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DR-COM

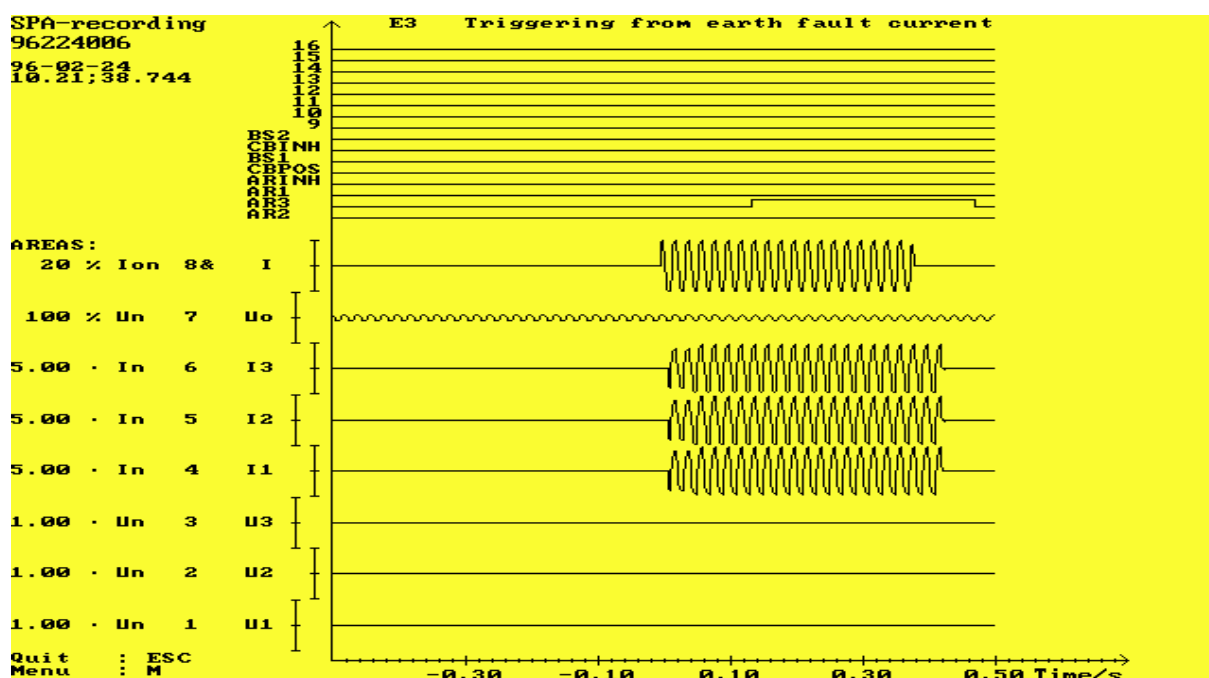
for SMS 010

User's Guide

SMS 010 DR-COM

program

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Contents	Page
1 WHAT IS DR-COM ?	7
2 USING DR-COM FOR THE FIRST TIME.....	10
3 CONFIGURING AND USING DR-COM.....	13
4 DR-COM EVALUATOR.....	23
5 DR-COM SPECIAL START-UP FUNCTIONS.....	30
A DIRECTORIES AND FILES IN DR-COM	36
B DR-COM SPECIFICATION.....	38
C RECORDINGS EXAMPLES ON DR-COM DISK 2.....	39
D TROUBLE SHOOTING	41
E APPLICATION NOTES FOR DR-COM V. 1.0 TO V. 2.0	43

Contents	Page
I THE SMS 010 CONCEPT	4
II DR-COM V. 2.0	5
III APPLICATION	5
IV CONDITIONS FOR USE	5
V COPYRIGHT	5
VI TRADEMARKS	6
VII DESIGNATIONS AND DEFINITIONS.....	6
 1 WHAT IS DR-COM ?	 7
1.1 A TYPICAL SYSTEM WITHDR-COM	8
1.2 DR-COM DATA FLOW.....	8
1.3 THE DR-COM FILE STRUCTURE.....	9
 2 USING DR-COM FOR THE FIRST TIME.....	 10
2.1 THE PARTS OF THE PRODUCT	10
2.2 INSTALLING THE PROGRAM.....	10
 3 CONFIGURING AND USING DR-COM.....	 13
3.1 CREATING A DR-COM STATION.....	13
3.1.1 Adding DR-COM stations.....	13
3.1.2 Configuring DR-COM stations	15
3.1.3 Configuring and using a modem	16
3.2 STARTING AND USING DR-COM	17
3.2.1 Using DR-COM, a brief introduction.....	17
3.2.2 DR-COM function screens.....	18
3.2.2.1 Common for all screens.....	18
3.2.2.1.1 MAIN SCREEN	19
3.2.2.1.2 STATION SCREEN	20
3.2.2.1.3 OBJECT SCREEN	21
3.3 DR-COM FUNCTION BUTTONS.....	22
 4 DR-COM EVALUATOR.....	 23
4.1 DRAWING	23
4.2 MENU FUNCTIONS.....	24
4.2.1 Starting time and length of the recording	25
4.2.2 Read recording	25
4.2.3 Edit drawing parameters.....	26
4.2.4 Select drawing parameters	28
4.2.5 Select printing mode	28
 5 DR-COM SPECIAL START-UP FUNCTIONS.....	 30
5.1 SOLVING THE APPLICATION STRUCTURE NAME AND'ORGANISATION' DIRECTORY	30
5.2 STAND-ALONE START FROM THE DOS PROMPT	32
5.3 DR-COM START-UP FROM AUTOEXEC.BAT	32
5.3.1 Start-up from AUTOEXEC.BAT with automatic return to DOS prompt	33
5.3.2 Start-up from AUTOEXEC.BAT with manual return to DOS prompt	34
5.4 STARTING DR-COM FROM OTHER PROGRAMS	35

A	DIRECTORIES AND FILES IN DR-COM	36
A.1	DISK 1	36
A.2	DISK 2	37
A.3	HARDDISK INSTALLATION.....	37
B	DR-COM SPECIFICATION.....	38
B.1	HARDWARE REQUIREMENTS	38
B.2	APPLICATION STRUCTURE AND DATA MEMORIES.....	38
B.3	COMMUNICATION	38
C	RECORDINGS EXAMPLES ON DR-COM DISK 2.....	39
C.1	CONTENTS	39
C.2	INSTALLATION PATH.....	39
C.3	ACQUISITION OF ENCLOSED RECORDINGS.....	39
D	TROUBLE SHOOTING	41
D.1	DIFFICULTIES THAT COULD OCCUR WHEN STARTING THE PROGRAM.....	41
D.2	PARTIAL COMMUNICATION INTERRUPTS.....	42
D.3	START-UP DIFFICULTIES DURING AUTOMATIC STARTUPS.....	42
E	APPLICATION NOTES FOR DR-COM V. 1.0 TO V. 2.0	43
E.1	DIRECT CONNECTION PC-SPA-ZC 22	43
E.2	SERIAL COMMUNICATIONS	43

I The SMS 010 concept

SMS 010 software as a whole consists of parametrisation, reporting and disturbance evaluation software. The separate software products are combined according to the needed functionality. Furthermore is communication equipment needed according to the system built-up. REPORT is also requiring a SACO 100 M or a SRIO 500 /1000 M data communicator.

The complete SMS 010 software package provides setting, reporting and disturbance evaluation facilities. The separate software products are combined according to the needs.

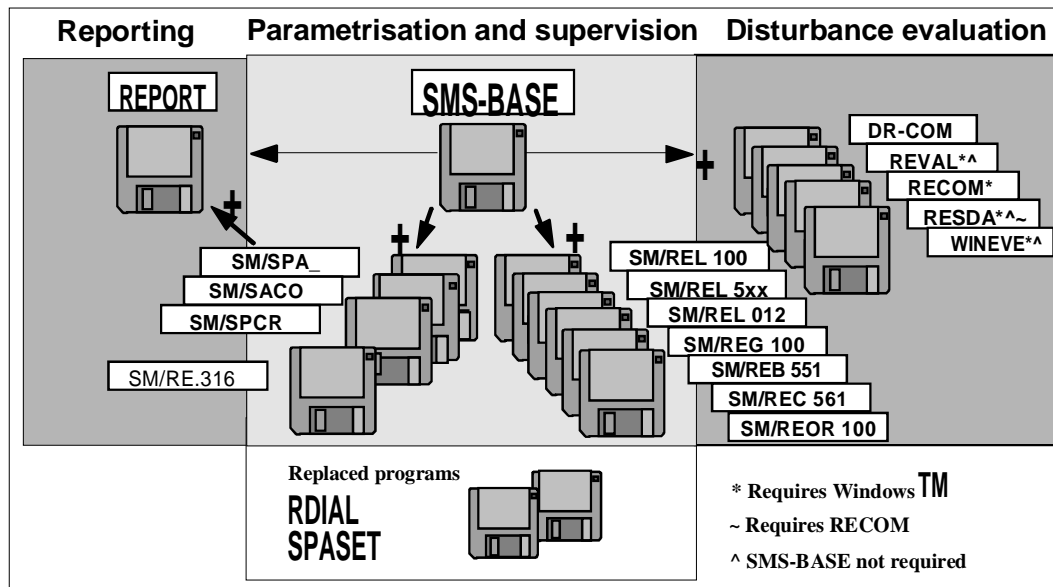


Fig. I.A SMS 010 software structure

SMS-BASE is the basic software that is always needed in order to run a SMS 010 application. It is a universal program for relays, disturbance recorders and annunciators. Other SMS 010 software modules are added to this program according to the requirements of the application. Depending on the types of protection in use, special software module/-s or programs are needed, e.g. SM/SPA_, SM/REL 100, REPORT, DR-COM, REVAL, etc.

SMS 010 enables the user to call a relay via a leased line, the public telephone system or, if he is in the station, via a direct optical fibre link to read relay data, events, disturbances and change settings. SMS 010 can also be made to communicate with a PC by connecting a cable to its serial port. For example, when using a SPAC 500/300 relay, it is possible to link SPAC to the PC by connecting the SPAC control module's RS-232 front panel interface to the PC's RS-232 port using the cable supplied with the SM/SPA_ package. The data read from the SPAC can then be examined in SMS 010.

The current power system load values, recorded values and relay settings can be viewed and the settings can also be changed.

The communication between the PC and the relay is based on the SPA protocol.

With the aid of the PC, it is also possible to create a file with relay settings which only takes a few minutes to download to the protection.

II DR-COM v. 2.0

DR-COM v. 2.0 is replacing earlier versions. Several changes have been made compared to previous versions. The DR-COM version 2.0 is now prepared for the directory structure used in SMS-BASE v.2.0. This means that DR-COM v. 2.0 is working with any SMS-BASE version, but older DR-COM versions aren't adapted to application structures made with SMS-BASE v. 2.0. DR-COM v. 2.0 is also capable of uploading recordings from all module versions of SPCD 2D55, SPCD 3D53, SPCR 8C19, SPCR 8C27, existing at the release moment of DR-COM v. 2.0.

The switches enabling DR-COM to be run stand-alone, automatic (re)startings etc. are increased, color handling is improved, the concept unload is replaced by upload and finally the COMTRADE format used is also updated by minimum and maximum values.

III Application

This User's Guide is applicable to DR-COM Version 2.0.

This User's Guide describes the normal application of the software product DR-COM v. 2.0.

Reference should be made to the specific documentation for details of communication hardware and its connection. Those mentioned in this guide are only by way of example.

