Portable Tools Can Make Fieldbus Easier

Most people think of fieldbus as digital integration of field devices with process automation systems and that working with Fieldbus can only be accomplished with fixed assets (such as PCs) located in fixed locations, but there are also a number of portable tools available that can make specific fieldbus tasks a lot easier and help you get a better return on your fieldbus investment. There are some very good reasons for using portable tools and a wide range of products available with different functions and price levels. Here are some of the more compelling reasons to use portable tools, the different classes of tools, and some things the Fieldbus Foundation is doing to ensure that the products you purchase match our specifications.

Why Use Portable Tools?

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One of the big advantages of FOUNDATION fieldbus is the ability to access information about a device remotely from the control room, instrument shop, or anywhere the information is needed. The ability to do diagnostics remotely can save you a considerable amount of money on maintenance costs and avoided failures.

Today, we are faced with a workforce that is becoming increasingly mobile, so the future of device diagnostics may not be limited to the confines of a control room. Likewise, today's portable tools can provide you with the same functionality as a process workstation, or they may be simpler or less expensive tools, designed to test specific functions. You may want to evaluate your existing wiring to see if it meets fieldbus physical layer specifications, or you may want to diagnose potential physical layer issues such as segment noise or communication jitter. Maybe you just want to send someone out to the field for a visual inspection; even with remote diagnostics, this is sometimes necessary. Whatever your needs, portable tools can help you realize flawless fieldbus project execution and keep your segments and devices running to their optimum potential.

The Value of Preconfiguration

If you are planning or in the midst of a Fieldbus project you may want to consider pre-configuring your devices at the site prior to commissioning. In the installation phase, you can use portable tools to pre-commission and tag FOUNDATION Fieldbus devices. Successful device downloads requires all of the information in the device, such as tag name and node address, to be identical to the information stored in the host system configuration. Preconfiguring devices before control system commissioning activities begin ensures consistency and can speed time to startup.

The Importance of the Physical Layer

Most engineers with experience in fieldbus projects and will tell you that most of the mistakes that are made during fieldbus installation are related to the physical layer. Since FOUNDATION fieldbus is a digital network, it has physical layer requirements that are somewhat different than those for analog installations. Portable tools are now available that can check physical layer issues such as the suitability of your existing wiring, segment noise, low voltage, or communications jitter.

Portable Tools in the Instrument Shop

In the instrument shop, portable tools can offer a degree of convenience and familiarity to instrument technicians. Portable tools can be used to perform a quick check of a new device "out of the box" before taking it to the field for installation. Some can also be used to set up and pre-commission devices before taking them to the field for installation.

Emerson's USB Fieldbus Interface

Ease of Use

Portable tools such as the Emerson 475 typically have simple, easy to use interfaces that are designed specifically for use by maintenance technicians doing series of Fieldbus related tasks. So, while today's sophisticated asset management applications and process automation systems offer a lot of functionality, your maintenance technicians may not want to take a course in how to use a DCS in order to accomplish what can be done via a tool he or she is already familiar with.

Go Anywhere, In Any Environment

If you are working in hazardous areas, you need equipment that can follow you into Class 1 Div 1 areas. This requirement for being hardened and approved for hazardous areas is probably one reason why iPads and smartphones have not really taken off as everyday tools in places like refineries and chemical plants. Albeit you will still pay a premium, you can get some highly functional wireless workstations that are essentially environmentally hardened tablet PCs.

Classes of Portable Tools

Portable tools fall into thee general classes:

- Laptops and wireless workstations,
- Handheld tools, and
- Remote wireless clients

Softing FFusb Interface

Each of these has its own advantages. Many users have a combination of these tools, so it's not a case of one tool versus another. In our System

Engineering Guide, the Fieldbus Foundation recommends that you have:

Laptops and USB Interfaces

If you want the functionality of a workstation in a familiar package, a ruggedized laptop or notebook PC is a good choice. There is a wide range of ruggedized laptops designed specifically for manufacturing applications. Of course, the laptop offers a more full featured user interface than a handheld. Because it is a PC, laptops can offer easier integration with plant asset management systems and other applications.

Most suppliers now offer USB fieldbus interfaces that can be used in conjunction with a laptop or notebook to allow direct access to FOUNDATION fieldbus H1 segments and FOUNDATION fieldbus H1 field devices. This allows users to commission, configure, and troubleshoot FOUNDATION fieldbus devices both on the bench and in the field. USB Fieldbus Interfaces are available from Emerson Process Management, Softing, and National Instruments. The newly released Emerson **USB Fieldbus Interface** provides power to the fieldbus segment, which can be useful in startup situations or emergencies where power is not available.

