Operating instructions

WinPP103 test program

Receive, check, filter, store, display, print, transmit and
simulate IEC 60870-5-103 messages.

Contents

1   Installation

Note: For the driver installation with Window 2000, NT, XP or Vista you must log on as Administrator.

System Requirements: Windows 95, 98, Me, 2000, NT 4.0, XP or Vista, 32 MB RAM, 40 MB Disc, VGA or better, at least one COM (USB-Serial is possible) and LPT or USB for dongle. Interfacing to the protection equipment is done via the serial interface COM. You may need a RS232 – Fiber Optic interface converter. The program supports two COM interfaces. It is possible to run the program several times simultaneously and thus support several COM interfaces.

The setup program of WinPP103 is delivers on CD. On the CD the program is in the folder "Programme".
The file name is SetupW103vvv.exe, vvv stands for program version.
Par example: SetupW1032200.exe = Setup program for WinPP103 Version 2.2.0.0.

Insert the CD into the drive and start the program "SetupW103vvv.exe", then follow the instructions on the screen.

When the installation are finished you can start WinPP103 with the icon on the Desk or with the menu "Start | Programme | WinPP103".

You can deinstall WinPP103 via the dialogue field "Properties of Software" (Menu: *Start | Settings | System Control | Software*).

After installation the following files are in the chosen directory:

Winpp103.exe   Test program
W103Text.ger   Program texts in German
W103Text.usa   Program texts in English
W103ger.hlp   German Online Help
W103ger.cnt   German Online Help
W103usa.hlp   English Online Help
W103usa.cnt   English Online Help
CbSetup.exe   Auxiliary program, installs the dongle driver.
3Version.txt   Versions log of WinPP103 only in German.
Log.lg3   Standard Log file for online messages
SeTel.st3   Standard file for transmission messages and lists.
InfTGer.csv   IEC 60870-5-103 text of Information numbers in German.
InfTUsa.csv   IEC 60870-5-103 text of Information numbers in English.

You can also save Log files, and the files for transmission messages and lists, under your own choice of name for reloading later. Do not add the file extensions ("lg3" or "st3") as the program automatically append them.

On exiting the program it saves the configuration specific to your PC in the file W103.cfg.

2   Overview

2.1   Function

WinPP103 is a test program for the transmission protocol IEC 60870-5-103. It receives, tests, filters, stores, prints and transmits IEC 60870-5-103 messages. The generic messages are as displayed as hexadecimal strings. For test purposes it can also be used as a "Byte receiver", here the parity, number of data bit and stop bit are to be parameterised, see Parameterize Rec/Trans 1 | Function.

The program can also be used without administrator rights.
Upon the first start, the program creates the "Data Directory" under "C:\MyDocuments\ Users\ User Data\ PPFink\ WinPP103\ and copies the "Log.lg3" and "SeTel.st3" files into the directory. The "Data Directory" is used for saving the log, send and configuration data.
You can change the directory with the menu „Parameterize | General | Data directory".

Interfacing to the telecontrol equipment is done via the serial interface COM. The program supports two COM interfaces. It is possible to run the program several times simultaneously and thus support several COM interfaces.

You can monitor an existing Link or simulate a control system or the protection equipment.

On **simulation protection equipment** the program transmits an "Identification Message" = message type 5 after "Reset Link Layer". If you have specified a transmit telegram as "Identification Message", this telegram is transmitted. Otherwise, the program transmits a predefined "Identification Message". You may also simulate a transmission of disturbance data.
If you wish to monitor the control and monitoring directions simultaneously then you need two free COM interfaces. For simulation, you need one free COM interface.

You can parameterize the following for example:
- Ø   Text of the objects (CSV file)
- Ø   Program function (Master, Slave, Monitoring)
- Ø   Use of single character E5
- Ø   COM Port
- Ø   Baud rate

The program reads the texts of the information numbers from a CSV file, format: "type; function type; information number; Color code; text;", see also file "InfTUsa.csv" in the program directory. Select a CSV file in the "File | Information texts Load" menu. The currently used file is indicated in the status bar.

Don't use the file names "InfTGer.csv" and "InfTUsa.csv". These files are overwritten during each installation.

The program checks the received messages for correctness. Faulty messages are marked as such. Every transmitted and received message is allocated a time stamp and is stored in a Log File.

The maximum size and the log file directory can be defined via the related parameters. As a rule, the program uses the "Log.lg3" log file. If the user activates the "Use new log file every day ..." option (see Parameterize | Options), a new log file will be created for each day of the month. The number of the day (01 - 31) is indicated in the file name.

During reception, the user can page up and down the messages saved in the log file and shown on screen. A message of 20 bytes takes up 50 bytes of Log file space. The log file can be printed or saved as a text file or log file.