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SM/SPA_	ABB Transmit Oy, Relays & Network Control Division, Finland
SM/SACO	ABB Transmit Oy, Relays & Network Control Division, Finland
SM/SPCR	ABB Transmit Oy, Relays & Network Control Division, Finland
IBM	International Business Machines Corporation
EGA	International Business Machines Corporation
VGA	International Business Machines Corporation

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VII Designations and definitions

Relay	PYRAMID relays
SMS 010	A system for setting of parameters, measuring, monitoring, event reporting and disturbance uploading and evaluation
SMS-BASE	The basic software needed to run SMS 010 applications
Application structure	The configuration of stations, protected units, relays and parts of relays and data storage for the relay parts for a particular application
SPA	Data bus and protocol for communication between a 'Master' and a number of 'Slaves'
Master	A unit requesting information
Slave	A unit responding to the requests from the 'Master'
Modem	Two-way converter at a signal interface
Phone modem	Modem between RS-232 and teleline corresponding to the CCITT specification
Fibre modem	Modem for RS-232 between an electrical and a optical fibre communication link
Data set	A block of data transferred by a relay to a PC
COMTRADE	Defines a standardized format for storing digital records of transient events
File name	8 characters or less followed by an extension
Extension	3 characters or less defining the type of file
.	The 'extension' starts with '.' and is abbreviated as 'Ext'
.INS	'Ext' for acquired 'installed values'
.VAL	'Ext' for observed 'validated values'
.CFG	'Ext' for COMTRADE header files
.DAT	'Ext' for COMTRADE data files
.REC	'Ext' for DR-COM evaluation files
.HDR	'Ext' for the REVAL header files
Window	A defined part of the screen
Default value	Value used when no other value specified
Password	Personal code entered by a user to permit him to modify relay settings
Chapter	Principal part of this guide
Section	Part of a chapter

1 WHAT IS DR-COM ?

DR-COM, (Disturbance Recorder COMmunication), is a software product that is used for collecting recordings from disturbance recorders, (SPCR 8C19, SPCR 8C27, SPCD 2D55 and SPCD 3D53), in the SMS 010 Station Monitoring System. The evaluation of these recordings can be done by a built in evaluator for 8 analog and 16 digital channels, (SPCD 2D55 has 8 analog and 12 digital, SPCD 3D53 has 6 analog and 11 digital, while SPCR 8C27 has 8 analog and 8 digital channels). The recordings uploaded by DR-COM are also stored in COMTRADE format, which is used by e.g. REVAL. However, COMTRADE format isn't used by DR-COM. It can therefore not evaluate COMTRADE recordings made by other programs.

DR-COM can be run continuously, performing the uploading according to the settings in 'DR-COM station configuration'. The benefit of automatic uploading is that the recordings are uploaded by appearance and this is also saving time for the operator. The recordings are already securely saved on the harddisk by the program and ready for evaluation when the operator arrives. Yet another advantage is that the recorder memory is released from the recordings and ready for collecting new disturbances. (SPCD 2D55 and SPCD 3D53 can record one recording each).

DR-COM can also be started in stand-alone mode or automatically, either directly from the DOS prompt or by adding command lines to the AUTOEXEC.BAT file. This means that when the operator turns on the PC, the DR-COM program will start without further measures. DR-COM can also be started within other programs, e.g. REPORT. Chapter 5 in this User's Guide is describing these start-up switches and the settings of these. Refer also to REPORT for the setting of the SCHEDULER file SPAREP.SCH that starts SCHEDULER programs.

The great advantage with the automatic restart is however for an unmanned SMS 010 station if a power failure occurs. An automatic restart of DR-COM will right away start the uploading recordings, and no waiting for an operator to start the system is required. The SPCR 8C19 and SPCR 8C27 saves the recordings also during a power failure, (battery back-up), but the SPCD 2D55 and SPCD 3D53 modules will lose their disturbance recordings if the power is disconnected. SPCD 2D55 and SPCD 3D53 will also lose their date and time settings, i.e. they will have to be synchronised again in order to get the date, hours and minutes. This is done from 'Select function'/'Synchronise time' on the module level in SMS-BASE. (Has to be done separately for each module). The synchronising function described in section 3.1.2 in this manual is when synchronising SPA relays sending seconds and milliseconds.

The disturbance recorders are not registering more recordings, when an uploading is performed.

The setting of the disturbance recorders, (parameters, triggering, channels to supervise etc.) is done by SMS-BASE and corresponding module/-s in the application structure.

Reference should be made to the specific documentation for details of communication hardware and its connection. Those mentioned in this guide are only by way of example.

1.1 A typical system with DR-COM

The DR-COM software can run on a PC that is connected either directly via cable or via telephone modems to one or several disturbance recorders, (Fig. 1.2.A) .

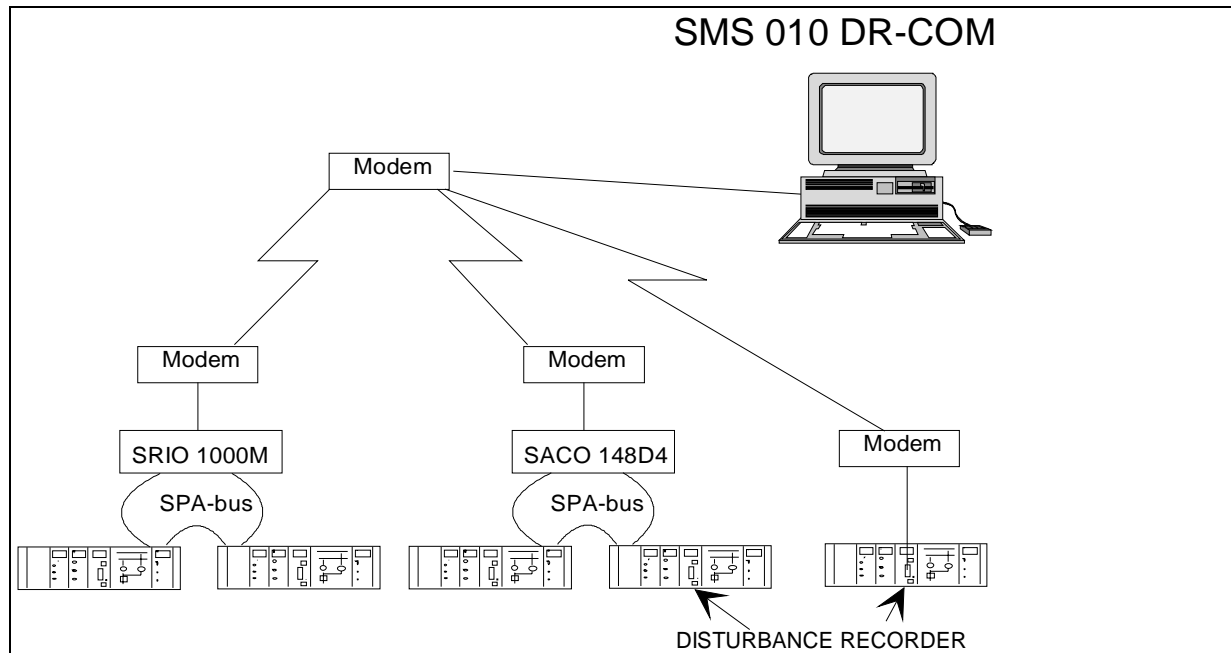


Fig. 1.1.A An example of a system including DR-COM utilizing modem connection.

Note ! In Fig. 1.1.A are modems used, but the PC could also be connected directly to the SRIO 500/1000 M or SACO 100 M data communicators. The third possibility is to bypass these previous mentioned solutions and connect directly via a cable to the front of a disturbance recorder and upload the recordings from one module and repeating the procedure for each disturbance recorder.

1.2 DR-COM data flow

In a SMS 010 system which includes DR-COM, data is stored in the disturbance recorder units and in the PC. DR-COM uploads the recordings from the disturbance recorders, (SPCR 8C19, SPCR 8C27, SPCD 3D53 and SPCD 2D55), to a PC.

In DR-COM, an 'Application structure' is defined as the representation of the relays in the real power system structure. It is configured using SMS-BASE.

A file stored by the DR-COM program has a name of the following type:

YYMDDNNN.EEE

where:

- YY is the year of the time tag in the trigger information (0..99).
- M is the number of the month in the trigger information in hexadecimal format (1..C).
- DD is the number of the day in the trigger information (0..31).
- NNN is the disturbance number as assigned by DR-COM and stored in decimal format
- EEE is the extension identifying the COMTRADE FORMAT (CFG), e.g. 94726031.CFG

1.3 The DR-COM file structure

REVAL and DR-COM use the following file structure for storing disturbances:

Recording file path: See fig. 3.1.2.B.
 Station name: The name of 'Station' in which the object is located.
 Object/bay name: The name of 'Object/Bay' in the unit and module are located.

E.g. C:\REVAL\VAASA\SUNDOM\94614001.CFG

or

C:\BALDO\GREGER\96220008.CFG (No 'Recording file path' is given, Fig. 3.1.2.B)

or

C:\SMS\DR-EX\PROTMO\FEEDER4\96213007.CFG

In the last example is PROTMO the 'Station' name, while FEEDER4 is the name of the 'Object/Bay'.
 C:\SMS\DR-EX is the 'Recording file path' given in the DR-COM station configuration.

Depending on the path given for 'Recording file path', (Fig 3.1.2.B), will the amount of directories in the path vary, because the DR-COM program always adds 'Station' name and 'Object/Bay' name.

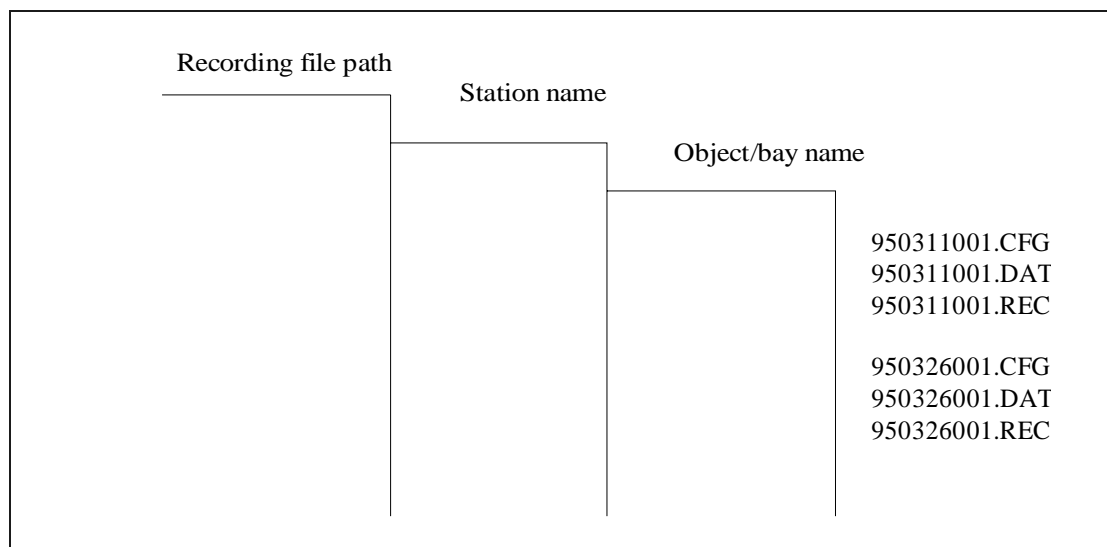


Fig. 1.3.A The DR-COM file structure. Each recording consist of 3 files.

2 USING DR-COM FOR THE FIRST TIME

Before DR-COM can be used for the first time, the software has to be installed on the hard disk of the PC. Other programs and module packages needed for DR-COM is SMS-BASE and/or SM/SPA_ if SPAD 346 is used and correspondingly SM/SPCR for SPCR 8C19 and SPCR 8C27 modules.

This User's Guide assumes that the user is familiar with using Personnel Computers, (PC's). The standard installation procedure is presented in detail and some alternatives are briefly discussed.

2.1 The parts of the product

The DR-COM product is supplied in a binder containing this manual and two floppy disks. The contents of the disk with the DR-COM software is presented in detail in Appendix A. DR-COM disk 1 contains the actual programs, while DR-COM disk 2 contains an example of an application structure and some uploaded disturbance recordings.

2.2 Installing the program

Installation of the DR-COM software system involves copying files from the floppy disk to the hard disk 'C:'. The installation procedure presented below assumes that the files are being loaded from the 'A:' drive, but any other 3½" drive may be used.

The program files can also be installed to a directory on an other drive than the C: drive.

In Brief :

The normal sequence when installing the program for the first time is:

- 1 Insert floppy disk 1 in drive A:.
 - 2 Change the command prompt to A:>.
 - 3 Determine the main memory and hard disk space by using 'RESOURCE'.
 - 4 Compare the result with the requirement for DR-COM given in Appendix B.
 - 5 Run the installation program 'INSTALL' on the floppy disk.
 - 6 Press 'ENTER' to install DR-COM in the path 'C:\SMS\.
 - 7 The files are now installed on your hard disk.
 - 8 The example structure is installed on your hard disk.
 - 9 Change the command prompt back to C:.
-

If DR-COM already exists on your hard disk, the installation program checks its version and providing it is older, starts to update it to the new version. Should the existing version be the same as the version on the disks, the message 'Program is up-to-date!' is displayed.

The detailed presentation of the installation sequence which follows assumes that the command prompt is set to show the current directory, i.e. "PROMPT=\$P\$G" is set in your AUTOEXEC.BAT file. The steps of the brief list of operations above are used as headings in the following detailed explanation.

IMPORTANT to know before installation of SMS 010 products !

If the harddisk of the PC is defect the installation program might perform an uncompleted installation. The DOS command **CHKDSK**, (**CHKDSK/F** can repair minor faults), can be used to clarify if the harddisk is defect. **SCANDISK** is another command possible to use.

