

## Features

- Engineering tool box including disturbance upload, parameter setting, monitoring and configuration of REX 5xx transmission terminals
- The CAP 540 terminal tool box can be ordered with- or without the configuration tool, Remote Connection and Settings Visualisation Tool
- Configuration based on international standard IEC 1131-3
- Used for both protection and control terminals
- Used on a standard PC with MS Windows-running on the following operating systems: Win95, Win98, WinNT, Win2000 and WinXP Professional
- User-friendly navigation for all terminals within your project
- Features authority handling by use of three user categories
- Upload of disturbance data from the terminals and presentation of graphical data
- Parameter setting and simple monitoring of both internal and power system data
- Provides a graphical overview of the terminals' internal connections
- Direct documentation of the configuration
- Easy to change default configuration
- Access to all internal signals and measured values facilitates commissioning
- Manuals included on the installation CD

## Application

CAP 540 is used throughout all stages of normal operation from engineering, parameter setting, commissioning and power system disturbance evaluation. It can also be used to clear front indications, switch setting groups and turn autoreclosure on/off. The engineering work can be done off-line on the PC.

A disturbance upload and an analyzer tool is included in the tool box for fault data presentation. The package also contains the User's Manuals for all the tool components in pdf-format and Acrobat Reader in order to view the manuals.

The default configuration in the terminals can easily be adapted to the customer's needs with the configuration tool. The configuration consists of function blocks, logic gates and timers. The functions blocks included in a terminal are available in a library of functions, where the engineer can pick a function and connect it according to the requirements.

The configuration tool offers a compilation check to help the engineer to make a correct configuration.

The monitoring function provides an on-line check of all internal signals in a 500-terminal.

It offers a window into the terminal, where the commissioner can see all changes in signal status. With this tool, the commissioner obtains a powerful help.

It is also used by the control system constructor that for example adapts the interlocking logic to the switchgear configuration of the station.

The configuration can be printed on a user-defined form which gives documentation of the configuration that matches the terminal completely.

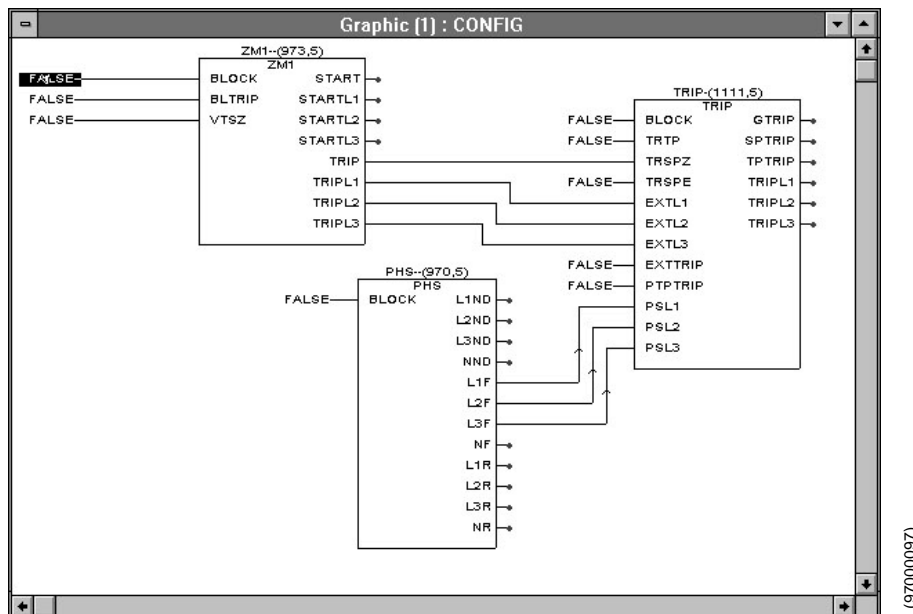


Fig. 1 Example configuration in CAP 531 of line protection terminal

With the parameter setting tool, you can read parameters from the terminal, edit the parameter values and write them to a terminal. You can also change parameter setting groups, compare terminal and PC-file parameters or edit your parameters in advance and write them to the terminal later when it is available.

