Nokia Siemens Networks GSM/EDGE BSS, rel. RG20(BSS), operating documentation, issue 02

Reference

TCSM2 User Commands

DN98513282

Issue 8-0

Confidential

⚠ Important Notice on Product Safety

Elevated voltages are inevitably present at specific points in this electrical equipment. Some of the parts may also have elevated operating temperatures.

Non-observance of these conditions and the safety instructions can result in personal injury or in property damage.

Therefore, only trained and qualified personnel may install and maintain the system.

The system complies with the standard EN 60950 / IEC 60950. All equipment connected has to comply with the applicable safety standards.

The same text in German:

Wichtiger Hinweis zur Produktsicherheit

In elektrischen Anlagen stehen zwangsläufig bestimmte Teile der Geräte unter Spannung. Einige Teile können auch eine hohe Betriebstemperatur aufweisen.

Eine Nichtbeachtung dieser Situation und der Warnungshinweise kann zu Körperverletzungen und Sachschäden führen.

Deshalb wird vorausgesetzt, dass nur geschultes und qualifiziertes Personal die Anlagen installiert und wartet.

Das System entspricht den Anforderungen der EN 60950 / IEC 60950. Angeschlossene Geräte müssen die zutreffenden Sicherheitsbestimmungen erfüllen.

Table of contents

This document has 125 pages.

List of figures

List of tables

Summary of changes

Changes between document issues are cumulative. Therefore, the latest document issue contains all changes made to previous issues.

Changes made between issues 8-0 and 7-0

Editorial changes. No effect on the contents of the document.

Changes made between issues 7-0 and 6-3

The document has been modularized. No content changes were made.

Changes made between issues 6-3 and 6-2

The document structure and links have been corrected to fit the online requirements. No content changes were made.

1 Overview of TCSM2 user commands

This section describes how to configure and operate the TCSM2 unit through a local or remote session, using the menu commands available.

How to use this manual

This manual provides the following information:

- Introduction
- Getting started
- A detailed reference chapter which describes the menus and commands
- Error messages in TCSM2 user commands
- Alarm list
- Cable connections

Where to find more

For information on the initial start-up procedures, see the *TCSM2 Commissioning*.

The BSC manuals cover specific uses related to the TCSM2. Consult the *GSM System Documentation* for a description of the BSC manuals.

Use of the terms TCSM2, TCSM2E, TCSM2A and TCSM2A-C

TCSM2 is the general term for the second generation Nokia DX 200 Transcoder and Submultiplexer equipment. *TCSM2A* stands for an ANSI (US) version and *TCSM2E* for an ETSI (European) version of the transcoder. Further, *TCSM2A-C* stands for the ANSI version in special cases where the TCSM2A is provided with an E1 interface (2048 kbit/s) towards the Mobile Switching Center (MSC). The term TCSM2 is used in this document to stand for all three applications. Note that the term is used in two ways:

- TCSM2 unit: the unit (group of cartridges and their plug-in units) responsible for transcoding and submultiplexing the traffic channels carried by a single PCM line between the BSC and the transcoding site.
- TCSM2 equipment: the assembly of racks housing the TCSM2 units of one or more BSCs.

Use of PCM/T1/E1

The term *PCM circuit* used in the menus stands for a *T1 circuit* for ANSI applications (TCSM2A) and an *E1 circuit* for ETSI applications (TCSM2E). A T1 circuit is a 1.544 Mbit/s metallic interface which corresponds to a 2.048 Mbit/s E1 circuit. In TCSM2A-C application, E1 circuits are used in the MSC direction and T1 circuits in the BSC direction.

Typographic conventions

Transition from one menu to another is performed with the command Z and the main level commands, or by giving a command of any menu directly in any menu as in the following example:

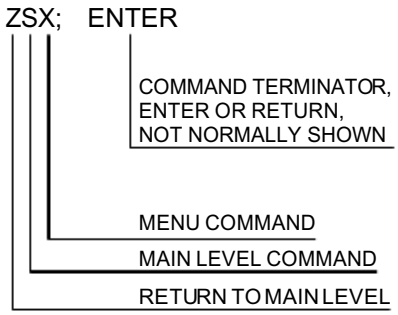


Figure 1 Command example

The following command sequences are identical with the above command:

```
Z ENTER
S ENTER
X ENTER or
ZS ENTER
X ENTER or
Z ENTER
SX ENTER
```

A semicolon (;) after a command is not necessary when you use a local session to manage the TCSM2, but it is necessary when you use a remote MML session through the Base Station Controller (BSC) or Network Management System (NMS). Note that the commands are given without showing the command terminators ENTER or RETURN. Some commands are carried out by pressing the spacebar. In these cases the terminator SPACE is shown. The table below shows the typographic conventions:

Emphasized font	Indicates a reference to a section, word or phrase, for example: See *Installation*.
COURIER CAPITALS	Indicates the menu commands and displays, for example: `TCSM_XXX:LUC>X`

Table 1 Typographic conventions

Indexes in parameters

Note that in several commands you can give a parameter which includes index (identifier) numbers. Each index number shown is for the maximum HR configuration, so the actual index depends on the application.