Note!

SMS-BASE must always be installed before DR-COM !

1. Insert floppy disk 1 in drive A:
2. Change the command prompt to A:>


```
Computer - C:\>
User      - C:\>a:      followed by <Enter>
Computer - A:\>
```
3. Determine the main memory and hard disk space using 'RESOURCE'.


```
User      - A:\>c:\sms\base\resource      followed by <Enter>
```

The following screen appears:

```

===== ABB RELAYS SMS RESOURCE =====
RESOURCES OF THIS PC
- MS-DOS version 5.00

- Basic primary work memory available:      538      kbytes

- Available space at hard disk C:           7.3      Mbyte

Info: The figure for the available basic primary work
      memory does not include the size of this program
                                           Version 1.0
=====

```

A:\>

Fig. 2.2.A 'Resource' shows how much memory is available.

4. Compare the result with the requirement for DR-COM given in Appendix B. Compare the available space to that required according to Appendix B. There is no sense in continuing with the installation unless there is sufficient main and hard disk memory space!
5. Run the installation program 'INSTALL' on the floppy disk


```
Computer - A:\>
User      - A:\>install      followed by <Enter>
```

The following screens are then displayed:

6. First you select the SMS-BASE home directory:

```

=====Path for your SMS-BASE ?=====
C:\SMS\
=====

```

7. The program is now installed your hard disk:

```

=====Installing/Updating program...=====

```

Fig. 2.2.B Installing the program files

Installation of DR-COM on your hard disk is now complete:

```
=====
New program installed !
Press any key to continue
=====
```

8. The second disk includes an example application structure which is a help when using the program for the first time.

Use for instance C:\SMS\DR-EX\ as path for the application structure or give an own name for the purpose. Recommendation: Use C:\SMS\ as home directory, then you will always have your applications, if many, located at one home directory. Select 'Custom path' when entering the new path, (a maximum of 8 characters is allowed, DOS limit).

The installation can be performed continuously or separately by the INSTALL command at the floppy disk station. Select the path for your application structure.

There are no other limits than the free harddisk space for the amount of installed application structures, which means that it is possible to install the enclosed application examples from other programs, as well. Select 'Custom path' and give the new application name. Notice that it is always the last installed application that will be used, when starting the SMS-BASE program. Changing between different application structures is done within the SMS-BASE program, '**SETUP**/'**Appl. struct. path**' where a new or existing appl. struct. path can be given. Confirm the change by selecting '**SETUP**/'**Save setup**'. Another possibility is '**UTILITIES**/'**Alter application structure**/'**S = AS handling**', (available from SMS-BASE v. 2.0).

9. Change the command prompt back to C:

```
C - A:;>
U - A:;>c:      followed by <Enter>
C - C:;>
U - Remove the last floppy disk from drive A:.
```

How to start DR-COM is described in section 3.2.

Providing you used the default paths and depending on what relays are installed, the hard disk will have the following directory tree after the installation has been completed:

C:\SMS\BASE\		Home directory of the SMS-BASE system
	SUPPORT\	SMS-BASE auxiliary programs
	MODULES\	Descriptions
		OTHER\
		MODEM\
		DRCOM\
		SPCR\
C:\SMS\DATA-EX\		Descriptions of non-SPA modules and relays
C:\SMS\DRCOM		Description of modem
		Description of DR-COM station
		Description of SPCR modules
		Application structure data

The C:\SMS\BASE\MODULES\SPCR\ directory is created only by installing SM/SPCR, but is listed because the SPCR 8C19 and 8C27 module configuration files are essential for setting up the SPCR 8C19 and 8C27 disturbance recorders.

3 CONFIGURING AND USING DR-COM

This chapter describes the procedure for all the DR-COM menu and function key selecting operations. The application structure in this chapter is configured using the 'Alter application structure' option which is selected from the SMS-BASE 'UTILITIES' menu.

As described in Fig 3.A is the SMS-BASE program started, (it is assumed that you already have installed SMS-BASE and some example application structure). In this user's guide is a ready-made application structure being used. How you can make an own application structure is described in the SMS-BASE User's Guide, ('UTILITIES'/'Alter application structure' section).

```

C - C:\>
U - C:\>cd SMS\BASE           followed by <Enter>      changes directory to ..\BASE\
C - C:\SMS\BASE>
U - C:\SMS\BASE\SMSBASE       followed by <Enter>      starts SMS-BASE

```

Fig. 3.A Starting the SMS-BASE program. C equals Computer and U equals User.

How to start DR-COM is described in section 3.2. Before you can start using DR-COM you will have to add a DR-COM station to each 'Station' where the disturbance recorders are located and the station configuration be made. This is however done at the 'Object/Bay' level, but valid for all 'Object/Bay's in the 'Station'. *Please note in Fig. 3.1.1.A and 3.1.1.E that 'DR-COM station' is forming an own 'Object/Bay', separated from the relays and disturbance recorder modules.*

3.1 CREATING A DR-COM STATION

3.1.1 Adding DR-COM stations

The stations to be polled by DR-COM must first be added and configured by using SMS-BASE. When the application structure is configured (refer to SMS-BASE User's guide, 'UTILITIES'/'Alter application structure'), a 'DR-COM STATION' for the 'Station's to be polled must be added. The adding of the 'DR-COM station' item is done at 'Select Object/Bay' level. Adding mode is accomplished by the <A> button and the 'DR-COM station' or another text can be typed.

<pre> ===== Select Organization ===== ABB Net Select Station ===== Wasa Vasklo ===== Select Object/Bay ===== Cubicle 32 North West Corner Cubicle 36 Market Square Report Station ===== Create a new menu item ===== DRCOM station </pre>	<pre> SMSBASE directory: C:\SMS\BASE\ Appl. data directory: C:\SMS\WASA\ </pre>
<pre> Organiz: ABB Network Partner Station: Wasa C/ALT+D/P=Change/Delete/Print comm. parameter E=Edit A=Add D=Delete ESC=previous level ENTER=select </pre>	

Fig. 3.1.1.A Adding a DR-COM station for Wasa at the 'Select Object/Bay' level

Select the previously added item, (DR-COM station), and continue to next level by <Enter>. Press <A> button and the quick adding of units window is shown, (Fig. 3.1.1.B).

```

===== Select Organization =====
ABB Network Partner
===== Select Station =====
W
V
A Manual Entry      SACO 16D3      SPAC 310
DRCOM STATION       SACO 64D4      SPAC 311
MODEM               SPAA 120       SPAC 312
OTHER               SPAA 121       SPAC 315
REG100 3.X          SPAA 320       SPAC 316
REG110 3.X          SPAA 321       SPAC 317
REL100              SPAA 322       SPAC 320
REPORT STATION      SPAA 323       SPAC 330
SACO 148D4          SPAA 330       SPAC 331
SACO 16A3           SPAA 331       SPAC 335
SACO 16D1           SPAA 337       SPAC 336
SACO 16D1B          SPAA 341       SPAC 510
SACO 16D2           SPAA 345       SPAC 520
SACO 16D2B          SPAA 348       more..

Organiz:  ABB Network Partner
Station:   Wasa
Obj/Bay:   Cubicle 32 North West Corner

C=Create communication parameters      ESC=quit      ENTER=select

```

Fig. 3.1.1.B Selecting DR-COM STATION at the 'Select Unit' level for Wasa

```

===== DRCOM STATION Configuration =====
Do you want to add this 'Unit' into your
application data structure (Y/N) ? Y

```

Fig. 3.1.1.C Confirming the adding of 'DR-COM STATION' at the 'Select Unit' level for Wasa

After the DR-COM station 'Unit' has been added, continue to the 'Module/Part' level and give the address for the 'DR-COM STATION', (Fig. 3.1.1.D). The address must not be used by any other unit in the application structure.

```

===== Setting SPACOM slave address =====

Old Default address: 001
New Default address: 360

```

Fig. 3.1.1.D Changing the DR-COM station slave address at the 'Module/Part' level for Wasa

In fig 3.1.1.D is the address for the 'DR-COM station' given to 360, but this address is not used for communication, because 'DR-COM station configuration' is no communicating module itself ! In this case could any free address be used, e.g. 318 or 340 or...

The 'Station' Wasa can now be configured as a DR-COM STATION via the SMS-BASE 'SELECT' menu, also refer to section 3.1.2 in this manual.

Refer to the SMS-BASE User's Guide for setting of the communication parameters, ('UTILITIES'/'Alter application structure'). Normally are the communication parameters set at the 'Station' level, because they will be valid for the entire 'Station'.

```

===== Select Organization =====
ABB Network Partner
===== Select Station =====
Wasa
Vasklo
===== Select Object/Bay =====
Cubicle 32 North West Corner
Cubicle 36 Market Square
Report Station
DRCOM station

SMSBASE directory:
C:\SMS\BASE\

Appl. data directory:
C:\SMS\WASA\

===== Edit communication parameters =====
Phone no: 1707 1707
Connection: Direct Direct
Serial port: COM1 COM1
Protocol: SPA SRIO
Baud rate: 9600 9600
Parity: EVEN NONE
Data bits: 7 8
Echo: IGNORE IGNORE
Handshake: NONE NONE
Stopbits: 1 1

=====
SPACE=next value ESC=quit ENTER=save

```

Fig. 3.1.1.E Example communication parameters for the DR-COM station Wasa

In Fig 3.1.1.E are default settings for SPA given to left in present values and SRIO settings to the right in new values. If you have a SRIO 500/1000 M or SACO 100 M connected, you should use SRIO settings, otherwise you manage with SPA protocol and corresponding settings.

A special case is the front panel connection of SPCR 8C.. modules, which can use both 7 or 8 databits for the SPA settings. The actual settings can however be checked from the front panel display. Refer to the SPCR module manuals if necessary.

3.1.2 Configuring DR-COM stations

Select the DR-COM STATION Wasa from the SMS-BASE main menu 'SELECT' (Fig. 3.1.2.A). After opening the 'Select function' window, press <Enter> to open the configuration window for DR-COM station Wasa.

```

SELECT      UTILITIES      ABOUT      SETUP
=====
Select Organization=====
ABB Network Partner
===== Select Station =====
Wasa
Vasklo
===== Select Object/Bay =====
Cubicle 32 North West Corner
Cubicle 36 Market Square
Report Station
DRCOM station
===== Select Unit =====
Cub DRC
Rep DRC
DRCOM st
===== Select Module/Part of Unit =====
DRCOM STATION Configuration
===== Select function =====
DR-COM Station settings [360]

Organiz: ABB Network Partner
Station: Wasa
Obj/Bay: DRCOM station
Unit: DRCOM STATION Configuration
Module: DRCOM STATION Configuration [360]

F7      F8      Enter      Esc
REPORT  DOS     SELECT   EXIT

```

Fig. 3.1.2.A Opening the configuration window for DR-COM station Wasa

All parameters which can be set for a DR-COM STATION are displayed on one screen. Both 'Present values' and 'New values' are listed. The currently valid settings are visible in the 'Present values' window and the 'New values' can be entered by the user.

```

=====SPCR STATION===== v 2.0 =====Screen 1 of 1
SPCR station settings                                     19.02.1996

Present values
-----
Recording file path -----
C:

No = Synchronize SACO/SRIO
Yes = Poll this station

Station polling settings-----
11.10 hh.mm = Poll start
0.01 hh.mm = Poll interval

Recording file path. ||

PC-file time 30.11.1994 14.22
New values
-----
Recording file path -----
C:\RECS

No = Synchronize SACO/SRIO
Yes = Poll this station

Note -----
Recording file path: We recommend
to use the hard disk.

Station polling settings-----
11.10 hh.mm = Poll start
0.20 hh.mm = Poll interval

```

Fig. 3.1.2.B Settings for DR-COM STATION Wasa

If you select 'Yes' in the 'Synchronize SACO/SRIO' field and 'Protocol' has been set to 'SRIO' in the 'Edit communication parameters' window of the 'Station' (Fig. 3.1.1.E), will DR-COM once a day send synchronizing time taken from the PC to SACO/SRIO. If the 'Protocol' has been set to 'SPA' is DR-COM sending synchronization message, (seconds and milliseconds) to all modules. Full date and time synchronisation of each disturbance recorder module is done from the module level in the SMS-BASE application structure by selecting 'Synchronise time' in the 'Select function' menu for concerned module. This will send date, hour, minute, seconds and milliseconds taken from the PC clock.

The 'Station polling settings' field is meant for determining when and how often a 'Station' should be polled. The resolution of the interval is one minute. If the 'Poll interval' is set to 0.00, the 'Station' will be polled as often as possible.

