Operating instructions

WinPP104 test program

Receive, check, filter, store, display, print, transmit and simulate IEC 60870-5-104 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, Network interface (LAN Ethernet, TCP/IP) and LPT or USB for dongle.

The setup program of WinPP104 is delivers on CD. On the CD the program is in the folder "Programme".
The file name is SetupW104vvv.exe, vvv stands for program version.
Par example: SetupW1042300.exe = Setup program for WinPP104 Version 2.3.0.0.

Insert the CD into the drive and start the program "SetupW104vvv.exe", then follow the instructions on the screen.

You can deinstall WinPP104 via the dialogue field "Properties of Software" (Menu: *Start | Settings | System Control | Software*).

After installation the following files are in the chosen directory:

Winpp104.exe	Test program
W104Text.ger	Program texts in German
W104Text.usa	Program texts in English
W104ger.hlp	German Online Help
W104ger.cnt	German Online Help
W104usa.hlp	English Online Help
W104usa.cnt	English Online Help
CbSetup.exe	Auxiliary program, installs the dongle driver.
ExText4.csv	Example file for text of objects.
Typ4ger.csv	Example file for short texts of message types, German.
Typ4usa.csv	Example file for short texts of message types, English.
4Version.txt	Versions log of WinPP104.
Log.lg4	Standard Log file for online messages
SeTel.st4	Standard file for transmission messages and lists.

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 ("lg4" or "st4") as the program automatically append them.

On exiting the program it saves the configuration specific to your PC in the file W104.cfg.

2   Overview

2.1   Function

WinPP104 is a test program for the telecontrol protocol IEC 60870-5-104. It receives, tests, filters, stores, prints and transmits IEC 60870-5-104 messages.

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\ WinPP104\ and copies the "Log.lg4" and "SeTel.st4" 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".

You can monitor an existing connection or simulate two Masters or two Substations. You can start the program several times.

You can parameterize the following for example:
  Ø   Text and color of the objects (CSV file)
  Ø   Structure of station address
  Ø   Structure of object address
  Ø   The parameters t_0, t_1, t_2, t_3, k and w
  Ø   Program function (Master, Station, Monitoring)
  Ø   IP address of partner station

The program reads the plaintexts of the individual objects from a CSV file, format: "Object address; Color code; Plaintext;", see also file "ExText4.csv" in the program directory. Select a CSV file in the "File | Objecttexts Load" menu. The currently used file is indicated in the status bar.

Don't use the file names "BspText4.csv" and "ExText4.csv". These files are overwritten during each installation.

You may also import files which are created by "libpcap" or "winpcap" programs, menu "File | Log open".

The program checks the received messages for transmission errors, link faults and ASDU faults. 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.lg4" 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.st4
Name of object text file	ObjTextNorth.csv
Name of log file	GaNorth.lg4

When using the "Name Log File" option, it must be considered that this log 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\WinPP104\WinPP104.exe online ObjTexteNorth.csv SeTelNorth.st4"

The parameters used last (function, t_0, t_1, t_2, t_3, k…) 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.lg4, Log2.lg4, Log3.lg4, 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 ExText4.csv)
- Ø   Color of the ASDU type
- Ø   Color of the object address, refer to the ExText4.csv object 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 messages. For example: send private ASDU, increment the Send Sequence Number by 2, or do not send ACKs, 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". Connect the PC with the network. On starting the first time you should parameterize in the dialogue field Parameterize Rec/Trans 1 (Menu: Parameterize | Receiver/Transmitter 1) the following parameters:

"Function: ..." and
"IP Address of Partner station: ...".

Save the parameters by clicking "OK".
Choose the display "On-line message" (Menu: View).
Go On-line (Menu: Mode).
Please note the table, 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.

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.

WinPP104 saves the current parameters, Log file and messages when you exit from the program.

For test purposes you can carry out a loop test. Parameterize: "Function" from Receiver/Transmitter 1 to "Station" and "Function" of Receiver/Transmitter 2 to "Master".
Enter your own IP address for the "IP Address of Partner station".

If no network card is installed in the PC, enter the IP address 127.0.0.1.

2.3   Operating Instructions

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

The program WinPP104 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 <u>F</u>ile 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;

2.4   Display Messages

The program displays either the "On-line messages" or the "Log messages". With the Menu **View**you select the messages and the output format. The status bar (lowest line) displays the program status, the kind of displayed message, the status of the filters and the name of the Log file. The kind of message will also be displayed in the message header. The name of the transmitted message file will be displayed in the Title bar. With the **Output filter**you can filter the On-line messages and the Log messages. The meanings of abbreviations can be found in the online help. Faulty messages are marked with an Error text. For the message time a millisecond timer is used which is always synchronised with the PC time at a change from offline to online. For a received message the message time gives the time of reception of the last byte of the message, for a transmitted message the time of starting transmission. With a right click you call the pop up menu.

Display On-line messages
In the window of the "On-line Message Display" you can see the Status Table, the Header and the received and transmitted messages. You can change the message display, see Parameterize | Options | Display online messages.

The Status Table displays the most important parameters from receiver/transmitter 1 and 2, see also **Parameterize Rec/Trans**. The columns have the following meaning:

Text	Description
Received	Displays the number of received and saved messages since selection of on-line status.
Errors	Displays the number of received and saved messages with errors since selection of on-line status.
Transmitted	Displays the number of messages transmitted since selection of on-line status.
Errors	Displays the number of repeatedly transmitted messages since selection of on-line status.
Status	Displays the state of the port.
	- Port is off-line
	Opened Port is waiting for connection.
	Connected Port is connected.
IP Partner	Displays the IP address of the partner station.
Cl., Se. Port	Displays the port number of the client and server after a connection is established.
Function	Displays the parameterized function.

The **Header** displays the kind of message, the filter function and the output format. The messages are displayed continuous (scroll mode) or with 7 lines offset, that means also that a maximum of 7 lines are displayed from any one message. The output format "Single line" displays the messages in single lines. The yellow bar indicates the message most recently displayed. If you wish to look at the messages received at your own speed, select "Display Log messages" via F9. The program continues to send/transmit in the background.

Display Log messages
In the "Log Message Display" window will be displayed: the Header, the date and the number of the first message and the number of messages. The output format can be selected via **View**.

With the cursor keys and the scroll bar you can page forwards and backwards. The cursor key Up/Down leafs one message back or forwards. The Page Up/Down keys move five messages backwards or forwards. If you press simultaneously the key Page up/down and the Key Shift, Control or Shift and Control then you move 50, 500 or 5000 messages backwards or forwards. The Home key displays the first (oldest) message. The End key displays the latest (newest) message. If the on-line reception overwrites the messages just being displayed, then the last message received will be displayed the next time that you leaf through the pages.