Handheld Tools

There is also a wide range of handheld tools available for use with FOUNDATION fieldbus and other intelligent devices. These tools have been around for a long time and there has recently been a wave of innovation in handheld tools resulting in some interesting new functions, interfaces, and enhanced use. Portable diagnostic tools assist in troubleshooting specific problems and may present additional data not available with permanent diagnostic tools. Functions of portable diagnostic tools include:

Emerson's 475 Field Communicator

- Voltage per segment
- Segment noise
- Maximum fieldbus signal (communications) level
- Minimum fieldbus signal (communications) level
- Low resistance between shield and negative signal pole
- Low resistance between shield and positive signal pole
- Segment jitter
- Retransmissions

Some of these tools are fully functioning configuration tools that can operate with multiple protocols - not just FOUNDATION fieldbus but also HART, Profibus, etc. The more sophisticated of these devices include products such as the well-known **Emerson 475 Field Communicator** (and its predecessor the 375) and the Beamex MC6. The 475 is ubiquitous in the process industries, and includes a nice full color LCD display. With the 475, you can view device diagnostic graphics, run valve analyses with

snap-on packages such as ValveLink Mobile and transfer the results to Emerson's AMS plant asset management application, and more.

The **Beamex MC6** also sports a full color LCD display and is a full fieldbus communicator for HART, FOUNDATION Fieldbus, and Profibus PA instruments. MC6 also offers significant calibration capabilities for pressure, temperature and myriad electrical signals.

In addition to full-function handheld device configurators/calibrators, there is a class of portable tools designed more for physical layer diagnostic tasks. These include products like the **Relcom FBT-6** fieldbus monitor or the **Pepperl+Fuchs Mobile Advanced Diagnsotics Module**. These tools can help you diagnose just about all of you physical layer problems fast, and typically have a simpler interface. The Pepperl+Fuchs ADM has the added feature of a built-in oscilloscope which can come in handy when one wants to see a visual representation of the quality of Fieldbus pulses or frames . We all know the adage of a picture being worth a thousand words.

Relcom FBT-6 Fieldbus Monitor

Remote Wireless Clients

Remote wireless clients can include laptops, notebooks, or other wireless workstations, which have a wireless connection to the control network and can serve as clients with direct access to the plant asset management system or an application in the field. Such wireless clients can allow changes to be tracked immediately in audit software available in many operating systems. Many end users are employing just such an approach to do "in the field commissioning" of fieldbus devices. Having a wirelessly connected client allows the technician to fully commission a fieldbus device in the field without the requirement of having an engineer in the control room. Of course, this approach also required an in-plant WiFi or other wireless connection.

Remote Wireless Clients can Greatly Simplify the Task of Commissioning Fieldbus Devices Like this Control Valve

Fieldbus Foundation Testing and Registration

Portable tools that perform host functions such as device commissioning are classified under the Host Profile Registration process at the Fieldbus Foundation. We classify these task-specific hosts as either Visitor Hosts or Bench Hosts, and we have an entire testing and registration process for these hosts just as we do for DCS Integrated Hosts and FOUNDATION fieldbus H1 devices.

The Fieldbus Foundation "Class 62 Visitor Hosts" typically reside in

portable tools like the 475 that are used for maintenance and have a temporary connection to the network. Visitor Hosts can also reside in specialized device applications such as online control valve diagnostic applications.

Class 63 Bench Hosts may set the network configuration for off process testing. Primary users include maintenance and instrumentation personnel. Bench Hosts can be used for several applications, including testing of skid operations and setting up a new device for service. Class 64 Bench Hosts are primarily off-process hosts for access to a previously commissioned device. Primary Users of Class 64 Bench Hosts would be instrumentation and maintenance personnel. The Class 64 Bench Host usually resides in a portable tool that is connected to an off-process segment or specialized device application such as offline valve diagnostics.

The Fieldbus Foundation Registered Products page has a complete list of tested and registered hosts, devices, and other products. We also offer resources for developers, including developer training and tools. You can check out the Fieldbus Foundation web page at http://www.fieldbus.org and go to our End User Resources section for a list of registered products or email us at marketing@fieldbus.org.