'Recording file path' is determining where the uploaded recordings should be saved. Section 1.3 exemplifies the storing of DR-COM recording files. A maximum of 8 characters is accepted by DOS as directory name. The recommendation is that the data should be saved on the harddisk, while this is the fastest solution and normally provides with enough disk space.

If the path is changed by giving different names from one time to another will the files when stored be located in different directories. By changing back to some path name used before will the corresponding recordings be listed again in DR-COM Station and 'OBJECT SCREEN's, but this is only possible when using the same application structure and same 'Organisation' with the 'Station' and 'Object/Bay' names as when the recordings where uploaded and saved.

It is never necessary to add 'Station' and 'Object/Bay' path names, because these are automatically detected or added.

The full path for the saved recordings is necessary to know only when wanting to evaluate these recordings from an application structure or 'Organisation' other than the actual used, or when using e.g. REVAL.

3.1.3 Configuring and using a modem

Details of how to configure a HAYES compatible modem are to be found in the SMS-BASE User's Guide.

The modem dials the telephone number set in the 'Station's communication parameters by using SMS-BASE. When DR-COM is run in a continuous session will dialling, (and hang-up), be done according to the polling times set in 'DR-COM station configuration'.

3.2 STARTING AND USING DR-COM

Once the DR-COM station has been configured, the program is started by choosing the SMS-BASE 'SELECT' menu, selecting 'Organisation' and pressing the function key F5 (Fig. 3.2.A).

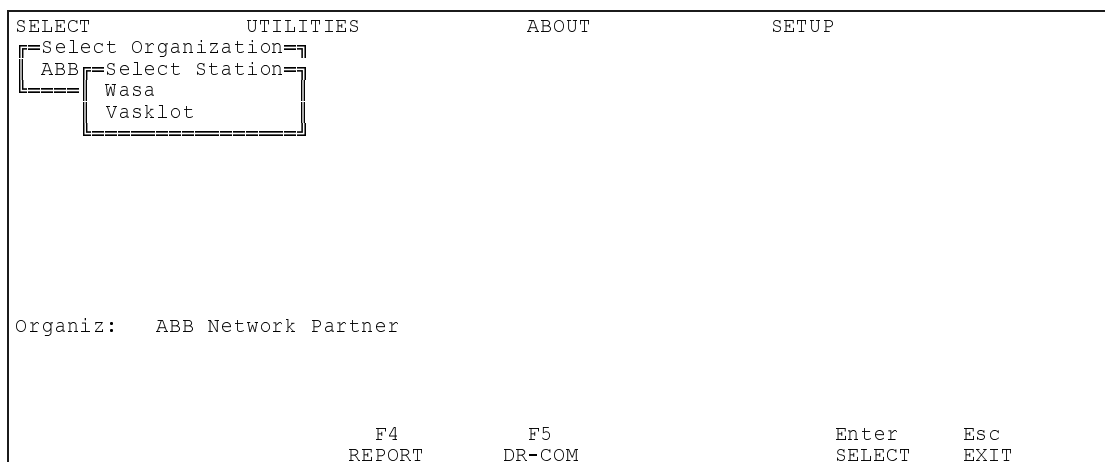


Fig. 3.2.A Starting DR-COM from 'Organisation' level by <F5> button.

NOTE! If the DR-COM is started by function key F5, it uploads automatically recordings from all specific 'Station's according to the 'DR-COM station configuration'. If you do not want to upload automatically, start the DR-COM on the module level (select 'Upload recordings').

DR-COM trouble shooting for solving start-up difficulties is described in appendix D, section D.1.

3.2.1 Using DR-COM, a brief introduction

When DR-COM is started from <F5> button an automatic uploading of disturbance recorder recordings will be performed for those 'Station's that are located within selected 'Organisation'. They will be polled one after another, and this is continued according to the 'DRCOM station configuration', (time settings). By starting DR-COM at module level, (Upload recordings (DR-COM)), has the recordings to be uploaded on request. In both cases can the uploading be interrupted by <Esc>, (temporarily by automatic uploading) and 'F3=Stop poll', (permanently until released again with 'F3=Start poll').

DR-COM will always by start-up contact the disturbance recorder modules in actual 'Organisation', (on module level to current module and solely on command). If the communication for some reason isn't working, or hasn't been connected at all, will in both situations a message be given that informs that no contact to address [] and module type [] was established, accomplished by an audible signal. Even though no connection is obtained it is possible to continue the DR-COM program and evaluate earlier uploaded recordings.

When new recordings are uploaded they will be saved according to path given in 'DR-COM station configuration' and furthermore add corresponding 'Station'-name and 'Object/Bay'-name. If this path is changed, will the files be saved at the new location, though adding the same 'Station'-name and 'Object/Bay'-name, as long as these names are unchanged. When you want to evaluate recordings stored from current application structure, but stored at another 'Path for recordings', you simply change this path in the DR-COM station configuration, Fig 3.1.2.B. Omit the 'Station'-name and 'Object/Bay'-names when giving the path.

Since the recordings are stored according to 'Station' and 'Object/Bay' it is not possible to list more recordings than the recordings stored under the 'Path for recordings' given in the DR-COM station configuration. When the recordings are made from the same 'Organisation', but with different 'Station's, the corresponding 'Station' with recordings can be selected at the 'STATION SCREEN' and the files for selected 'Station' are displayed and at your disposal in the 'OBJECT SCREEN' and can be evaluated by 'F1=Evaluate' button.

When you want to evaluate a recording is the easiest way to mark it with the cursor in the 'OBJECT SCREEN' and evaluate by the <F1> button. When wanting to evaluate another recording, return to the 'OBJECT SCREEN' mark the following recording and evaluate by <F1>.

If you during a DR-COM session want to evaluate recordings stored from another application structure or 'Organisation' then there are two possibilities: 'F1=Evaluate' at 'STATION SCREEN' which ALWAYS prompts you for the adequate FULL path for where the recordings are located or by evaluating any recording listed in 'OBJECT SCREEN' and then selecting 'M = Menu' option and choose the option 'Read recording'.

When the recordings are stored from an application structure or 'Organisation' other from actual one it is in no case possible to get information about the recordings in the 'STATION SCREEN' or 'OBJECT SCREEN', because the information about the files is application structure specific and cannot be transferred to another 'Organisation' or application structure, not even by changing path in the DR-COM station configuration.

APPENDIX C gives an example on how to manage when the recordings are "foreign" to actual DR-COM session. This example is useful, especially if the operator copies the recordings from e.g. a PC in a 'Station' in order to evaluate them in another PC at the office. Be sure to copy all files, (3 files for each recording, refer to section 1.3), when copying. This is fortunately taken care of when using the 'F2=Copy' command within the program.

The recommendation is that the recordings should when running DR-COM be saved on the harddisk, while floppy disks are rather slow and also suffers from quite limited capacity.

3.2.2 DR-COM function screens

The DR-COM program contains three screens:

1. MAIN SCREEN
2. STATION SCREEN
3. OBJECT SCREEN

3.2.2.1 Common for all screens

Uploading of recordings from a disturbance recorder can be done from any screen, i.e. 'MAIN, STATION or OBJECT SCREEN'. When uploading of recordings is performed are following three counters displayed: MEASUREMENT, BLOCK and RECORDING. ('BLOCK' and 'RECORDING' is used only with SPCR 8C19 or SPCR 8C27 modules).

The field 'RECORDING' displays the amount of recordings stored in current module. The counter informs which recording is being uploaded of the total amount.

One 'RECORDING' may consist of one or several 'BLOCK'. The block counter displays which block is being uploaded.

Each 'BLOCK' consists of a number of 'MEASUREMENT's. This 'MEASUREMENT' field displays how many samples that has been transferred to DR-COM.

The 'UPLOADING' window is normally empty when no recordings are uploaded, or showing other types of information.

DR-COM is not removing the 'RECORDING' from the disturbance recorder until it has entirely and successfully been uploaded. This means that if an failure occurs, has the recording to be uploaded from the beginning.

'Disk space' shows the total and available disk spaces on the drive you have selected (See Fig. 3.1.2.B field 'Recording file path'). If the available disk space is less than 1000 kB, the free disk space field is blinking. If the available disk space is less than 100 kB, 'Station' polling will be disabled automatically.

'Poll time' field shows, when the last poll was made and when the next poll will be made and the module concerned,

3.2.2.1.1 MAIN SCREEN

The main screen contains a list of unacknowledged, but uploaded recordings. The list contains the name/-s of the 'Station', 'Object/Bay' where the disturbance recorder is located, the module address, date, time for triggering and the reason for triggering. The files are still listed in 'OBJECT SCREEN' after acknowledging. If the DR-COM program is ended without acknowledging will the unacknowledged recordings still be listed in the 'MAIN SCREEN'.

```

- DR-COM 2.0 -----MAIN SCREEN----- 19.02.1996  11:19.26

```

		DISK SPACE C:-	POLL TIME
		TOTAL: 114393 kB	MADE: 11:19.20
		FREE : 10199 kB	NEXT: 11:21.20 [011]

```

Station-----Obj/Bay-----Date--Time-----Triggering-----1/1-----

```

```

Use PAGE-UP/PAGE-DOWN and arrow keys to scroll, ENTER to select
F1=Station screen  F2=Copy  F3=Stop poll  F4=Ack  F5=Del  Esc=Exit

```

Fig. 3.2.2.1.1.A The start-up window for DR-COM when no recordings are uploaded.

```

- DR-COM 2.0 -----MAIN SCREEN----- 19.02.1996 11:46.54
      -----UPLOADING-----
UNIT ADDRESS/TYPE: 002/SPCR 8C27
MEASUREMENT      : 223/250
BLOCK            : 001/002
RECORDING        : 001/007
DISK SPACE C:
TOTAL: 114393 kB
FREE : 10938 kB
POLL TIME
MADE: 11:46.54
NEXT: 11:48.54 [002]

Station-----Obj/Bay-----Date--Time-----Triggering-----1/1-----
Vasklot      Feeder4forpow 012 04.01 14.07;47 E1 Triggering on I01>
Wasa         Cubicle32Nort 002 19.02 11.27;35 E1 Triggering on overcurren
Wasa         Cubicle32Nort 002 19.02 11.27;39 E3 Triggering on Io
Wasa         Cubicle32Nort 002 19.02 11.27;44 E8 triggering on signal 3
Vasklot      Feeder4forpow 011 16.02 00.26;31 E1 Triggering on 3I>

Use PAGE-UP/PAGE-DOWN and arrow keys to scroll, ENTER to select
F1=Station screen  F2=Copy  F3=Stop poll  F4=Ack  F5=Del  Esc=Exit

```

Fig. 3.2.2.1.1.B DR-COM main screen with some unacknowledged recordings.

By pressing the <F1> button at the MAIN SCREEN mode is the STATION SCREEN mode obtained.

3.2.2.1.2 STATION SCREEN

The 'STATION SCREEN' contains a list of 'Station's and 'Object/Bay' with the number of stored recordings in each.

```

- DR-COM 2.0 -----STATION SCREEN----- 19.02.1996 11:47.46
      -----UPLOADING-----
DISK SPACE C:
TOTAL: 114393 kB
FREE : 10938 kB
POLL TIME
MADE: 11:46.54
NEXT: 11:48.54 [002]

Station-----Obj/Bay-----# of recording made--1/1-----
Wasa         Cubicle32NorthWestCorn 6
Vasklot      Feeder4forpowerplant 4

Use PAGE-UP/PAGE-DOWN and arrow keys to scroll, ENTER to object screen
F1=Evaluate  F3=Stop poll  Esc=Prev.

```

Fig. 3.2.2.1.2.A DR-COM station screen

All 'Obj/Bay's for the stations containing recordings are listed. However, only 'Station's within current 'Organisation' are displayed. When wanting to list the files for an 'Obj/Bay', this is done by marking the particular 'Obj/Bay' with the cursor and pressing <Enter>. This opens the 'OBJECT SCREEN'.

Note !

If 'F1=Evaluate' is pressed will the operator be asked for the entire path for the recording to evaluate. This is useful when the recordings aren't located within the current 'Organisation'. Location could for instance be on a floppy disk or elsewhere on the harddisk.

Access to the 'OBJECT SCREEN' is achieved by selecting a 'Station' and pressing <Enter>. Even if the 'STATION SCREEN' is empty, (no recordings), is access to 'OBJECT SCREEN' encouraged by the same operation, i.e. <Enter>.

