



Fieldbus
Foundation



**FREEDOM TO CHOOSE.
POWER TO INTEGRATE.**

**FOUNDATION FIELDBUS™
TRAINING WORKSHOPS
2006**

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FOUNDATION FIELDBUS™ TRAINING WORKSHOPS

FOUNDATION Fieldbus™ Training Workshops

As FOUNDATION fieldbus™ technology continues to grow among the end user community, technology updates with new benefits and advancements strengthen the demand. Whether you need to learn the basics or keep abreast of the latest enhancements, training is essential. Manufacturers must be confident with the technology to meet both the demands and expectations of their end users. Fieldbus professionals must be able to identify fieldbus applications, understand the requirements to install those applications, and be able to talk about the benefits and advantages, in addition to knowing the differences between FOUNDATION fieldbus and existing technology used in control systems today. The Fieldbus Foundation offers a variety of workshops that every fieldbus professional should attend. Review the workshop information below and sign up to attend.

Fieldbus Overview Workshop

(1 day class)

The vendor-neutral Fieldbus Overview course has been designed for end users, marketing professionals, applications engineers, system integrators, developers and others interested in obtaining a fundamental knowledge of FOUNDATION fieldbus.

Background and Prerequisites

The course assumes little or no knowledge of FOUNDATION fieldbus, but students should be familiar with process control. Students should already be acquainted with existing 4-20mA technology found in present day installations.

Description

Students will become familiar with the basic concepts and new terminology related to FOUNDATION fieldbus. The technology introduces a plethora of new terminology that students must be confident with if they intend to be successful. Students will understand the key strategies for wiring and installation of a fieldbus network. Special emphasis will be made on such design issues as power requirements, device types and topologies.

A basic introduction of communications will help students understand appropriate device placement and expected bandwidth utilization. This knowledge will aid students in determining the appropriate control strategies, loop times, and device types to be implemented on individual segments.

Finally, the course covers a review of Function Blocks, the applications that characterize a FOUNDATION fieldbus device. Students learn the differences between the block types as well as key components of the standard function blocks defined by the Fieldbus Foundation. Other concepts reviewed include mode and status, linkages, alarming, and trending. The course will discuss the importance of the Device Description that accompanies every fieldbus device.



COURSE DESCRIPTIONS

Fieldbus Overview Workshop Agenda

- ✦ Fieldbus Foundation Overview
 - History of the Fieldbus Foundation
 - Product and Services
 - Specification Status
- ✦ Fieldbus Fundamentals
 - Overview
 - Terminology
 - Benefits
- ✦ Wiring and Installation
 - Comparison to 4-20mA
 - Maximum Devices/Lengths
 - Segment Layouts
 - Segment Requirements
 - Recommendations
- ✦ Communications
 - Fieldbus Device Types
 - Device Addressing
 - Device Data Storage
 - Basic Device Communications
- ✦ Function Blocks & Device Description Technology
 - Block Fundamentals
 - Standard Flexible Function Blocks
 - Mode and Status
 - Trending
 - Alarming
 - Scheduling
 - Device Descriptions
 - Capability Files
- ✦ Demonstrations
 - Demonstration of the technology using registered devices in a simulated process

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COURSE DESCRIPTIONS

Advanced Technical Workshop

(3 day class)

The vendor-neutral Advanced Technical Workshop is designed for manufacturers and developers of fieldbus hardware and software. The course is best suited for development engineers, test engineers, and all who wish to understand the detailed inter-workings of a fieldbus device.

Background and Prerequisites

The Fieldbus Overview Workshop is a prerequisite for this class. Students should be familiar with the basic terminology of FOUNDATION fieldbus. Students should have a general understanding of the technologies communications, function block execution, linkages, and device description technology.

Description

The course covers the usage of two major tools used by fieldbus developers: a dialog system and bus monitor. The dialog system is used for modifying values in the device's object dictionary, and the bus monitor shows a detailed view of the current communications of the fieldbus. Students will understand the basics of the bus monitor and know how to apply appropriate filters to help troubleshoot a network.

The course covers H1 and HSE communications between fieldbus devices. For H1 communication, emphasis is made on synchronous and asynchronous communication and the configuration and responsibility of the Link Active Scheduler (LAS). Students will examine the detailed messaging described in the System Management Specification for address assignment, tag assignment, and time distribution. The HSE communication protocol is explored in detail to understand the implementation of Linking Devices and HSE field devices.

