering. It is the fieldbus solution with the most complete functionality for this area of application.

In addition to the services exclusively for communication, "FOUNDATION™ fieldbus" also offers comprehensive functions for network and system management. It provides a large number of standardized function blocks and a comprehensive device description language.

Thus, the "FOUNDATION™ fieldbus" is much more than a fieldbus. It offers the basic functionality of an operating system for distributed applications in process automation. In terms of physical bus characteristics, both the "FOUNDATION™ fieldbus" and the "PROFIBUS-PA" use the H1 standard according to IEC 61158-2.

The specification "High Speed Ethernet" (HSE) adds an Ethernet-based protocol to the "FOUNDATION™ fieldbus" which is harmoniously integrated in the overall architecture. Although mainly large American and Japanese manufacturers have been supporting the "FOUNDATION™ fieldbus" until now, it is increasingly spreading through Europe as well.

Softing – Competent and Efficient in "FOUNDATION™ fieldbus" Communication

As a manufacturer of systems or devices for process control engineering, you want to successfully supply the "FOUNDATION™ fieldbus" market. You want to integrate the "FOUNDATION™ fieldbus" technology in your devices as effectively as possible under economic and technological aspects. For this purpose, you are looking for a strong and competent partner – a service provider who, in cooperation with you, develops a solution that meets your requirements. We, Softing, would like to be your partner.

Profit from our vast Experience with the FOUNDATION™ fieldbus

The half of all certified devices with "FOUNDATION™ fieldbus" interface is using Softing technology. From the very beginning, Softing has been actively involved in the specification of the "FOUNDATION™ fieldbus". On behalf of the "Fieldbus Foundation" (FF), Softing took the initiative to implement, among others, the protocols "H1" and "HSE". These two protocol implementations are the central Softing technology on which the Softing "FOUNDATION™ fieldbus" services are based.

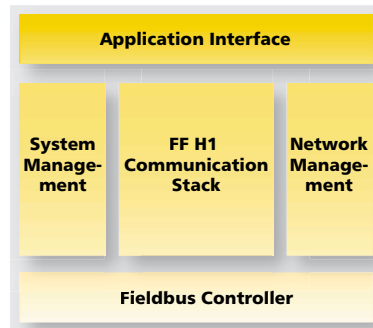
The scope ranges from consulting and training, specification, implementation and system integration down to the manufacturing of a prototype and the produc-

tion of serial components. All over the world, leading manufacturers of systems and devices for process control engineering rely on Softing's know-how for the development of fieldbus interfaces.

Protocol Software – the Modular Basis for your Interface

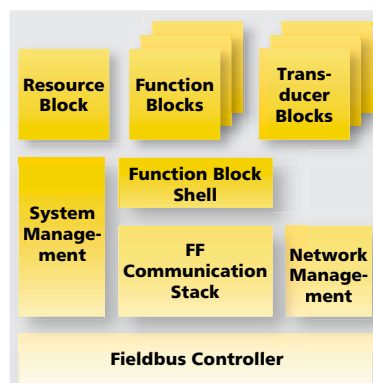
■ **FF H1 Host Stack**

The "big" solution for process control systems and controllers supports a large number of connections and objects. It offers the entire range of FF services. This protocol software can control an H1 segment as a "Link Active Scheduler" or as a "Time Master". It provides a complete interface for the implementation of typical host applications.



■ **FF H1 Field Device Stack**

This compact protocol software is optimized for 16-bit low-power microcontrollers. It permits the implementation of intrinsically safe field devices. The scope of functions is adapted to the typical requirements of field devices. By means of a "function block shell", you or we on your behalf, respectively, can integrate function block applications by standard function blocks.



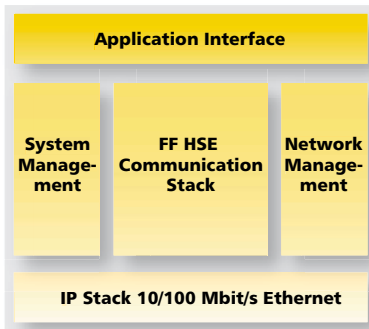
For the "FF H1 Field Device Stack", the following function blocks are available:

- Analog Input (AI)
- Analog Output (AO)
- Discrete Input (DI)
- Discrete Output (DO)

- PID Control
- Multiple Analog Input (MAI)
- Multiple Analog Output (MAO)
- Multiple Discrete Input (MDI)
- Multiple Discrete Output (MDO)

If desired, we will be glad to implement other function blocks for you. On request, we will add the Link Master functionality to the protocol software. In case of failure of the process control system, a field device will then be able to control the schedule of the H1 segment.

■ **FF HSE Stack**



This protocol software supports the "High Speed Ethernet" protocol both as a client and as a server. It is based on standard TCP sockets.