In addition, an simple monitoring function with access to service values is included. The

simple monitoring functionality lets you upload several power system values like currents, voltages and frequency. Service values include list of terminal events, current status of internal signals, self supervision, LED status, etc. The tool can also monitor communication for the line differential function and display internal measurements from functions like the automatic reclosing function.

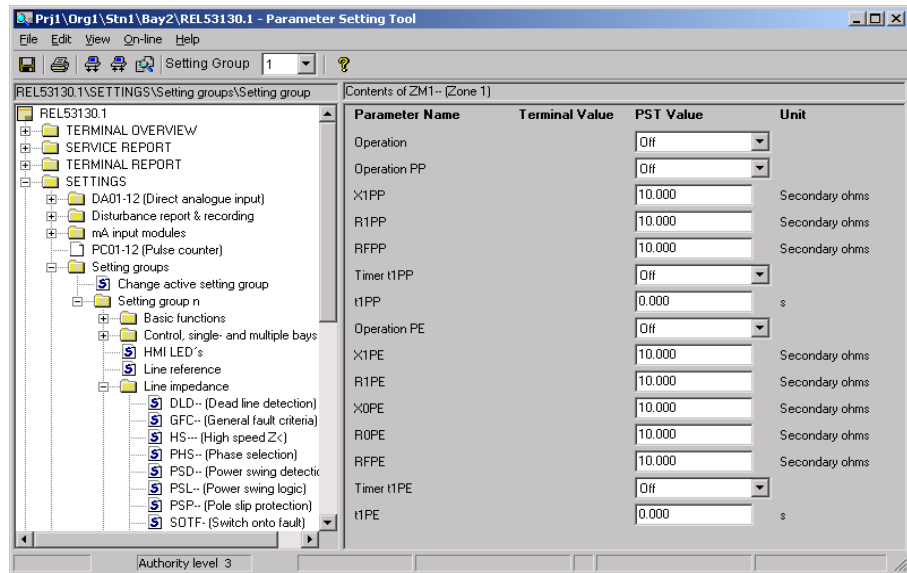


Fig. 2 Example parameter view in PST of line protection function

After the disturbance list has been uploaded the fault data can be uploaded and displayed with the graphical disturbance viewer and analysis program.

Curve forms and data can then be printed for documentation by the operator.