Students will study the details of the object dictionary for H1 and HSE devices. This is especially important to the device developer, as the object dictionary is used to describe all the parameters and objects which are accessible over the fieldbus network. Students will study the layout of the object dictionary and will examine an actual object dictionary in registered devices.

The course covers the requirements for building a function block application. This includes mode and status generation and propagation, resource and alert state machines, cascade handshake, and vendor-specific extensions. The course examines Device Description (DD) technology. Students will look at how the connection is made between the DD binary file and the object dictionary.

Throughout the course, live demonstrations of an interoperable fieldbus using registered products will be configured and analyzed using both dialog tools and bus monitors.



COURSE DESCRIPTIONS

Advanced Technical Workshop Agenda

- ✦ H1 Data Link Layer
 - Device Types
 - Bus Arbitration
 - Device Initialization
 - Synchronous/Asynchronous Messaging
 - Time Management
 - Link Active Scheduler Specific Function
- ✦ H1 Bus Monitor
 - Capturing
 - Filtering
- ✦ H1 System Management
 - System Management States
 - Device Address Assignment
 - Physical Device Tag Assignment
 - Tag Location Service
 - Application Clock Synchronization
 - Function Block Scheduling
- ✦ Fieldbus Message Specification
 - Virtual Field Device
 - Object Dictionary
 - Communication Objects
 - Communication Services
- ✦ High Speed Ethernet
 - Protocols
 - FDA Agent
 - Messaging
 - Sessions
 - Time Synchronization
 - Redundancy
- ✦ Object Dictionary
 - Structure and Layout
 - Function Block Object Dictionary
- ✦ Function Block Application Process
 - Fundamentals
 - Status – Calculation and Propagation
 - Cascade Initialization
 - Mode – Calculation
 - Write Checking
 - Resource State Machine
 - Alert State Machine
- ✦ Device Registration Process
 - Q&A on Device Registration
- ✦ Final Questions and Open Demonstrations



COURSE DESCRIPTIONS

Device Description Workshop (EDDL)

(4 day class)

The vendor-neutral Device Description Workshop (EDDL) is designed for field device developers implementing Device Description (DD) Files for field devices. New and experienced developers will benefit firsthand from interactive methods used in the workshop.

Background and Prerequisites

The course assumes that students are familiar with FOUNDATION fieldbus Function Block technology. Previous attendance at the Fieldbus Overview and Advanced Technical Workshop is highly recommended. 'C' programming and Device Description experience are also recommended but not required.

Description

The Device Description Workshop examines sophisticated Device Description Language (DDL) constructs and techniques that make DDs feature-rich for end users. Students will write DDs organizing parameters into rich dialogs with images and display complex data in graphical format, and learn how to preserve device data and retrieve it for later processing. In addition, the course will provide hands-on learning for writing and testing of actual Device Descriptions using the FOUNDATION fieldbus Tokenizer and the DD Super Viewer tools.

Device Description Workshop Agenda

- ✦ Review of the Technology
- ✦ Introduction to Products and Tools
 - Tokenizer
 - Standard Library
 - DD Super Viewer
- ✦ Basic DDL Components
 - Variables, Records
 - Arrays, Blocks
- ✦ Building a DD
 - Import
 - Redefinitions
 - Like
 - Refresh
 - Unit
- ✦ Methods
- ✦ Menu Constructs
 - New Rendering Techniques (image, grid)
 - Graphing
- ✦ Persistent Data Storage
 - List
 - File
 - Collections
 - Local Parameters
- ✦ Visualization Constructs
 - Graph
 - Chart
 - Waveform

Exercises are spaced throughout the workshop.

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COURSE DESCRIPTIONS

Fieldbus Development for Project Managers

(2 day class)

The vendor-neutral Fieldbus Development for Project Managers course is designed for Marketing Product Managers, Engineering Project Managers, and Technical Team Leaders responsible for development of new fieldbus products. The course provides an understanding of the key steps for successful specification, development and test of a new fieldbus device.

Background and Prerequisites

Students should be familiar with development of microprocessor-based industrial products such as distributed control systems, process controllers or instruments. Experience as team leader or project manager is also desirable.

