

## SDA 2 Graphics Program for Comtrade- and RIO- Files

### 1 Application

Many digital protection devices offer the possibility to record disturbance data and take them over using a PC program. For graphical representation and moreover mathematical evaluation a standard file format „Comtrade“ for disturbance data is used:

**C**ommon **F**ormat for **T**ransient **D**ata **E**xchange for Power Systems.

This standard was standardized in 1991 from Institute of Electrical and Electronics Engineers, Inc., New York, USA (IEEE C37.111-1991).

Beside the disturbance data the handing over of distance protection devices characteristics to test equipment and graphics takes a leading part.

For that a common file format is the RIO-format of company OMICRON electronics: **R**elay **I**nterface by **O**MICRON.

SDA 2 is a graphics PC Software for representation and mathematical evaluation of data in Comtrade- (1991 version) or in RIO – format.

SDA 2 is successor of the proved SDA for up to date Microsoft's operating systems:

- Windows 9x
- Windows NT
- Windows 2000
- Windows XP.

The PC operating program COMM-3 allows both the data interchange and launching of SDA 2. Also Comtrade and RIO files created from predecessor versions COMM-2 or COMM-2+ can be displayed without problems.

### 2 Structure and Function

Comtrade data consist each of 3 data files with extensions as follows:

- \*.HDR  
Header data in the sense of a comment (not mandatory)
- \*.CFG  
Configuration data (details of the process and the channels)
- \*.DAT  
Measured values (samples for all channels)

RIO data consist of one data file with the extension \*.RIO.

The SDA2 program is able to extract the data to be represented from up to 64 analogues and up to 32 digital channels stored in a COMTRADE file. The representation allows showing at most 10 analogue and at most 10 digital channels.

The graphical representation is in the form of diagrams located one on the top of the other with a common time axis shown at the bottom of the screen. One of the windows contains all digital channels, whereas each analogue parameter is shown in a separate window the dimensions of which will depend on the number of channels shown. To assign the analogue channels to the individual windows, a dialogue box is used which allows arranging 2 curves into a common window making comparisons easier.

The colours are selected automatically in such a way that the currents, voltages and digital parameters will be easy to distinguish.

Each window has its own y-axis and shows the names and units of the channels represented. Sizing up the window to the whole display area, tem-

porarily, makes the recognition of details easier.

The representation comprises optionally the overall record of the process or any time segment of it. To select the time segment, two rulers are at user's disposal, which are moved inside the window using the keyboard or a mouse. When a ruler is moved, each window shows the values for the instant the ruler is currently positioned.

The scale for the analogue parameters is automatically determined so as to make an optimum use of each window area and to have (at option) the zero line centred. The user can select between individual scaling of each window and common scaling of similar parameters (voltages, currents). In the case of currents it is further distinguished between high voltage, low voltage and tertiary side.

Besides the diagrams, some additional details about the process to be examined are displayed on the screen.

The status window at the bottom of the screen shows the name of the station and the identification extracted from the Comtrade file.

The information window in the right margin of the screen displays general data such as date, starting time, trigger time and network frequency. Besides that, the initial time, the final time and the time difference of each the overall process, the visible area and the area marked (by the rulers). The mode of indication of these times can be changed over from absolute values to values relative to the starting time and vice versa.

For the alphanumeric indication of all values, a table is provided that covers the whole display area. This table contains the hour, the values of the



analogue channels and the values of the digital channels.

The comment (contents of the header file, if any exists) and a help information also can be viewed.

The mathematical analysis of analogue parameters extracted from a COMTRADE file comprises a statistics function as well as a Fourier analysis.

number :	1132	
invalid :	0	
maximum :	14.500	+220.000 ms
minimum :	-14.600	+320.000 ms
arithmetical mean :	-0.061	
effective value :	9.032	

Fig. 1 Statistics

The parameter to be analysed is selected by mouse click on the respective window. In the dialogue box that opens hereafter the desired function for analysis can be initiated.

The zone values (polygons) of distance protection device extracted from a .RIO data file are drawn into an R-X diagram. If the data file contains the respective data, the line impedance angle and the direction straight-lines also are inserted into the diagram.

For better discrimination between the individual zones, always one of them is made the current zone. This zone is coloured so as even to distinguish between LL (line-to-line) values (characteristics of the zone for faults without earth participation) and LE (line-to-earth) values (characteristics of the zone for faults with earth participation). Furthermore, for the current zone additionally information is displayed.

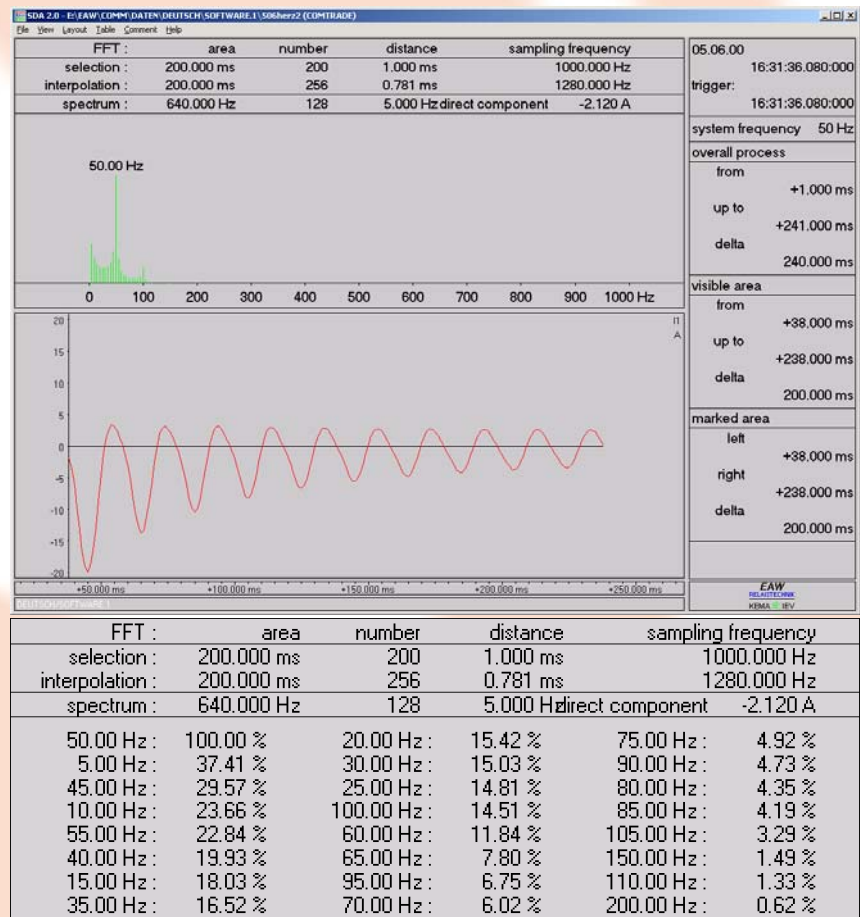


Fig. 2 Fast Fourier Analyse (FFT)

**Order Data**

**SDA 2 graphics software**

Pl.-No.: 1744 992 000

On supplied CDROM the user manual exists as a PDF-file.

**User manual SDA 2 printed version**

Pl.-No.: 1744 993 0-1

Language: 9 <sup>th</sup> digit	↑
German	0
English	1

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