Start options
If no start options have been defined, the program loads the default log file and the transmit message / object text file used last. Afterwards, it starts in the same mode in which it was terminated before. The start can be influenced by setting appropriate start options. The user can specify one or several options in a freely definable order. The options must be separated by at least one blank. The following options are supported:

Option	Example
Online	online
Offline	offline
Name of transmit message file	SeTelNorth.st3
Name of information text file	TextNorth.csv
Name of log file	GaNorth.lg3

When using the "Name Log File" option, it must be considered that this file will be also used on online mode.
A convenient method for the definition of start options is to extend the link on the Desktop by the options (click with the right mouse button on the link | Properties | "Destination: …" extension with blanks and options). The program searches the files in the directory indicated in the "Execute in: …" dialog box (see properties of the link).
Example: "c:\pp\WinPP103\WinPP103.exe online TextNorth.csv SeTelNorth.st3"

The parameters used last (Baud, COM number, function, …) are also saved in the transmit message file and in the log file.

The Log file is organised as a circular buffer. When the file is full then the newest message overwrites the oldest message. You can prevent this by deleting (Ctrl+D) the old messages, before you start testing or increase the maximum size of the Log file or limit the time for message storage or the number of stored messages via Filter.

If you start the program several times the following log files are used: Log.lg3, Log2.lg3, Log3.lg3, etc.

The message colors may be modified in one of the following ways:
    Ø   Color of the receiver/transmitter (lowest priority)
    Ø   Color of the transmission cause (dialog or file InfTUsa.csv)
    Ø   Color of the ASDU type
    Ø   Color of the information number, refer to the InfTUsa.csv text file (highest priority).

When storing or displaying messages you can filter them with respect to: time, message number, type, station address, object address, etc. With the time filter you can specify, for example, that only messages from 02:00 till 08:00 should be stored.

The transmitted messages are parameterized logically. There are 12 messages and 12 lists available, see **Parameterize message** or **Parameterize list**. In a list you can parameterize 400 objects. For the simulation of command responses 100 objects are available. The transmission instigation for the messages and lists takes place via the operation **Transmit** or via an event. An event can be: reception of a particular type of message or successful establishment of a link. You can then send an interrogation command, answer an

interrogation command automatically, send commands, simulate responses, transmit cyclic measured values or simulate an avalanche of messages.

For test purposes you can send illogical link and data messages. For examples: send NACK instead of ACK, do not toggle the FCB bit, send private ASDUs, see online help Simulate faults.

2.2   Initial start

Place the Dongle onto the parallel (LPT) or USB interface and start the program. You choose the English or German user interface with the menu "Parametrieren | Sprache".

On starting the first time you should parameterize the following two dialogue fields:

General parameters
Common address equal link address

Parameterize Rec/Trans 1
Page 1
Function
Reset link with
Link address

Page 2
COM Port for Rec/Trans
Baud rate

Save the parameters each time by clicking "OK".
Choose the "On-line message display" (Menu: View).
Go On-line (Menu: Mode).

Please note the LEDs and the status bar at the bottom of the window.

If you receive the message "e.n.n.n Dongle missing/wrong" after entering the online mode then check please:
   -   Was the program installed with administrators' right?
   -   Is the dongle on LPT or USB present?
   -   Is the LPT-Interface enabled (BIOS-Setup)?
   -   Test another LPT Mode, for example: EPP, ECP or Output only (BIOS-Setup).
The error code e.n.n.n has the following meaning:
2, 1011 or 1034.n.n.n   Dongle not found.
1004, 1005 or 1006.n.n.n   Device driver not installed.

Depending on the parameterized function you connect the PC's COM Port with the protection equipment following the plan below.

Monitoring (control and monitoring direction simultaneously)
COM1   Protection equipment (Master)
  5 Ground GND   to   Ground
  2 Receiver RxD   to   Transmitter (control direction)
COM2
  2 Receiver RxD   to   Receiver (control direction)

Simulation
COM1   Protection equipment
  5 Ground   to   Ground
  2 Receiver RxD   to   Transmitter
  3 Transmitter TxD   to   Receiver

With the Menu View or the keypad shortcut "1 to 7" you can change the output format of the messages. The current output format is displayed in the heading.

With Simulation switched on the program causes a link to be established. When the partner station transmits you should see the received messages.

WinPP103 saves the current parameters, Log file and messages when you exit from the program.

2.3   Operating Instructions

The usual Windows operations apply for program start, maximising, minimising and closing the program window.

The program WinPP103 uses menus for setting values and operation.