3.2.2.1.3 OBJECT SCREEN

The object screen contains a list of all recordings for selected 'Station'/'Object/Bay'. The 'OBJECT SCREEN' consists of the same information as the 'MAIN SCREEN', but it also shows the names of the recording files. The evaluation of files listed is done by marking the recording to evaluate by the cursor and pressing 'F1= Evaluate'. <Esc> will return to 'OBJECT SCREEN' and following recording can be evaluated by repeating the procedure.

<F4> will give the path for the marked file, while deleting is performed by <F5> button. No deleting can be performed until the files to delete are marked with a star left most on the same row as file/-s to delete. The same goes for 'F2=Copy'. Marking is done by cursor and <Enter>.

```

- DR-COM 2.0 -----OBJECT SCREEN----- 19.02.1996  11:48.17

```

Station : Wasa	
Obj/Bay : Cubicle3	

DISK SPACE C:-	POLL TIME
TOTAL: 114393 kB	MADE: 11:46.54
FREE : 10938 kB	NEXT: 11:48.54 [002]

File	Unit	Date	Time	Triggering	1/1
96219001.CFG	002	19.02	11.17;15.145	E3 Triggering on Io	
96219002.CFG	002	19.02	11.17;21.110	E8 triggering on signal 3	
96219003.CFG	002	19.02	11.17;30.275	E7 triggering on signal 2	
96219004.CFG	002	19.02	11.27;35.315	E1 Triggering on overcurrent	
96219005.CFG	002	19.02	11.27;39.230	E3 Triggering on Io	
96219006.CFG	002	19.02	11.27;44.245	E8 triggering on signal 3	

Use PAGE-UP/PAGE-DOWN and arrow keys to scroll, ENTER to select
F1=Evaluate F2=Copy F3=Stop poll F4=Path F5=Del Esc=Prev.

Fig. 3.2.2.1.3.A DR-COM 'OBJECT SCREEN' containing recordings for 'Station' Wasa, Cubicle 3.

The recordings in Fig 3.2.2.1.3.A are uploaded from a SPCR 8C27 disturbance recorder located in a SPAC 535 C1.

3.3 DR-COM function buttons

PgDn (NEXT)

Pressing this key changes the display to the next page of the screens. For instance, if page Nr. 1 of 4 is being displayed, PgDn displays screen Nr. 2.

PgUp (PREV)

Pressing this key changes the display to the previous page of the screens.

Arrow keys

These keys are used to move the cursor.

F1

Function key F1 opens the 'STATION SCREEN', (done from 'MAIN SCREEN'), or starts the evaluating program, (at 'STATION SCREEN' is full path required, but at 'OBJECT SCREEN' is the recording marked by the cursor evaluated).

F2 (Copy)

Pressing this key copies the selected files to the target path. While each recording consists of 3 files will $x * 3$ files always be copied.

F3 (Start/Stop poll)

Operation of F3 toggles the text between 'Start poll' and 'Stop poll'. This function enables polling of 'Station's in the applications structure to be stopped without exiting the DR-COM station polling routine. If the available disk space is less than 100 kB, polling of 'Station' is automatically disabled and the function key will start to blink 'Start poll'.

F4

This function acknowledges all the recordings at the same time ('MAIN SCREEN') or shows the path for a selected recording file ('OBJECT SCREEN').

F5 (Del)

This function key deletes the selected recording files.

Esc

Returns to SMS-BASE from the main screen, otherwise to the previous level. Esc can also be used for cancelling uploading of recordings, regardless of if DR-COM is started at 'Organisation' level or at 'Module' level. If uploading is cancelled will the recording have to be uploaded from the beginning next time. No data will, however, be lost. Other functions selected can also, before execution start be regretted by Esc.

4 DR-COM EVALUATOR

The graphics functions allow the measured values recorded in files to be drawn on the display. When you press the function key 1 'F1=Evaluate' in the 'OBJECT SCREEN', it starts to read the selected file and draw it on the display.

A condition for this function is that the PC used is provided with one of the display adapter cards mentioned in appendix B and a matching display monitor.

For evaluation purposes you can also use another program (e.g. REVAL), supporting the COMTRADE format.

4.1 Drawing

After selecting the 'F1=Evaluate' function, ('STATION' or 'OBJECT SCREEN'), is data about the recording to be drawn given, example in Fig 4.2.2.C. On the basis of this information you can select the starting point for the drawing and the time cycle you want to be drawn. Depending on the time cycle selected, the drawing program chooses the time axis scale to be used and draws the recording in accordance with the drawing parameters. Unless drawing parameters have been read from a drawing parameter file, the default drawing parameters are used.

If you want a printout of the drawing, type P, and if you want to exit, press Esc.

The drawing results can be edited by changing the corresponding drawing parameters of the file. It is recommended to create drawing parameter files at least for repeatedly occurring recording situations.

The drawing outfit for the recordings can be modified, (scales, height, curves be sorted out or relocalised etc.), by using drawing parameter files containing settings other than the defaults. Section 4.2.2 describes how the modifying is done and in Fig. 4.2.4.A is an example of a drawing made with edited drawing parameters.

When the drawing is started for the first time at the 'OBJECT SCREEN' will the recording be drawn by using default drawing parameters. The menu is then found by using the 'M Menu' button.

NOTE ! When new drawing parameters are set up and saved, they aren't automatically taken into use until they are selected as the drawing parameters to use in menu 'Select drawing parameters' / and select the file to use !

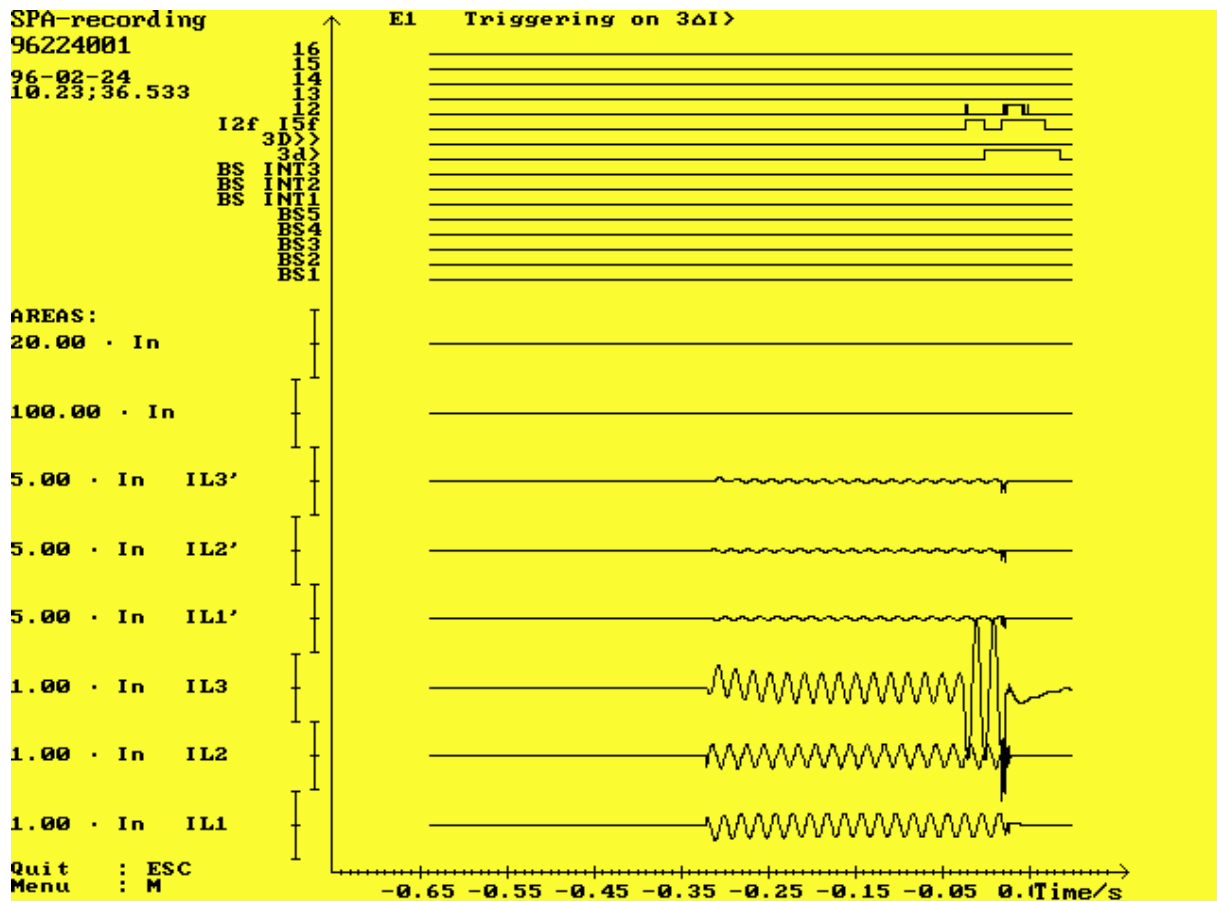


Fig. 4.1.A Screen for analyzing disturbance recordings, (recorded by SPCD 3D53). Default drawing parameters are used.

4.2 Menu functions

Depending on how you started the evaluation functions is the menu functions offered before drawing or after the drawing is done. If the recording is drawn can the menu be obtained from 'Menu : M' button.

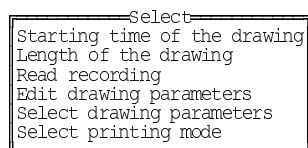


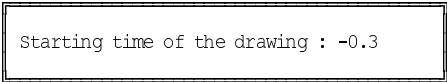
Fig. 4.2.A Menu for setting and selecting drawing parameters and files

When wanting to use drawing parameters other from the default values, then you should select this file before drawing. Or create a new drawing parameter file.

Section 4.2.1 is describing the use of time and length of drawing.

4.2.1 Starting time and length of the recording

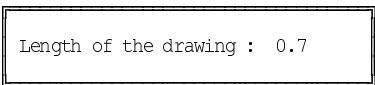
With these functions you can select the starting point for the drawing and the time cycle you want to be drawn.



```
Starting time of the drawing : -0.3
```

Fig. 4.2.1.A Menu for setting the starting point of the drawing

In Fig. 4.2.1.A is the starting value used given in seconds. Minimum time range accepted when drawing is 0.1 second. The minus means the time proceeding the triggering point, (history). The time '0' corresponds to the triggering point.



```
Length of the drawing : 0.7
```


Fig. 4.2.1.B Menu for setting the length of the drawing

In Fig. 4.2.1.B is the length of drawing corresponding to the factor used. A factor 1 equals 1:1 relation, while a number less than 1 results in extending of drawn curves. Naturally a number exceeding 1 will shorten the length of drawing.

4.2.2 Read recording

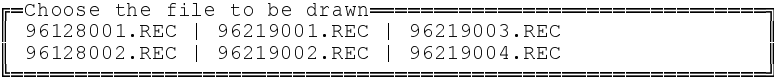
This function is used for reading a recording file of the PC. Reading directly from a disturbance recorder to the evaluation function is not possible. You have to give the full path, (Fig. 4.2.2.A), to the directory and then select the file to be read, (Fig. 4.2.2.B). During reading the program displays the file name, history length, the length of the recording to and the number of the samples, (Fig. 4.2.2.C).

By history is understood the time before triggering, i.e. samples recorded by the disturbance recorder before the triggering moment. Hence history time is designated as "minus" time proceeding the triggering moment at time '0'.



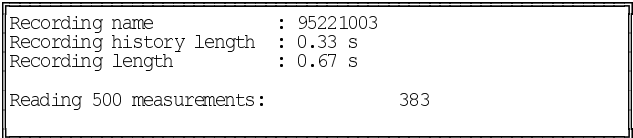
```
Path : c:\reval\Vaasa\Sundom\
```

Fig. 4.2.2.A Menu for selecting the path to the recording directory



```
Choose the file to be drawn
96128001.REC | 96219001.REC | 96219003.REC
96128002.REC | 96219002.REC | 96219004.REC
```

Fig. 4.2.2.B Menu for selecting the file to be drawn



```
Recording name      : 95221003
Recording history length : 0.33 s
Recording length    : 0.67 s

Reading 500 measurements:      383
```

Fig. 4.2.2.C Screen for indication of the reading. Already has 383 out of 500 samples been loaded !

In Fig. 4.2.2.C is following information about actual drawing given:

Recording name	'95221003'	name for the recording to be evaluated
Recording history length	'0.33 s'	which means the time proceeding the triggering moment
Recording length	'0.67 s'	which equals the total time for both history and time after triggering
Reading 500 measurements	'383'	displays the total and loaded amount of measurements/samples

This information is shown only during the loading of measurements phase and the time needed for this is depending on the computer.