Description

The course covers four major topics:

- 1) An overview of the FOUNDATION fieldbus 31.25 kbit/s (H1) and 100 Mbit/s (HSE) technologies.
- 2) The Integrated Architecture for Information Integration and how fieldbus devices fit into the architecture.
- 3) The engineering development process for a FOUNDATION fieldbus device including special project management requirements for the communication "stack," physical layer, Electronic Device Description (EDD), function blocks, stack conformance testing, and device interoperability testing. The course uses an example design from concept to production of an H1 FOUNDATION fieldbus transmitter product to illustrate the key development steps. An example HSE fieldbus device design and example host application design are also covered.
- 4) A review of third-party technology suppliers (e.g. chips, stacks, development kits) and development/test tools and training provided by the Fieldbus Foundation.

Students will be provided with a workbook containing a copy of the presentation materials.

NOTE: Course location, map and directions will be sent with your training confirmation by fax for the Amsterdam workshop.

COURSE DESCRIPTIONS

Fieldbus Development for Product Managers Agenda

- ✦ H1 Technology Overview
 - Device Types
 - H1 Physical Layer
 - Function Blocks
 - Electronic Device Descriptions (EDD)
 - H1 Communication System
 - ▶ System Management
 - ▶ Data Link Layer (DLL)
 - ▶ Link Active Scheduler (LAS)
 - ▶ Backup LAS
 - ▶ Fieldbus Messaging Specification (FMS)
 - ▶ Client/Server
 - ▶ Publisher/Subscriber
 - ▶ Event and Report Distribution
 - International Standards
 - H1 Device Interoperability Testing
 - H1 Device Registration
- ✦ HSE Technology Overview
 - HSE Device Types
 - HSE Physical Layer
 - Flexible Function Blocks and Applications
 - HSE Communication System
 - ▶ System Management
 - ▶ Redundancy
 - ▶ IEEE and Internet Protocols
 - ▶ Fieldbus Device Access (FDA) Agent
 - International Standards
 - HSE Interoperability Testing
 - HSE Device Registration
- ✦ Integrated Architecture for Information Integration
 - H1 Field Level Device Integration
 - HSE Control Backbone and Subsystem Integration
 - Data Server Integration
 - Application Software and MIS Integration
 - Integrated Architecture Live Demo (Video)
- ✦ New Technology
 - FF/HCF/OPCF/PNO Cooperation
 - ▶ Visualization
 - ▶ Standard Procedures
 - ▶ Client Applications
 - Safety Instrumented Systems
- ✦ Fieldbus Device Development
 - Engineering Development Process
 - ▶ Top Level Plan
 - ▶ Product Specification and Concept
 - ▶ Project Schedule
 - ▶ Product Design and Make/Buy Decisions
 - ▶ Engineering Prototype
 - ▶ Interoperability Testing
 - ▶ Production Planning
 - H1 Device Design Example
 - ▶ Marketing Specification
 - ▶ Engineering Lab Setup and Cost
 - ▶ Hardware Cost Estimate
 - ▶ Software Cost Estimate
 - HSE Device Design Example
 - ▶ Implementation Architecture
 - ▶ System Management Kernel
 - ▶ UDP/TCP Sockets Interface
 - ▶ FDA Agent/DHCP Client
 - ▶ SNTIP Client/SNMP Server
 - ▶ LAN Redundancy Entity
 - Host Device Design Example
 - ▶ Device Description Services (DDS) Integration
 - ▶ Connection Manager
 - ▶ Remote Object Dictionary
 - ▶ Registered Device Description Library
- ✦ Technology, Tools and Services
 - Member-supplied Technology and Tools
 - ▶ Communication and Physical Layer Silicon
 - ▶ Communication and Function Block Software
 - ▶ Device Development Systems
 - Foundation-supplied Tools and Services
 - ▶ Conformance and Interoperability Testers
 - ▶ Packet Analyzers and Test Automation Tools
 - ▶ Device Description Tokenizer (Field Device)
 - ▶ Device Description Services (Host Device)
 - ▶ Training Courses
 - ▶ Host Interoperability Support Testing (HIST)
 - ▶ Consulting Services
- ✦ Final Discussion and Course Evaluation

TRAINING SITE: AUSTIN, TX

Austin, Texas, USA

Training courses in Austin, Texas, USA are held at the Fieldbus Foundation.



