

Operating instructions

WinPP102 test program

WinPP102 is a test and simulation program for the transmission of integrated totals protocol IEC 60870-5-102. You can monitor the Messages of an existing link or simulate the Master or the substation.

WinPP102 receives, sends, checks, filters, stores, displays, prints and simulated IEC 60870-5-102 messages.

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1 Installation

Note: For the driver installation you must log on as Administrator.

System Requirements: Windows 7, Vista or XP, Pentium, 100 MB RAM, 100 MB Disc, VGA or better, at least one COM port (USB-Serial is possible) and USB port for dongle.

The setup program of WinPP102 is delivered on CD. On the CD the program is in the folder "Programme".

The file name is SetupWinPP102vnnnn.exe, nnnn stands for program version.

Par example: SetupWinPP102v2300.exe = Setup program for WinPP102 Version 2.3.0.0.

Insert the CD into the drive and start the program "SetupWinPP102vnnnn.exe", then follow the instructions on the screen.

The program makes an entry in the Program directory of the Start Menu for starting WinPP102. You can uninstall WinPP102 via the dialogue field "Properties of Software" (Menu: *Start > Settings > System Control > Software*).

After installation the following files are in the chosen directory:

WinPP102.exe	Test program
W102Text.ger	Program texts in German
W102Text.usa	Program texts in English
W102Ger.chm	German Online Help
W102Usa.chm	English Online Help
Bed102Ger.pdf	German operating instructions
Bed102Usa.pdf	English operating instructions
CbSetup.exe	Auxiliary program, installs the dongle driver.
ExText2.csv	File example for text of objects.
Typ2Ger.csv	File example for short texts of message types, German.
Typ2Usa.csv	File example for short texts of message types, English.
2Version.txt	Versions log of WinPP102 (German).
Log.lg2	Standard log file for online messages.
SeTel.st2	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 ("lg2" or "st2") as the program automatically appends them.

On exiting the program it saves the configuration specific to your PC in the file W102.cfg.

2 Overview

2.1 Function

WinPP102 is a test and simulation program for the transmission of integrated totals protocol IEC 60870-5-102. You can monitor the Messages of an existing link or simulate the Master or the substation.

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. Do you want to monitor the command and monitoring direction simultaneously, you need two COM ports. For simulation a COM port is sufficient.

For test purposes it can also be used as a "Format 1.2" or 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 be used without administrator rights.

Upon the first start, the program creates the "Data Directory" under "C:\MyDocuments\Users\User Data\PPFink\WinPP102\" and copies the "Log.lg2" and "SeTel.st2" 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 parameterize the following for example:

- Ø Program function (monitoring, master, station, byte receiver)
- Ø Length of link address
- Ø Structure of common address
- Ø COM Port, Baud rate
- Ø Use of the single control character E5
- Ø Transmit messages
- Ø Transmit lists
- Ø Plaintext of the common addresses (CSV-file)
- Ø Dial up modem commands

When storing or displaying messages you can filter them with respect to:

- Ø Message type, Cause of transmission, Quality descriptor
- Ø Common address, Object address
- Ø Time, Message number (and others)

The program reads the plaintexts of the common addresses from a csv file, format: "CA; common address; Plaintext;"; see example file "ExText2.csv" in the program directory. Select your csv file in the "File > CA Texts Load" menu. The currently used file is indicated in the status bar. Don't use the file names "BspText2.csv" and "ExText2.csv". These files are overwritten during each installation.

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.lg2" 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
Transmit message file	d:\east\SeTel.st2
Common address text file	d:\east\CAText.csv
Log file	d:\east\Ga.lg2

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). Specify directory and file name. Example:

"c:\Programs\WinPP102\WinPP102.exe online d:\east\ObjTexte.csv d:\east\SeTel.st2".

The parameters used last (Baud, COM number, function, ...) are 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.lg2, Log2.lg2, Log3.lg2, 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
- Ø Color of the ASDU type (highest priority).

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 3000 objects. 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 a single point information, message or lists of integrated totals 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, use private ASDU, send the check character incorrectly, etc., see Simulate faults.