4.2.3 Edit drawing parameters

When you enter this function you are requested to select the file you want to modify. You can select an existing file to be changed or press <Esc> to create a new file, in which case the program asks you to name the new file when you exit the editor. The files are saved in C:\SMS\DRCOM\ directory, (default installation).

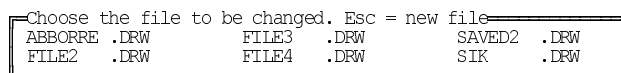


Fig. 4.2.3A Menu for selecting drawing parameter file

It is possible to produce a graph printout of the recording files, including the curves of one to eight analog channels and one to sixteen digital status signals. The axis of the co-ordinate system common to the channels is fixed, but you are able to change the place of the channels, the drawing area, the scaling and drawing method.

The scaling of the time axis depends on the length of the drawing and the drawing program automatically selects the correct scale to be used.

The parameters for the channels to be drawn can be selected separately for each channel. Select the values so that the whole vertical drawing area of the co-ordinate system corresponds to drawing area value 1. You can select the place of the 'ORIGIN OF THE CHANNEL' (measured value zero) in the vertical direction on the display (e.g. the value 0.5 will be in the middle of the co-ordinate system). The scale of the drawing is determined on the basis of the width of the selected 'DRAWING AREA OF THE CHANNEL' and the 'DRAWING AREA OF THE CHANNEL AS PER UNIT VALUE' (for example 5 x In). Also the values outside the drawing area of each channel are printed, provided they are inside the area of the picture. The scaling lines of the measured values are given for each separate curve on the left side of the Y axis. The ends of the lines correspond to the +/- peak values of the value printed before these lines. It is also possible for you to specify the type of drawing for each individual curve, (Fig. 4.2.3.B).

The following types of drawing are available:

Line	The curve is drawn as an unbroken line without showing the measuring points
Dots	The curve is drawn as a dotted line, where the dots represent the measuring points
Dash-dot	The curve is drawn as a line, where the measuring points are represented by dots which are united by a dash line
No drawing	The curve is not drawn, the scale values are insignificant

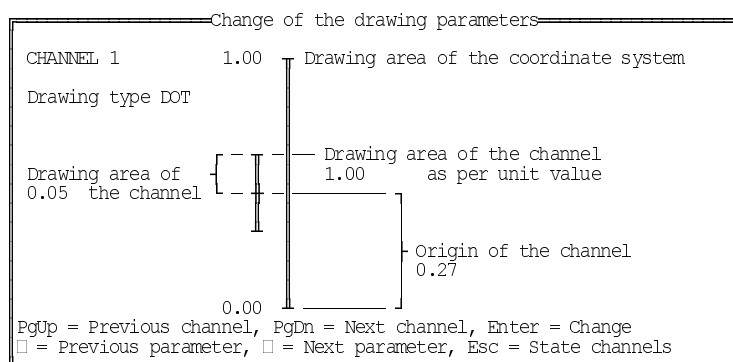


Fig. 4.2.3.B Menu for setting drawing parameters (the analog channels)

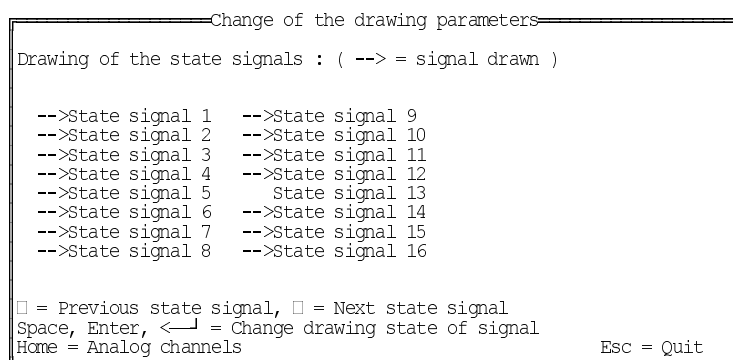


Fig. 4.2.3.C Menu for setting drawing parameters (the state signals)

In Fig 4.2.3.C is digital channel 13 excluded from the channels to be drawn.

The colors to be used for drawing can be changed in the 'COLOR CHANGE' mode.

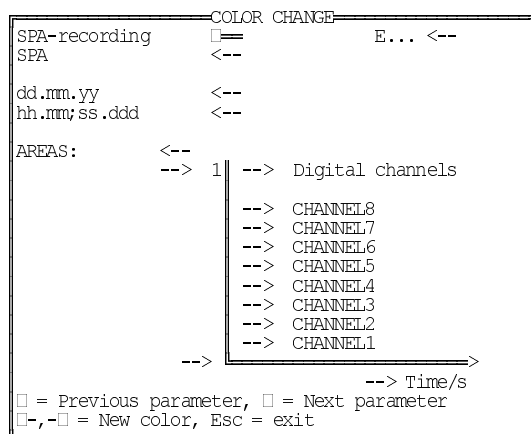


Fig. 4.2.3.D Menu for setting colors

When a drawing is printed the header texts are written in the normal writing direction of the printer, at the upper edge of the output page.

Note!

Changes made to the drawing parameters do not affect the currently selected drawing parameters. If you want to use the new parameters, they have to be activated by the 'Select drawing parameter' option.

4.2.4 Select drawing parameters

This function allows you to retrieve the required drawing parameters from the drawing parameter file. These drawing parameters will be used until they are replaced or modified.

Fig 4.2.4.A gives an example of a drawing using edited drawing parameters and also with changed starting time and drawing length. Some channels are removed.

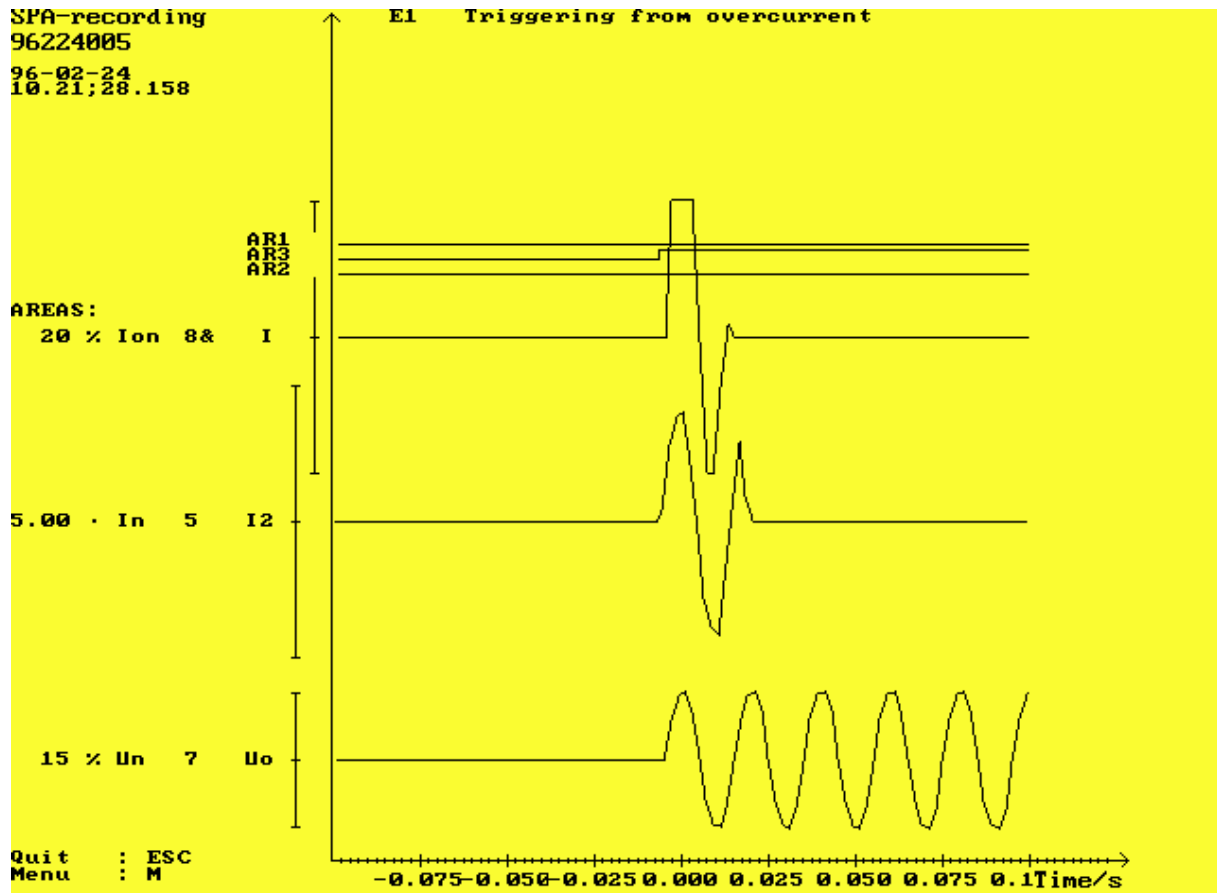


Fig. 4.2.4.A A recording made by SPCR 8C27, triggered by overcurrent and using edited drawing parameters.

4.2.5 Select printing mode

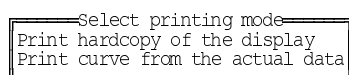


Fig. 4.2.5.A Menu for selecting printing mode

A printout is produced by using the so-called Bit Image Printing mode of the matrix printers. The printing mode has been designed for a Brother M-1509 type matrix printer using printout control commands compatible with those of both IBM Graphics Printer and Epson FX-100 printers. The printing mode as such can be used for a large number of different, non-expensive types of Epson (IBM) compatible matrix printers, one example could be 'STAR LC 24-10'. To obtain a better printout, a 24-pin Epson LQ-2500 compatible printer can be used.

The 'Print hardcopy of the display' selection copies the screen picture to the printer.

The 'Print curve from the actual data' selection draws in the horizontal direction of the paper, thus making a better use of the paper. It uses the same drawing parameters as those of the display. When you select this mode, you also have to select the printer type.

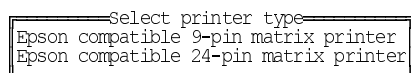


Fig. 4.2.5.B Menu for selecting printer type

Before starting the drawing function you have to choose the drawing parameter file to be used, otherwise the program will use the default parameters. At first, you will get details about the recording to be drawn. Then select, on the basis of this information, the point from which you want the drawing of the curves to start and for which time cycle you want the curves to be drawn. Depending on the time cycle selected the drawing program decides what time scale is to be used and draws the recording in accordance with the set drawing parameters.

5 DR-COM SPECIAL START-UP FUNCTIONS

DR-COM provides the operator with some additional start-up features. Normally is DR-COM started from SMS-BASE, but other possibilities are :

- Stand-alone from the DOS prompt
- Automatic start-up from AUTOEXEC.BAT with automatic return to the DOS prompt
- Automatic start-up from AUTOEXEC.BAT with manual return to the DOS prompt
- Starting from other programs

However, there are several alternatives within these cases and these start-ups are realised by using various set-up switches.

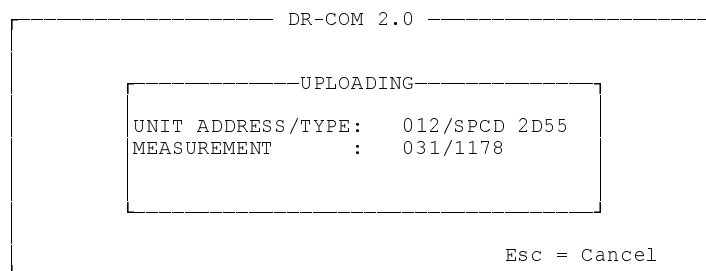


Fig. 5.A A typical view for uploading recordings to DR-COM, using the special upload only version.

The difference between the DR-COM versions started by these start-ups is that a special “upload only” version can be used. This version is performing uploadings and returning to the previous environment, but the recordings have to be evaluated from a “normal” DR-COM session. A full stand-alone start of DR-COM means that the program works as normal with uploading and evaluation functions.

It is assumed that the SMS 010 installation is the default C:\SMS\BASE\SUPPORT\, but if your installation uses another path, then the whole path has to be given.

The DR-COM has to start from the application directory, where the polling is to be performed. This means by setting the switches you have to know the application structure name and ‘Organisation’ directory.

If you are using one ‘Organisation’ in your application structure and have only one application structure it is in most cases only needed to add C:\SMS\BASE\GLOBAL.CNF as parameter for DR-COM. GLOBAL.CNF is the file containing the path for the application structure.

BUT ! If the application structure you are using in SMS-BASE is another than for DR-COM special start-up functions or the ‘Organisation’ in the application structure isn’t the first one, then it is recommended to carefully study the information in section 5.1.