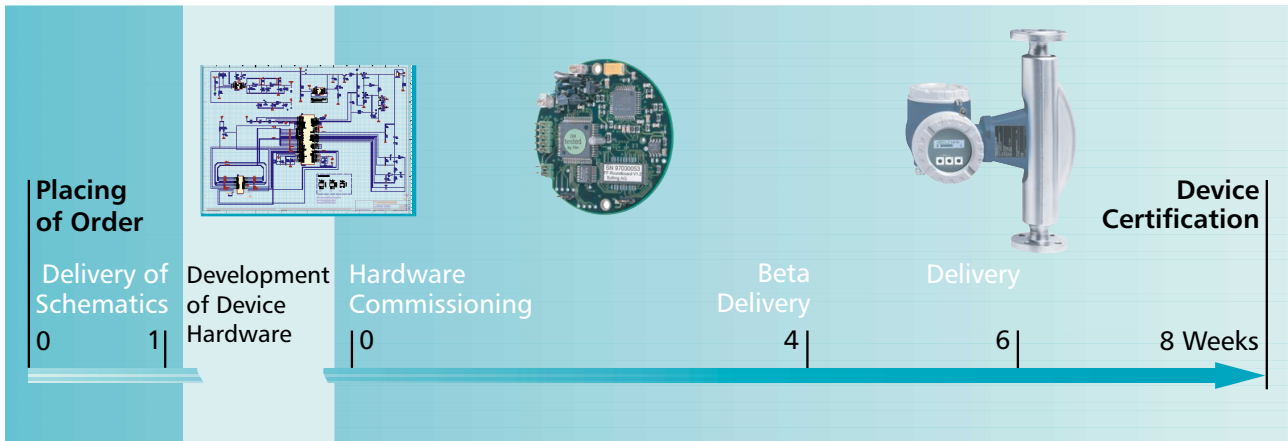
■ **Project Services with "FOUNDATION™ fieldbus" – for your Customized Solution**

For the implementation of a "FOUNDATION™ fieldbus" interface to your device or system, profit from Softing "FOUNDATION™ fieldbus" services. The project services – in combination or individually – are based on the reliable protocol software packages by Softing. They comprise:

■ **Consulting and Feasibility Study**

It is our ambition to provide you with the best solution for your demands. In thorough consultations with you, we will therefore perform a detailed analysis of the current status and define your exact requirements. In addition to all relevant technical aspects, we will naturally take into account important economic and marketing factors and tell you which fieldbus ASICs, microcontrollers and real-time operating systems best suit your demands.

Technical Data	H1 Host Stack	H1 Field Device Stack	HSE Stack
Functionality			
FMS Client	■		
FMS Server		■	
SM + NM Manager	■		
SM + NM Agent	■	■	
Time Master	■		
H1 Link Master	■	optional	
High Speed Ethernet			■
Function Block Shell	optional	■	■
Function blocks	optional	AI, AO, DI, DO, PID MAI, MAO, MDI, MDO	Flexible Function Block (IEC 61131)
Block Instantiation		optional	
Fieldbus Interface			
Number of fieldbus channels	4	1	1
Controller	FIND-1+, Frontier-1+	FIND-1+, Frontier-1+, SPC4-2	based on sockets
Transfer rates	31.25 kbit/s	31.25 kbit/s	10/100 Mbit/s
Portations			
Performed CPU portations	x86, Motorola CPU32, Infineon C16x, MPC8xx, Hitachi H8S	MELPS 3773x, M16C62 Toshiba T900	x86, Motorola CPU32, MPC8xx
Performed operating system portations	no OS (only 1 channel), Linux, VxWorks, uITRON	no OS, embOS CMX/RTX	Windows NT/2000, Linux, VxWorks, pSOS
Minimum Hardware Requirements			
CPU class	16 bit	16 bit	32 bit
CPU clock	10 MHz	2 MHz	50 MHz
ROM	200 kbyte (CPU32)	150 kbyte (M16C)	110 kbyte (CPU32)
RAM	> 256 kbyte	> 48 kbyte	> 150 kbyte



■ Specification

You will receive a specification tailor-made to your requirements. It will define the following: functionality, the interface to the application, the hardware and software requirements and the test conditions for hard- and software.

■ Hardware Development

We develop the hardware for you according to your specification. For the creation of the fieldbus interface, we take into account all general requirements on an FF product, such as EMC regulations and technical directives. You can also license well-trying hardware designs by Softing.

■ Portation of the FF Protocol Software

We port the FF protocol software on your target system, i.e. on the microcontroller and the real-time operating system desired by you. For frequently used micro-controllers and real-time operating systems, adapted versions of the protocol software are available.

■ Integration in the Application

Softing integrates the protocol software in your application. We will be glad to implement additional functions specified by you.

■ System Test

We will commission the target hardware for you and test the basic functionality. For the fieldbus interface, we will on request carry through internal conformity and interoperability tests.

■ Certification

We prepare all actions pertaining to certification and interoperability testing by the fieldbus organization. If desired, Softing supports you with the fieldbus interface certification on site.

■ Manufacturing

We manufacture and test the customized fieldbus interface. If desired, we will also perform brand labeling and packaging for dispatch including the manual.