2.2 Initial start

Place the Dongle onto the 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

Length of link address
Structure of common address
Signature present (type 2-7)

Parameterize Rec/Trans 1

Page 1

Function
Link address
Use of single character E5

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:

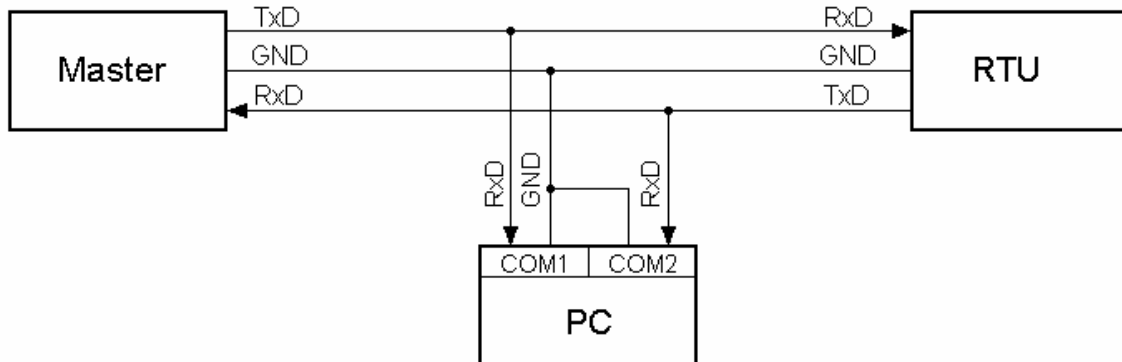
- Was the program installed with administrators' right?
- Is the dongle on LPT or USB present?

The error code e.n.n.n has the following meaning:

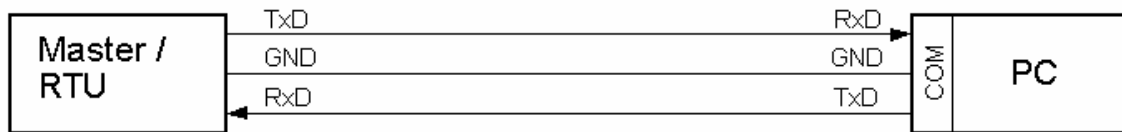
2, 1011 or 1034.n.n.n	Dongle not found.
1004, 1005 or 1006.n.n.n	Device driver not installed.

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

Monitoring wiring diagram



Simulation wiring diagram



With Simulation switched on the program causes a link to be established. You should see the polling and the answer messages.

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.

WinPP102 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 WinPP102 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 **WinPP102 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 the object table in the send list 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.

After the time, the time difference to the previous telegram is displayed, eg: d = 0.035 s means: The current telegram was saved 35 ms after the previous telegram.

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. The messages will be issued one below the other (scroll mode). The lower most is the newest message.

	Received	Error	Transmitt.	Error	L-Rec	L-Tr	COM	Baud	Function	Procedure
Rec/Tr 1	4	0	4	0	-	ok	4	9600	Master	unbalanced
Rec/Tr 2	0	0	0	0	-	-	-	9600	Monitoring	unbalanced

```

Online Messages, logical, with time, with link

18      PI 09:21:45,920 COM4 Start Master unbalanced 9600 Baud R1: 0/0 T1: 0/0
19      T1 09:21:45,933 d=0,013s
Link    : Request status      add=1 $49: res=0 prm=1 fcb=0 fcv=0
20      R1 09:21:45,968 d=0,035s
Link    : Status of link      add=1 $0B: res=0 prm=0 acd=0 dfc=0
21      T1 09:21:45,968 d=0,000s
Link    : Reset link          add=1 $40: res=0 prm=1 fcb=0 fcv=0
22      R1 09:21:46,006 d=0,038s
Link    : Single character    $E5
23      T1 09:21:46,007 d=0,001s      add=1 Link ok
24      T1 09:21:46,055 d=0,048s
Link    : Request data 2      add=1 $7B: res=0 prm=1 fcb=1 fcv=1
25      R1 09:21:46,103 d=0,048s
Link    : Requested data      add=1 $08: res=0 prm=0 acd=0 dfc=0
Type    : 70=End of initialization
Cause   : 4=initialized
Station : 0- 3 List=0
Object  : 7 RTU local reset
26      T1 09:21:48,987 d=2,884s
Link    : Request data 2      add=1 $5B: res=0 prm=1 fcb=0 fcv=1
27      R1 09:21:49,029 d=0,042s
Link    : Requested data      add=1 $08: res=0 prm=0 acd=0 dfc=0
Type    : 1=Single-point information with time tag
Cause   : 5=request/ed
Station : 0- 3 List=18
Object  : 12 ON id=0 WD=3 03.04.2013 09:21:48,997
    
```

Online Online messages Log filter: Off Output filter: Off Log: Log.lg2 Text: BspText2.csv

Online messages window

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.
L-Rec	Displays the Link status of the receiver. OK Link status is correct ??? Link status is faulty. - No simulation or COM port is not allocated.
L-Tr	Displays the Link status of the transmitter. OK Link status is correct ??? Link status is faulty. - No simulation or COM port is not allocated.
COM	Displays the parameterized COM port number. - No COM port allocated.
Baud	Displays the parameterized baud rate.
Function	Displays the parameterized function.
Procedure	Displays the parameterized transmission procedure.

The **Header** displays the kind of message, the filter function and the output format. The messages will be issued one below the other. The lower most is the newest message. 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 Menu 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.