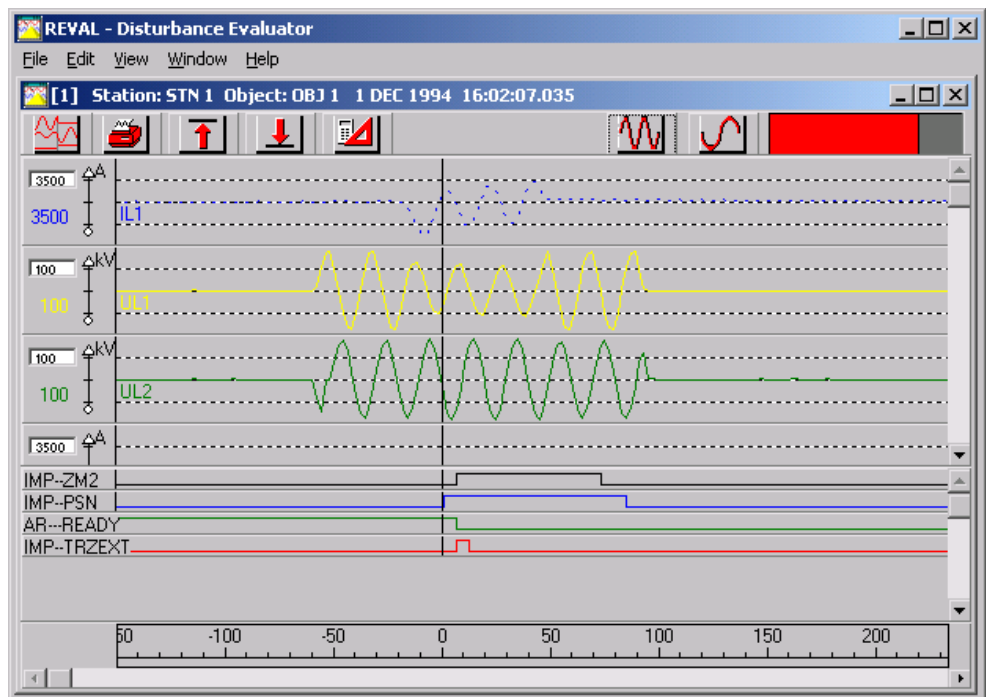


Fig. 3 Disturbance view.

Settings Visualisation Tool, SVT, is a tool for visualising PST steady-state parameters for under impedance protection functions. You can run SVT while editing parameters in PST and see the effect of the changes in the terminal settings. Analysis of the zones can also be carried out.

The program allows export of figures available in SVT to test set software by RIO-format de-facto standard. This file is supposed to be used by test equipment software and con-

tains zone characteristics and trip time.

Impedance measurement zones are cut by the General Fault Criteria, GFC, (if switched on) in the RIO-file. On the screen these characteristics remain the same, because SVT presents settings, rather than operation. It is also possible to export a graphical plot to the Clipboard. A plot displays a part of the impedance plane in accordance to the current scale and position. All zones and faults are shown on the plot.

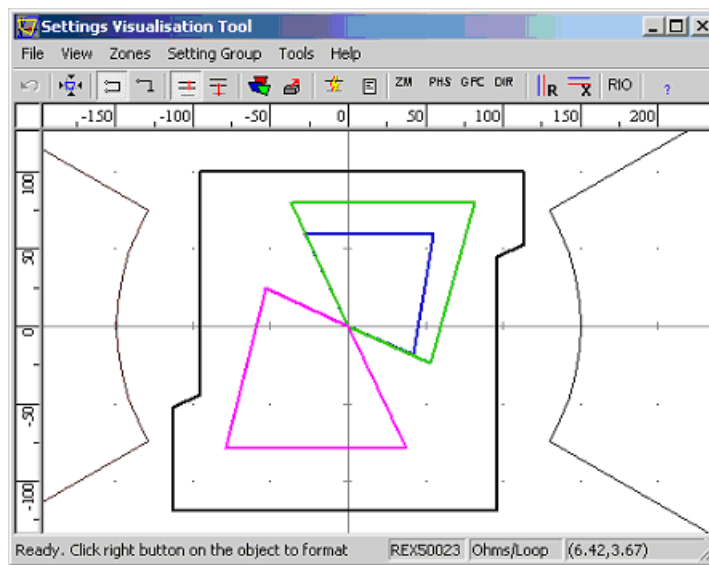


Fig. 4 Graphical view/plot

## Design

The design of the configuration, parameter setting, and disturbance handling tool package is modular, with a base tool – CAP 540 navigator, and a set of tool modules linked into this navigator. Configuration and Remote connection are optional modules.

Three levels of authority handling is built into the program. In addition, the configuration tool has its own password. Level 1 can only

view data and upload disturbance files. Level 2 can in addition manually trigger the disturbance recorder for test purposes and clear LEDs and indications. Level 3 can in addition change parameters, access configuration (if special password is known) and clear disturbances in terminal.