You call the on-line Help for any main menu and for the dialogue fields via the key "F1" (e.g. select the menu and press F1).

You can select menus and input fields with the mouse or keypad. Keypad selection takes place via the "Alt" key and a "**Hotkey**". "Hotkey" is the underlined character in the menu text (e.g. "F" in File Menu) or in the label of an input field. Some operating systems display the Hotkey in the menu text only after menu selection (Press the Alt key).

For commonly used commands (On-line, Off-line, Transmit Message) you can enable a "**keypad shortcut**", see Menu "Parameterize | Options" . A "keypad shortcut" is a key combination with which you execute a command directly. For example the key combination "Alt+F1" transmits the first message or "Ctrl+D" deletes the messages in the log file.

Please note that the key Alt activates the Menu selection (a Menu is optically highlighted/raised). If the Menu selection is activated then the shortcuts are **deactivated**. By pressing the Alt key once more you can deactivate the Menu selection again.

If you have selected a table then you are in Navigation mode. Select the desired field with the cursor keys. By a mouse click or by using the key F2 or by pressing "any key" you change to the edit mode. If the "any key" is a valid input then the character entered replaces the previous value. If the input is an invalid key then the current value is retained.

In dialogue windows you can select the next field with the keys "Tab" or "Enter" (Return) or select the previous field with "Shift+Tab". In a drop-down field you can make the list drop down via the key F4 or make a selection with the arrow keys Up/Down or the Spacebar.

In the dialogue windows usually the buttons "OK", "Cancel" and "Help" are displayed. "OK" saves the entered values and ends the input, "Cancel" ends the input **without** saving the values, "Help" calls the on-line Help for the current dialogue field.

You can enter numbers as decimal or hexadecimal numbers, example: 100 or $64;

3 RS232 <> Fiber Optic interface converter

The RS232 <> FO interface converter is optionally available.

Functioning
The interface converter converts two RS232 interfaces (COM_1 and COM_2) into two fiber-optic interfaces. Each interface converts the Transmitter (TxD) and Receiver (RxD) signal. All other signals are not relevant. The maximum transmission speed is 64 kBaud. The converter operates independently of the data format used.
With the converter, you can simulate two protection devices or listen to the control and monitoring direction simultaneously. According to the IEC 60870-5-103 standard, the light used has a wavelength of 850 nm. Ordinary duplex multi-mode optical cabel of the type 62.5/125 µm are connected by means of the FO connectors.

Housing and connections
The converter is located in an aluminum housing. The RS232 cables are connected by means of two DB9 sockets with a DCE assignment. In this way, a standard cable wired in a 1 to 1 ratio can be used for connection.
With FO cables, two FSMA plug-in connectors are available for COM_1 and two ST plug-in connectors are available for COM_2. A light-emitting diode is assigned to each plug-in connector. It lights up with "Light ON".
In this way, FSMA or ST connections can be simulated and listened (without intermediate coupling). A duplex cable with FSMA-ST connectors is required for listening. A plug-in power supply unit ensures power supply. The existing voltage is indicated by means of a light-emitting diode.

Operating modes
The converter can be used for simulation or for listening. The operating mode is set by actuating a switch. During simulation, the E_1 and S_1 FO connections are assigned to the COM_1 interface, whereas the E_2 and S_2 connections are assigned to COM_2. The COM interface data are converted transparently to the FO in both directions.
In the listening mode, the data available on E_1 are sent automatically to S_2. COM_1 allows for listening the data available on RxD. All data available on E_2 are sent to S_1 and can be listened on COM2, RxD. The TxD signals of COM_1 and COM_2 are disconnected.

The line idle position on the optical cable can be set by means of a second switch. The "OFF" position means "Light OFF" in the line idle position, whereas the "ON" position means "Light ON" in the line idle position. The switch is used for all FO connections.

Devices equipped with SC connectors can be connected with ST-SC connectors or FSMA-SC connectors via FO cables. An ST-SC coupling is required for listening.

Technical data

Power supply:	6-10 V DC
Current input:	Maximal 200 mA with 10V DC
Plug-in power supply unit:	230V AC +/- 10%
Baud rate:	100 - 64000 Baud
Transmitted signals:	RxD, TxD
RS232 connection:	Two female 9-pole DSUB sockets
FO connection:	Two FSMA and two ST (B-FOC) sockets
	Multi-mode glass fiber cable
Wavelength:	850 nm
Housing:	Aluminum housing
Dimensions:	105 x 100 x 26 mm
Weight:	Approx. 400 g incl. power supply unit

Included in the scope of delivery:
     1 RS232 <> FO converter
     1 AC plug-in power supply unit 220 V, 9 V
     2 RS232 cables, 9-pole, DSUB