5.1 Solving the application structure name and ‘Organisation’ directory

In some options it is referred to the directory name/-s of the ‘Organisation/-s’. The question is then “How can the operator find out the directory name/-s needed ?”

First thing is to find out what is the application name. This can easiest be done from ‘SETUP’/‘Appl. struct. path’, where actual path for the application structure is listed. Another possibility is from ‘UTILITIES’/‘Alter application structure’/‘S = AS handling’, (available from SMS-BASE v.2.0).

Second thing is to check the ‘Organisation’ directory name. The easiest way is, when within selected ‘Organisation’, to go down in the application structure to module level and press ‘F8 DOS’ button. Normally is the full path listed, e.g. C:\SMS\DR-EX\O001\S001\U001\M001.

In the example is DR-EX the APPLICATION STRUCTURE NAME and O001 the 'Organisation name, (home directory).

In some cases might the DOS prompt from 'F8 DOS' be shown as C>, this is due to the PC setup. If this is the case, do as example in Fig 5.1.B describes.

In this example 'DR-EX2' is the application structure name. Move to corresponding home directory for the application structure and take a list of the contents by DOS command 'DIR'.

```
C:\SMS\DR-EX2>dir

Volume in drive C is R356037
Volume Serial Number is 251B-15CE
Directory of C:\SMS\DR-EX2

.                <DIR>          15.02.96  19.36
..               <DIR>          15.02.96  19.36
SPACOM  CNF       352    15.02.96  19.36
CHOICES DSC       42    15.02.96  19.40
O001     <DIR>          15.02.96  19.37
O002     <DIR>          15.02.96  19.40
6 file(s)    394 bytes
9904128 bytes free
```

Fig. 5.1.B Listing the application structure home directory by DIR command

In this case there are two 'Organisations' within the DR-EX2 application structure. We would now want to know which directory is matching which 'Organisation'. This is done by typing the contents of CHOICES.DSC by DOS command 'TYPE'.

```
C:\SMS\DR-EX2>type choices.dsc
2
O001,ABB Transmit Oy
O002,ABB Network Partner
```

Fig. 5.1.C Checking the contents of the CHOICES.DSC file by TYPE command

As appears the 'Organisation' ABB Transmit Oy is located in the O001 directory, while ABB Network Partner is located in directory O002.

However, in most cases there is only 1 'Organisation'.

Application structures created by SMS-BASE v. 1.1 or 1.0 uses shorter application structure names. *Do NEVER manipulate any files in the application structure, it might interfere with the running of SMS 010.*

It is, of course, provident to test that your special start-ups for DR-COM are working properly, according to your plans.

What is the result if no connection is established ? This is exemplified in appendix D section D.3

5.2 Stand-alone start from the DOS prompt

DR-COM can be started directly from the DOS command line by following command:

```
C:\SMS\BASE\SUPPORT\DRCOM -d C:\SMS\BASE\GLOBAL.CNF
```

Another possibility is

```
C:\SMS\BASE\SUPPORT\DRCOM -r C:\SMS\BASE\GLOBAL.CNF
```

The switch -r means that an 'upload only' version started, (Fig. 5.A).

The switch -d means that a "full" DR-COM session is started.

The -r and -d switches means that the DR-COM polls modules only, if condition of time interval was fulfilled. Refer to 'Station polling settings' in section 3.1.2.

In following commands will DR-COM use invoked 'Organisation:

```
C:\SMS\BASE\SUPPORT\DRCOM C:\SMS\<Appl. path name>\<Organisation>
```

examples:

```
C:\SMS\BASE\SUPPORT\DRCOM c:\sms\DR-EX2\O001
```

or

```
C:\SMS\BASE\SUPPORT\DRCOM c:\sms\DR-EX2\O002
```

These commands are NOT accepted:

```
C:\SMS\BASE\SUPPORT\DRCOM -r C:\SMS\<Appl. struct. path name>\<Organisation>
```

```
C:\SMS\BASE\SUPPORT\DRCOM -d C:\SMS\<Appl. struct path name>\<Organisation>
```

5.3 DR-COM start-up from AUTOEXEC.BAT

DR-COM can be started automatically. The method for enabling this is to add command lines to the AUTOEXEC.BAT file.

This means that when the operator turns on the PC, will the DR-COM program start without further measures.

The automatic start-ups can however be performed differently by using different switches. Using other programs is no obstacle for automatic restarts. E.g. automatic (re)starting of REPORT from AUTOEXEC.BAT will through the SCHEDULER file, (SPAREP.SCH) enable the usage of e.g. DR-COM. Refer to the REPORT User's Guide for these settings.

Common for these automatic starts are that DR-COM is run without starting SMS-BASE. When access to the SMS-BASE program and the application structure is required will SMS-BASE have to be started as usual.

WARNING !

Before modifying your AUTOEXEC.BAT it is sensible to make a back up copy.

5.3.1 Start-up from AUTOEXEC.BAT with automatic return to DOS prompt

This is a 'upload only' version, (Fig 5.A), of DR-COM that after performing eventual uploadings return to the DOS prompt. This means that no evaluating is possible, but the recordings can be examined later from a "normal" DR-COM session.

The switch is:

```
C:\SMS\BASE\SUPPORT\DRCOM C:\SMS\<Appl. path name>\<Organisation>
```

examples:

```
C:\SMS\BASE\SUPPORT\DRCOM c:\sms\DR-EX2\O001
```

```
C:\SMS\BASE\SUPPORT\DRCOM c:\sms\DR-EX2\O002
```

or

```
DR-COM -r C:\SMS\BASE\GLOBAL.CNF
```

The -r switch means that the DR-COM polls modules only, if condition of time interval was fulfilled. Refer to 'Station polling settings' in section 3.1.2.

When DR-COM is started it will use the application structure defined in GLOBAL.CNF and the first 'Organisation' found in this application structure.

Add e.g. following lines to your AUTOEXEC.BAT

```
CD \
C:\SMS\BASE\SUPPORT\DRCOM -r ..\GLOBAL.CNF
```

Example:

```
PATH C:\DOS;C:\BAT;C:\WIN;
BREAK ON
VERIFY OFF
PROMPT $P$G
LH C:\DOS\KEYB SU,,C:\DOS\KEYBOARD.SYS
LOADHIGH C:\DOS\DOSKEY
MOUSE.COM
CD \
C:\SMS\BASE\SUPPORT\DRCOM -r c:\sms\base\global.cnf
CD \
```

Fig. 5.3.1.A Example of AUTOEXEC.BAT configuration

If there are more than one organisation to be polled it is possible to exactly define 'Organisation/-s to poll by adding following lines to AUTOEXEC.BAT instead:

```
C:\SMS\BASE\SUPPORT\DRCOM C:\SMS\<Appl. path name>\<Organisation>
```

```
C:\SMS\BASE\SUPPORT\DRCOM C:\SMS\<Appl. path name>\<Organisation>
```

examples:

```
C:\SMS\BASE\SUPPORT\DRCOM c:\sms\DR-EX2\O001
```

```
C:\SMS\BASE\SUPPORT\DRCOM c:\sms\DR-EX2\O002
```

5.3.2 Start-up from AUTOEXEC.BAT with manual return to DOS prompt

DR-COM will run as normal with full functionality, but outside the SMS-BASE environment. Furthermore exiting is done manually.

The switch for this is

```
DRCOM -d C:\SMS\BASE\GLOBAL.CNF
```

The -d switch means that the DR-COM polls modules only, if condition of time interval was fulfilled. Refer to 'Station polling settings' in section 3.1.2.

Add e.g. following lines to your AUTOEXEC.BAT

```
CD \  
C:\SMS\BASE\SUPPORT\DRCOM -d C:\SMS\BASE\GLOBAL.CNF
```

Example:

```
PATH C:\DOS;C:\BAT;C:\WIN;  
BREAK ON  
VERIFY OFF  
PROMPT $P$G  
LH C:\DOS\KEYB SU,,C:\DOS\KEYBOARD.SYS  
LOADHIGH C:\DOS\DOSKEY  
MOUSE.COM  
CD \  
C:\SMS\BASE\SUPPORT\DRCOM -d c:\sms\base\global.cnf  
CD \
```

Fig 5.3.2.A Example of AUTOEXEC.BAT configuration

5.4 Starting DR-COM from other programs

The DR-COM can be invoked for from other programs, e.g. REPORT, i.e. it does not necessarily have to be started by first running SMS-BASE and pressing F5 at the 'Organisation' level, (or 'Upload recordings' on the module level). The advantage with this feature is that if the operator have more than one program that continuously polling the protection relays and disturbance recorders isn't one program excluding the use of other programs. This means that data can still be uploaded to DR-COM and the recordings are ready for evaluation for the operator at his arrival.

The recordings uploaded has to be evaluated from a regular DR-COM session, (except from the -d switch).

The DR-COM can be started in two ways and depending on the start mode, it will either every time poll all specific modules in the 'Station's or it will first check the time to poll and then poll every defined module. After this operation, will DR-COM return to the host program, (except from the -d switch).

Common for these cases is that polling can be made only within specified 'Organisation'.

E.g. the REPORT User's Guide contains information for how to configure the SCHEDULER file that performs these automatic start-ups.

1. Command line: DRCOM, -r

If you use this command, the DR-COM polls modules only, if condition of time interval was fulfilled. See 'Station polling settings' in section 3.1.2. The DR-COM has to start from the application directory, where the polling is to be performed.

2. Command line: DRCOM, C:\SMS\<Appl. path name>\<Organisation>

e.g. DRCOM, c:\sms\dr-ex2\o001

If you use this command, DR-COM will by each start poll all modules within the specific 'Station'. Give the path to the 'Organisation' directory you want to poll. Thus, if the 'Organisation's are many will the command lines have to be repeated for each 'Organisation'

3. DRCOM, -d C:\SMS\BASE\GLOBAL.CNF is possible, but perhaps not useful, because it starts a DR-COM session with full access to the DR-COM program functionality and waits for the user to quit manually by <Esc>. Then will the program return back to the host program.

Important:

In this cases described is comma ',' very important and has to be added after DRCOM

The executable DR-COM programs are in these cases assumed to be installed in the default location C:\SMS\BASE\SUPPORT, hence is no path given.

A DIRECTORIES AND FILES IN DR-COM

The DR-COM software product is delivered on two 3½" high-density (1.44 Mbytes) floppy disks. The disks are numbered and named as follows:

NUMBER	DESCRIPTION
1	DR-COM
2	Example application structure

Both floppy disks have the same directory structure or a part thereof and the same structure is retained when the system is installed. The files on the disks are packed by using the program 'pkzip' to minimize the number of installation disks. The contents of the disks are presented below as they appear when the disks are inserted into drive A: and are viewed by using the program 'pkunzip':

A:\	Root directory of the system
\BASE\SUPPORT\	DR-COM auxiliary programs
\BASE\MODULES\	Descriptions
DRCOM\	Description of the DR-COM station
DATA-EX\	Application structure data

A.1 Disk 1

The disk Nr. 1 contains:

A:\	
DRCOM	Identification file
INSTALL.EXE	Installation program
INSTALL.LAN	Installation language texts
MUST.ZIP	Archived files
PKUNZIP.EXE	File expansion program
README	Disk information

The file 'MUST.ZIP' contains:

RELEASE	Latest news
\SUPPORT\	
SPCR_AS.EXE	Application structure generator
SPCREDIT.EXE	Starting 'EDIT.EXE'
SPCRSEND.EXE	Sending data to SPCR modules and start 'SEND.EXE'
SPCR_RX.EXE	Acquire data from SPCR modules
DRCOM.EXE	Reading and storing recordings from objects
SPCRTIME.EXE	Synchronizing time
SPCRSTAT.EXE	Monitoring SPCR system
SPCRDEL.EXE	Erasing file (SPCRAPPL.DAT)
SPCRDREC.EXE	Erasing of all recordings
DREVAL.EXE	Disturbance evaluator
DREVAL.LAN	DREVAL language texts
DRCOM.LAN	DRCOM language texts

A.2 Disk 2

Disk labelled no 2 is having following contents:

A:\

INSTALL.EXE	Installation program
INSTALL.LAN	Installation language texts
README	Disk information
SPACOM.CNF	Texts for selection headline
CHOICES.DSC	Texts for the 'Organization' menu
Onnn\ CHOICES.DSC	Texts for the 'Station' menu
Snnn\ PHN-STN.DAT	Communication settings
SPIN.CNF	Communication settings
CHOICES.DSC	Texts for the 'Object/Bay' menu
Onnn\ CHOICES.DSC	Texts for the 'Unit' menu
Unnn\ CHOICES.DSC	Modules/Parts texts
PACKAGE.PCK	Tranducer data i.e. CT and VT ratios
Mnnn\ VALUES.VAL	Settings created by using the editor
VALUES.INS	Acquired values of variables
SLAVE.DAT	Slave number, i.e. node number (existing and new number)
EVENT.DSC	Event configurations
CHANNEL.DSC	Channel configurations
LOGGING.DSC	Logging configurations
REC\VAASA\SUNDOM*.CFG	The examples of the recordings for DR-COM evaluator

A.3 Harddisk installation

The system installed on the hard disk has the same directory structure as the floppy disks. The default directory created for the system is:

C:\SMS\

B DR-COM SPECIFICATION

The DR-COM system requirements and the typical data of DR-COM functions are given in this Appendix B.