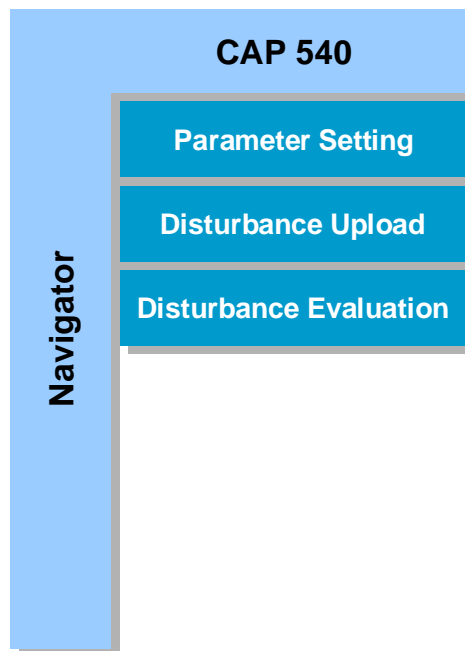


Fig. 5 Basic tool box package

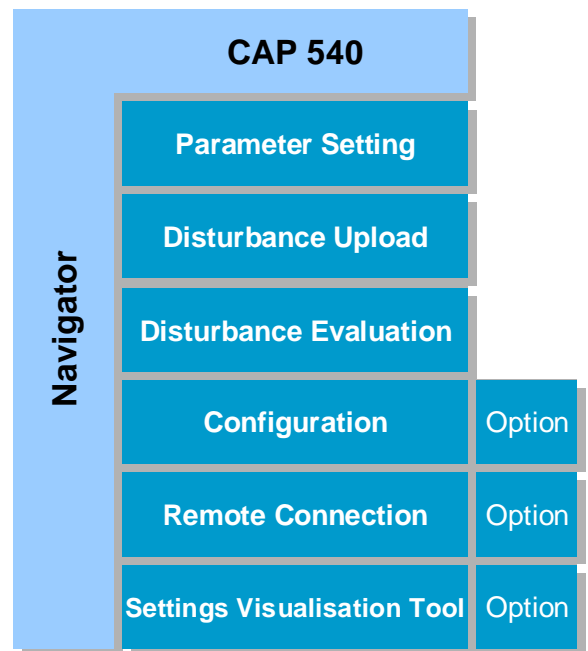


Fig. 6 Tool box with options

## Technical data

The PC should meet the following recommended requirements:

- Pentium processor
- 233 MHz or higher
- 128 Mb RAM or more available
- 500 Mb or more disk space available
- VGA compatible monitor, min. resolution 800 x 600, 256 colors
- Windows 95 (with DCOM 95), Windows 98, second edition (with DCOM 98), Windows NT 4.0 (service pack 4 or higher), Windows 2000 and Windows XP Professional, Service Pack 1
- CD-ROM drive for installation

## Supported terminals

Supported terminals	Parameter Setting	Setting Visualisation	Disturbance handling	Configuration
REOR 100 v 2.2 and 3.0	■		■	
REG 1xx v. 3.0	■			
REL 100 v. 3.0	■			
REB 551 v. 1.1 and later	■		■	■
REC 561 v. 1.0 and later	■		■	■
REL 5xx v. 1.0 and later	■	■	■	■
REO 5xx v. 1.2 and later	■	■	■	■
RES 505 v. 2.3 and later	■		■	■
RET 521 v. 2.0 and later	■		■	■

- No versions of REL 517, REO 517 and REx 5xx version 2.2 are supported by the Setting Visualisation Tool (SVT).
- Version 2.3, 2.4 and 3.1 of REx 5xx terminal versions support upload of configuration graphics.