Directions (From Austin-Bergstrom International Airport)

Total Distance: 19.39 miles (31.2 km)

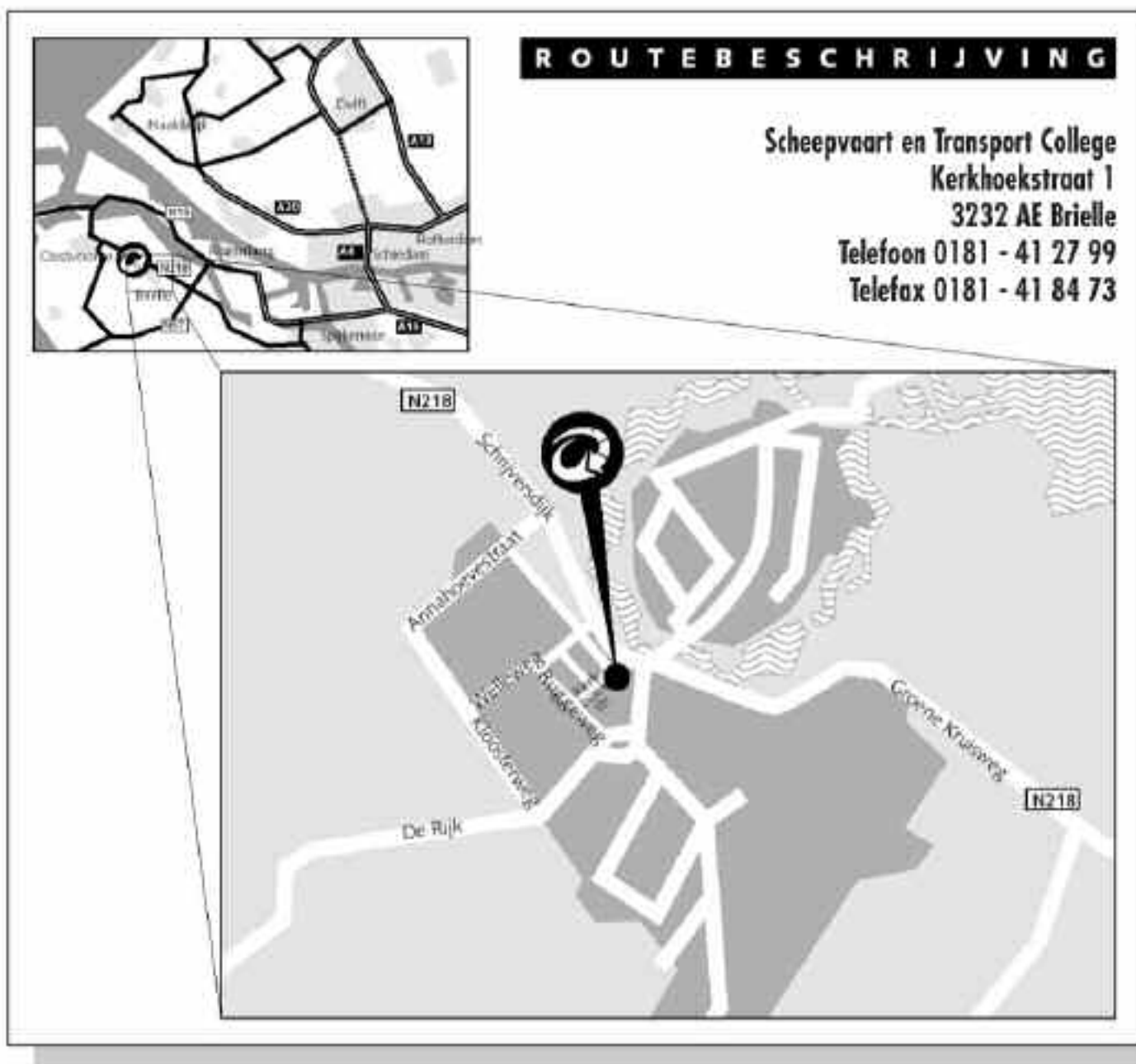
Estimated Time: 30 minutes

1. Depart airport
2. Take left onto 71 West
3. Merge onto 183 N (16 miles)
4. Take 360/Capital of Texas Highway exit & turn left at intersection
5. Make a U-turn at the first light at Great Hills Trail
6. Make a right onto Mountain Ridge Drive
7. Make a left into the business center and you will see the Bowie Bldg. on the right

TRAINING SITE: BRIELLE

Brielle, The Netherlands

Training courses in Brielle, The Netherlands, are held at the Scheepvaart en Transport College (STC).



A blue-tinted world map showing the continents of North America, South America, Europe, Africa, and Asia. The map is centered on the Atlantic Ocean.