Turnkey Solutions or Licenses by Softing

We will be glad to provide you with a Softing turnkey solution. As an alternative, you can buy a license for protocol software by Softing and perform all related development work yourself. In any case, Softing is a strong and competent partner for the integration of "FOUNDATION™ fieldbus" in your system.

Order Information

Designation	Order Number
FF Link Master protocol software	FF-LM-SW
FF Field Device protocol software	FF-FD-SW
FF Link Master functionality for FF-FD	FF-FD-LAS-SW
FF-HSE-Server protocol software	FF-HSE-SRV-SW
FF-HSE-Client protocol software	FF-HSE-CLT-SW
FF-HSE-Device protocol software	FF-HSE-DEV-SW
FF function block Analog Input	FF-FB-AI
FF function block Analog Output	FF-FB-AO
FF function block Discrete Input	FF-FB-DI
FF function block Discrete Output	FF-FB-DO
FF-function block Multiple Analog Input	FF-FB-MAI
FF-function block Multiple Analog Output	FF-FB-MAO
FF-function block Multiple Discrete Input	FF-FB-MDI
FF-function block Multiple Discrete Output	FF-FB-MDO
FF function block PID Controller	FF-FB-PID
FF development tool	FF-Gen-VFD
Portation and implementation on the target system	FF-PORT
Support contract	FF-SPT
Hardware schematics	FF-SCHEM
Hardware development	on request
Implementation	FF-IMPL
Production	on request

Technical Data	Evaluation Board	Implementation Board
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Fieldbus Software

FF Field Device	■	■
PROFIBUS-PA Slave	■	■

Fieldbus Interface

Connection	2-pole screw terminal	2-pole plug connector
Controller	SPC4-2, Yamaha Find 1+	Yamaha Find 1+
MAU	Yokogawa uSAA22Q	
Transfer rates	31.25 kbit/s	

Process Interface

Signals	all processor I/O pins	UART 0, UART 1, 5 I/O pins, Flash Programming Port
Connection	gold-plated plug connectors	

Microcontroller

Type	Mitsubishi M16C62M	
Flash	256 kb internal	
SRAM	20 kb internal	
Features	5 serial I/Os (3 UARTS & 2 SSC), 10 x 16-bit timer, A-D converter (8 x 10bits), D-A converter (2 x 8bits), Watchdog timer, 87 programmable I/O lines	

External Memory

SRAM	128 kb	
Flash	256 kb (optional)	none
EEPROM	32 kbit IIC	

Environment/Dimensions

Operating temperature	0 - 70 °C (-25 - +85 °C optional)	
Storage temperature	0 - 70 °C (-25 - +85 °C optional)	
Relative humidity	< 90 %, non-condensing	
Dimensions [mm]	107 diameter	40 x 56

Power Supply

Supply voltage	IEC 61158-2 bus voltage, 9 - 32 volt	
Power consumption	ca. 10...15 mA	

"FOUNDATION™ fieldbus" Products and Softing's Training Program

In addition to our protocol software and services we also offer you our products for the "FOUNDATION™ fieldbus". Thus, we support you in your development projects, planning and implementation phases as well as in further solutions in this area.

With our FG-300 FF Linking Device we provide a high-performance gateway which allows connection of an Ethernet segment (with the HSE – High Speed Ethernet protocol) to up to four H1 segments. This

allows remote access to the H1 field devices and their data resp. for device configuration and for "republishing" of process data from H1 to HSE or between the H1 strings. The FG-300 FF Linking Device supports the class 42c of the FF-HSE profile.

As the bussystems "FOUNDATION™ fieldbus" and PROFIBUS-PA, which are both relevant for the process automation, are based on the same bus physics it is possible to equip field devices with a hardware-sided interface, which is suitable for both bus systems. Just either the "FOUNDATION™ fieldbus" or PROFIBUS-PA protocol will be supported software-sided by the corresponding stack implementation. We assist you

with our evaluation and implementation board in developing the bus interface of your field devices. Both boards unmodified are suitable for "FOUNDATION™ fieldbus" as well as for PROFIBUS-PA. Consequently, your device can be connected to "FOUNDATION™ fieldbus" as well as to PROFIBUS-PA.

As a matter of course, we are pleased to pass our know-how to you. Our training program is intended for engineers and technicians responsible for commissioning and maintenance as well as for developers of field devices and corresponding bus interfaces.

Further information about our "FOUNDATION™ fieldbus" range under www.softing.com.

We certainly will also be glad to send you information free of charge and without engagement. Please mark the subject which is interesting for you, fill in your address or copy your business card and send the form by mail or fax (no. +49 (89) 456 56-399). You might as well send us an e-mail which we will follow up quickly: info.automation@softing.com.

Yes, please send me following information:

- General information about FF technology
- Information about FF training program
- Information about FG-300 FF Linking Device
- Information about FF LM implementation
- Information about FF FD implementation
- Information about FF and PROFIBUS PA implementation
- Information about the bus systems PROFIBUS-PA and DP
- We have an individual request and ask you to call us.

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Department

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Date Stamp/Signature

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