## CAP 540 Architecture

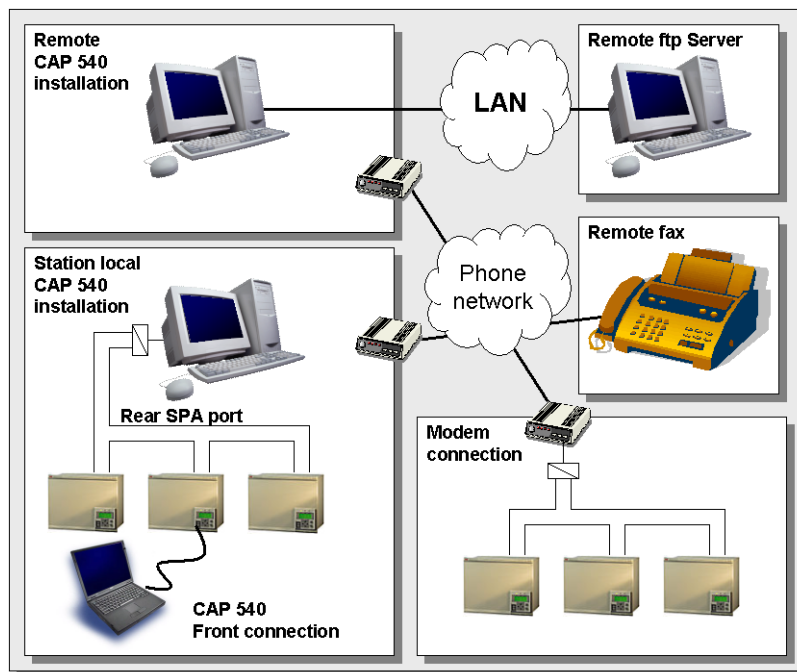


Fig. 7 CAP 540 architecture

CAP 540 supports the architecture shown in figure Fig. 7. Computers with CAP 540 installed can be connected to both the front and rear SPA port. When CAP 540 is installed on a station local PC automatic upload of disturbance data and transfer of disturbance reports to a remote fax is possible. It is also possible to only have a modem in the station. From the remote CAP 540 PC it is possible to

connect to both stations with a station local PC and stations with only a modem connection. In order to work with remote IEC 61131-3 configuration it is required to only have a modem connection in the station without the station local PC. With CAP 540 it is possible to post disturbance data in COMTRADE format on a ftp Server. This requires LAN/WAN connection.

## Ordering

Product specification:

The CAP 540 terminal tool box in its basic package delivered with disturbance upload, disturbance viewer, parameter setting, and simple monitoring. Configuration, Remote connection and Setting Visualisation Tool are options.

The basic package comes both as single license and corporate license. The corporate license includes 5 cd's. Both have the possible options of configuration, remote connection and Setting Visualisation Tool. A Corporate License entitles the user unlimited use in accordance with the Corporate License Agreement.

How to order: First specify single or corporate license, then specify options to include if needed.

The specified order will be delivered on a CD.

The manuals are distributed electronically on the same CD as the software. If paper copies of user manuals are needed they may be ordered separately.

<b>1. Specify basic package license</b>	<b>Medium</b>	<b>Ordering number</b>
CAP 540 v. 1.2 Single license (CAP 540 in it's basic package for single license can be downloaded from internet) or	CD      ___ pcs.	1MRK 002039-DB
CAP 540 v 1.2 Corporate license	CD <input type="checkbox"/>	1MRK 002039-EB
<b>1.1 Specify options</b>		
Configuration	<input type="checkbox"/>	1MRK 002061-AB
Remote connection	<input type="checkbox"/>	1MRK 002061-BB
Setting Visualisation Tool	<input type="checkbox"/>	1MRK 002061-DA
<b>2. Documentation</b>		
Printed documentation	Paper <input type="checkbox"/>	1MRK 002045-CB

## References

CAP 540*1.2 User's manual	1MRK 511 112-UEN
CAP 531*1.6 User's manual	1MRK 511 105-UEN
PST*1.2 User's manual	1MRK 511 114-UEN
REVAL*2.0 User's manual	1MRK 511 053-UEN
SVT*1.0 User's manual	1MRK 511 022-UEN

See the Buyer's Guide for each terminal in the REX 5xx series.

On-line information and updates can be found on the Internet site:

[www.abb.com/substationautomation](http://www.abb.com/substationautomation)

**Manufacturer**

**ABB Automation Technology Products AB**

Control & Force Measurement

Substation Automation

S-721 59 Västerås

Sweden

Telephone: +46 (0) 21 34 20 00

Facsimile: +46 (0) 21 14 69 18

Internet: [www.abb.com/substationautomation](http://www.abb.com/substationautomation)