IMPORTANT INFORMATION

Registration

Registration prior to the registration deadline is required. To register, complete the registration form and fax to the Fieldbus Foundation at +1 (512) 794-8893. Each class has limited seating. Register early to guarantee a space.

Pricing

Pricing for each workshop is listed on the registration page. Attendees who register on or before the Early Registration Deadline are entitled to a 15% discount. Voting members of the Fieldbus Foundation are entitled to the discounted Member Price.

IMPORTANT: The registration form and payment must be received by the Fieldbus Foundation on or before the Early Registration Deadline to qualify for the 15% discount.

Cancellations and Substitutions

Cancellations received up to 10 business days prior to the start of the workshop will be fully refunded. Cancellations within 10 business days to the start of the workshop are subject to the entire workshop fee. If you don't cancel and don't attend, you are still responsible for payment.

Substitutions can be made at any time.

Schedule

Please arrive at the training site between 8:30 a.m. and 9:00 a.m. Morning refreshments will be served. Each workshop promptly begins at 9:00 a.m. and ends at 5:00 p.m.

Food

The course fees include lunch. Please contact the Fieldbus Foundation at time of registration if you require special dietary needs.

Recordings

The workshops are copyrighted by the Fieldbus Foundation. No video or audio recording is permitted.

Hotels/Transportation

It is the student's responsibility to arrange for hotel and transport to and from the training site.

2006 Fieldbus Foundation Workshop Registration Form

Registration Instructions - Please complete and fax this form to the Fieldbus Foundation at 512-794-8893 no later than the final deadline date. You will receive a letter confirming your registration by fax. One form is required for each person attending the workshop. Please verify that you understand the cancellation policy and payment options by placing your signature on the line at the end of this form. The registration will not be accepted without your signature. If you have any additional questions, please contact the Fieldbus Foundation at 512-794-8890. Thank you for your registration!

Register early and save 15% !

Course	Regular Price	Member Price
Fieldbus Overview	\$ 630.00	\$ 420.00
Advanced Technical	\$ 1,653.75	\$ 1,102.50
DD Workshop	\$ 2,205.00	\$ 1,470.00
Project Management	\$1,620.00	\$1,080.00

Payment Information

Purchase Order: (fax PO with this form to 512.794.8893)

Credit Card: Mastercard Visa American Express

Total Payment:	
Card Number:	
Expiration Date:	
Signature:	

Cancellation Policy – Cancellations received up to 10 business days prior to the start of the workshop will be fully refunded. Cancellations within 10 business days to the start of the workshop are subject to the entire workshop fee. Substitutions can be made at anytime.

Choose the workshop(s) you wish to attend:

√	Course	Location	Date	Early Registration Deadline (15% discount)	Final Registration Deadline
	Fieldbus Overview	Austin, Texas, USA	March 21	January 24	February 28
	Advanced Technical	Austin, Texas, USA	March 22-24	January 24	February 28
	DD Workshop	Austin, Texas, USA	March 27-30	January 30	March 6
	Project Management	Amsterdam, Netherlands	April 3- 4	February 2	March 9
	Fieldbus Overview	Brielle, Netherlands	May 30	April 4	May 9
	Advanced Technical	Brielle, Netherlands	May 31-June 2	April 4	May 9
	DD Workshop	Brielle, Netherlands	June 6-9	April 11	May 16
	Project Management	Austin, Texas, USA	June 26-27	April 27	June 1
	Fieldbus Overview	Austin, Texas	July 10	May 15	June 19
	Advanced Technical	Austin, Texas	July 11-13	May 15	June 19
	Fieldbus Overview	Austin, Texas, USA	September 12	July 18	August 22
	Advanced Technical	Austin, Texas, USA	September 13-15	July 18	August 22
	DD Workshop	Austin, Texas, USA	September 18-21	July 24	August 28
	Fieldbus Overview	Brielle, Netherlands	November 7	September 12	October 17
	Advanced Technical	Brielle, Netherlands	November 8-10	September 12	October 17
	DD Workshop	Brielle, Netherlands	November 13-16	September 18	October 23
	Fieldbus Overview	Austin, Texas, USA	December 4	October 9	November 13
	Advanced Technical	Austin, Texas, USA	December 5-7	October 9	November 13

Please print or type the following:

Name: _____

Company: _____

Member: YES NO

Email Address: _____

Mailing Address: _____

City, State, Zip, Country: _____

Telephone: _____

Fax: _____