B.1 Hardware requirements

The hardware requirements which have to be fulfilled for DR-COM to operate correctly are:

- Relay end

- SPACOM relay with an SPA communication option
- Optical fibre SPA loop with an optical fibre modem or a direct connection to the relay from the PC's serial port.

- Remote communication

- A leased line equipped with modems or a telephone modem and automatic answering function at the station.
- A public telephone network according to CCITT.
- A telephone modem that which accepts "AT" commands at the PC end.

- PC

- PC IBM-AT or higher but 100% compatible. No special configuration. No special accessories for controlling serial or parallel ports.
- Operating system DOS 3.3 or higher
- Main memory 460 kbyte available
- Hard disk 2.4 Mbyte for DR-COM programs
- Display VGA or SVGA colour display
- Parallel port 1 for the printer, LPT1
- Code page 437, 860, 863 or 865

B.2 Application structure and data memories

The application structure represents the actual physical structure of stations, bays and relays and enables the user to select relay and data memories of interest.

B.3 Communication

- Communication settings

- Serial port COM1, COM2
- Data transfer 300, 1200, 2400, 4800, 9600 bps
- Protocol SPA, SRIO

- Data transmission time at 9600 Baud (SPCR 8C27 and SPCR 8C19)

- Upload via front connector (RS) 0.05 s/measurement
- Upload via SPA-bus 0.09 s/measurement (minimum)

- Time to establish a modem link 10 s typical

C RECORDINGS EXAMPLES ON DR-COM DISK 2

C.1 Contents

DR-COM disk 2 contains except from the application structure example also some recordings uploaded via DR-COM from disturbance recorders SPCD 2D55, SPCD 3D53 and SPCR 8C27. The purpose with these files are to provide with some recordings that the operator can train evaluating functions on; draw the file, change drawing parameters, copy, delete etc. These functions are described earlier in this User's Guide.

The focus in this chapter is directed on the how to achieve access to these files.

C.2 Installation path

When installing the DR-COM disk 2 will these recordings be located under the path you give for the application structure example. If you install the application structure under e.g. C:\SMS\MYPATH\ will the path for these recordings be C:\SMS\MYPATH\REC\VAASA\SUNDOM*.*

This is due to the fact that the recordings on the disk from the beginning were saved in the path C:\REC\VAASA\SUNDOM\.

In section 1.3 and in Fig. 3.1.2.B are more details given about the saving principles used in DR-COM.

C.3 Acquisition of enclosed recordings

The procedure described in this section can with advantage be used whenever you want to evaluate files stored from various application structures and in different locations. The training in this example will be to access and evaluate the files enclosed on DR-COM disk 2.

For your convenience has following step-by-step procedure been made. Refer to sections 1.3, 3.1.2, 3.2 and 4.1 for more details, if needed.

Start the DR-COM program and open the 'STATION SCREEN' or 'OBJECT SCREEN'. The 'OBJECT SCREEN' is a longer way to go because you will then when files exist in your application have to draw one of these first and then select 'Menu M'.

DR-COM 2.0		STATION SCREEN		20.02.1996 07:12.53	
		DISK SPACE C:		POLL TIME	
		TOTAL: 114393 kB		MADE: 07:03.50	
		FREE : 11712 kB		NEXT: 07:05.50 [002]	
Station	Obj/Bay	# of recording made--1/1--			
Wasa	Cubicle32NorthWestCorn	9			
Vasklot	Feeder4forpowerplant	3			
Use PAGE-UP/PAGE-DOWN and arrow keys to scroll, ENTER to object screen F1=Evaluate F3=Stop poll Esc=Prev.					

Fig C.3.A The 'STATION SCREEN' in DR-COM.

Whether there are 'Obj/Bay's or not in the 'STATION SCREEN' makes no difference, because you should activate 'F1=Evaluate' and the menu in Fig. 3.2.B is shown.

```

=====Select=====
Read recording
Edit drawing parameters
Select drawing parameters
Select printing mode
=====

```

Fig C.3.B Select desired function.

If you right away want to draw the recordings with default drawing parameters, (if not other selected before), select 'Read recording'. Following step is to give the exact path for your recordings.

```

=====
Path : c:\sms\mypath\vaasa\sundom
=====

```

Fig. C.3.C Giving the path for the recordings

In Fig C.3.C is the application structure home path 'MYPATH'. If the files are located elsewhere, e.g. C:\SMS\HERMAN\BYLING\GRENNAY\ then that one is the proper one to use. (A:\REC\VAASA\SUNDOM\ could also be used directly).

Select the file to draw

```

=====Choose the file to be drawn=====
96128001.REC | 96219001.REC | 96219003.REC
96128002.REC | 96219002.REC | 96219004.REC
=====

```

Fig. C.3.D Select file to draw

After the file has been selected, the measurements of the recording are processed:

```

Recording name      : 95221003
Recording history length : 0.33 s
Recording length    : 0.67 s

Reading 500 measurements:      383

```

Fig C.3.E Data about the recording

After the recording is processed the 'Select' menu box will be displayed. You can, of course, choose or set other drawing parameters.

```

=====Select=====
Starting time of the drawing
Length of the drawing
Read recording
Edit drawing parameters
Select drawing parameters
Select printing mode
=====

```

Fig C.3.F Select menu

By pressing <Esc> the recording will be drawn.

After the file is drawn another file can be drawn by repeating the procedure described in this section or by pressing 'M MENU' option offered within the drawn recording and select 'Read recording', Fig. C.3.F.

D TROUBLE SHOOTING

D.1 Difficulties that could occur when starting the program

The error message in D.1.A is shown when there is an application structure error. E.g. the DR-COM station isn't installed yet or located wrong. At least one disturbance recorder has to be installed as well, (SPCD 2D55, SPCD 3D53, SPCR 8C19 or SPCR 8C27), otherwise the application structure is regarded as faulty ! Section 3.1.1 explains how to add a 'DR-COM station'.

```
ERROR: DR-COM Stations not found or not correct
Press ESC to continue
```

Fig. D.1.A Some settings in the application structure are wrong

The error message in Fig. D.1.A appears also when using an application structure made with SMS-BASE v. 2.0, but the DR-COM version IS NOT 2.0 or later . ***IN THIS CASE UPDATE YOUR DR-COM !***

Following error, Fig. D.1.B, appears when the communication to a module is impossible or the communication settings are wrong. Check your communication settings or connections. If your communication parameters seem to be OK, try with e.g. 'Receive parameters' at the module level or trace the difficulties with a terminal emulator, (SMS-BASE User's Guide).

```
[11]:Timeout while waiting acknowledge
```

Fig. D.1.B The communication fails to module 11.

There might sometimes appear difficulties when uploading in Windows 3.1™ environment, because of communication problems.



Fig D.1.C Problems caused in Windows 3.1™ environment.

The solution in this case is to quit Windows and continue in DOS environment only.

Warning ! If the file SPACOM.CNF located at 'Organisation' level in the application structure is modified or edited it might cause severe interference by running DR-COM, because a application structure check against the information in this file is done. If the contents of SPACOM.CNF and the application structure libraries aren't compatible no DR-COM can be used and a fault message 'No DR-COM stations found' is given.

D.2 Partial communication interrupts

Some parts of the system might temporarily be out of order. In this case refer to previous sections to locate the difficulty and correct it. The example in Fig. C.7 is taken from a automatic “upload only” situation.

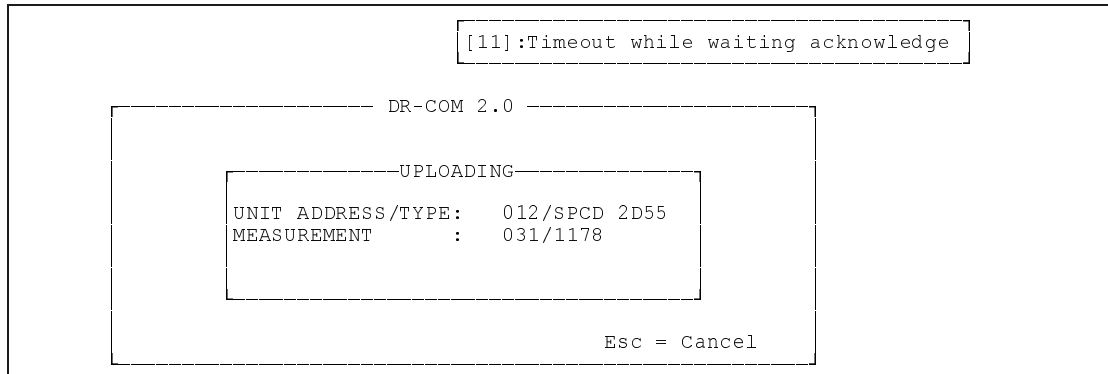


Fig. D.2.A No connection to module 11, but uploading from module 12 is successful.

If the communication isn't working with all modules, then check with communication parameters for corresponding 'Station' or check if contact to the particular module can be obtained, ('Terminal emulator'). Check your application structure, too, e.g. by 'Receive parameters' for the module that seems to be disconnected!

D.3 Start-up difficulties during automatic start-ups

If your application is OK, but the communication fails then following picture is popping up:

[11]:Timeout while waiting acknowledge

Fig D.3.A No communication is established to slave address 11

Check the connection and the communication parameter settings. Note ! It might take a while before the error message is popping up

If the application structure path you have referred to in the settings is totally wrong. e.g. not existing will following pictures be shown:

First error message:

```
ERROR: Unable to write the file
C:\...\SPCRAPPL.DAT
Press ESC to continue
```

Fig. D.3.B DR-COM is unable to write the file because the entire application structure is missing !

Second error message shown:

```
ERROR: DR-COM Stations not found or not correct
Press ESC to continue
```

Fig D.3.C The following step after message described in Fig. D.3.B

The DR-COM program is returning back to the previous program or to the DOS prompt by it self after a while.

E Application notes for DR-COM v. 1.0 to v. 2.0

E.1 Direct connection PC-SPA-ZC 22

When a PC with DR-COM installed is connected directly by means of the cable SPA-ZP 13 A3 to a SPA-ZC 22 electro/optical converter with relays connected on one or several loops are some cable modifications necessary.

From SMS 010 point of view, this is a fast and reliable communication that except from when DR-COM is used, meets no difficulties, but when the DR-COM program is used in above described situation some changes to the cable SPA-ZP 13 A3 is required. This is due to that DR-COM is expecting some signals that are not available. By disassembling the female 9 pin PC connector of the SPA-ZP 13 A3 cable and performing the below described modifications will the DR-COM communication be maintained, (e.g. uploading of recordings and time synchronisation of the disturbance recorders).

Following modifications need to be done to the SPA-ZP 13 A3 cable:

Female connector, 9 pin, used on PC side:

The pins number **4**, (DTR signal), and **6**, (DSR signal) have to be connected.
The pins number **7**, (RTS signal), and **8**, (CTS signal), have to be connected.
After welding the pins together re-assemble the female connector.

Male connector, 25 pin, SPA-ZC 22 side:

No changes required.

After these modifications are made, the SMS 010 system can be used as before for the communication with the relays connected to the SPA-ZC 22 loop.

E.2 Serial Communications

The serial port can in SMS-BASE when setting the communication parameters, (UTILITIES/Alter application structure/C= Change communication settings), in the application structures be given directly as COM1, COM2 or as IRQ level and I/O address. These IRQ and I/O settings enables the usage of COM1 to upto COM 6 and can thus be used by SMS-BASE and REPORT. DR-COM and SM/SPCR is using COM1 or COM2 as inputs and therefore not permitting the use of IRQ levels and I/O addresses.

Even if the SPA loop, where the SPCR 8C19 and 8C27 disturbance recorders are applied, is connected to COM3 or higher, the benefits of DR-COM and SM/SPCR can still be utilised by using another PC as well; (using COM1 or COM2), and connecting it to the front RS-232 connection of the SPCR or SPTO modules, (when housed in a SPAC unit).