Here are two examples of how the indexes are shown in the commands:

Plug-in unit index (unit type):

The parameter indicates where in the cartridge the plug-in unit is added.

0 - 3 ET2A/ET2E plug-in unit's slot

0 - 13 TR12/TR16 plug-in unit's slot

PCM circuit index (identifier):

The identifier indicates which PCM circuit (line) parameters are to be displayed.

0 BSC direction PCM circuit (line)

1 - 7 a certain MSC direction PCM circuit (line)

Your comments

We are always interested to know whether our manuals provide the information you need. If you have any comments about this document or any other Nokia Siemens Networks manual, please pass them on to your local Nokia Siemens Networks sales representative.

2 Introduction to TCSM2 functions

The TCSM2 program

The local operating program (LUCTCS) is available for managing the second generation Transcoder and Submultiplexer (TCSM2), from the BSC or Network Management System (Nokia NMS) by a remote session, or by using a local terminal. With this program you can configure and control the TCSM2 unit, which is used in the GSM900/GSM1800/GSM1900 digital cellular network to provide transcoding function for traffic channels. This function is located in the Base Station Subsystem (BSS). The TCSM2 is used together with the Nokia DX 200 BSC (Base Station Controller) and the BTS (Base Transceiver Station).

A standard terminal (VT52 or VT100) is available for local (MMI) terminal. The asynchronous V.24/V.28 serial interface is located on the front panel of the TRCO. The connector is a 25-pin D connector conforming to ISO standard.

The figure below presents the operating environment of the TCSM2. The major telecommunication interfaces are the A-interface towards the MSC and the Ater-interface towards the BSC.

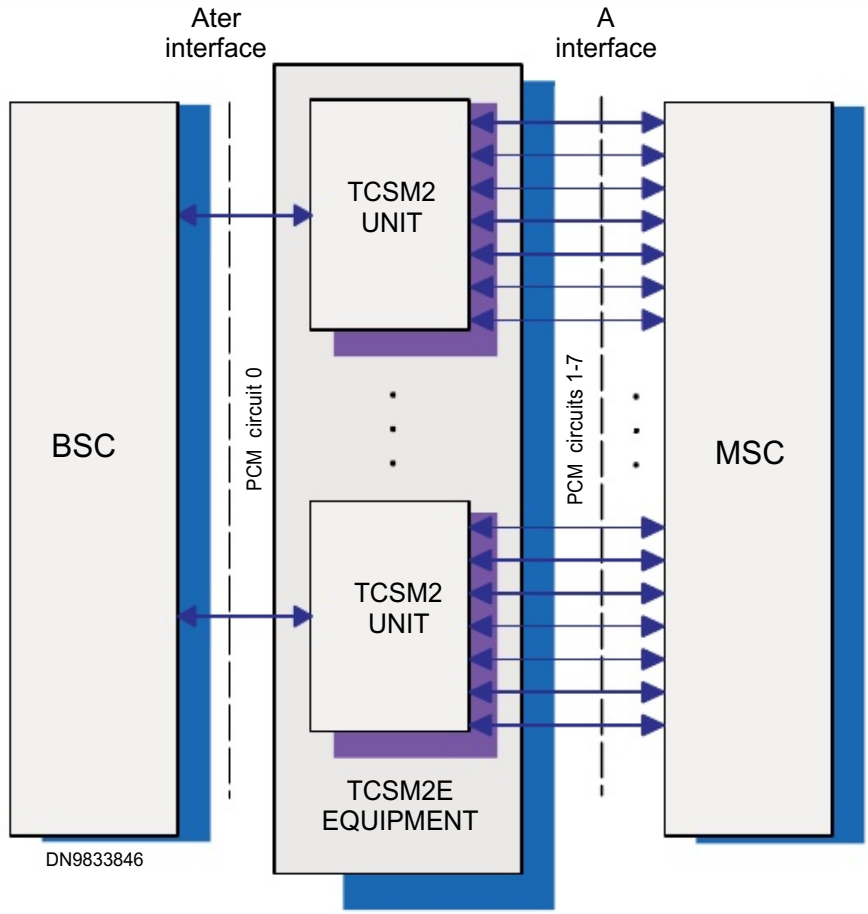


Figure 2 Operating environment of the TCSM2

Software requirements

The system requirements of the computer needed to run the TCSM2 unit:

- Operating system: MS-DOS, at least Version 3 (or Windows 95 or NT)

- Microsoft windows 3.1, 3.11, or later (optional)
- Terminal software with Kermit protocol

Hardware requirements

The system requirements of the computer needed to run the TCSM2 unit:

- IBM PC-compatible computer (at least 80286)
- Cable PC - TCSM, connections shown in Cable connections (RS-232C)
- Mouse, track ball or equivalent pointing device (optional)
- Serial port for communication to the TCSM2 unit
- 3.5 in. floppy drive for the installation diskette

Display unit types

The software supports the following display unit types:

- VT52
- VT100 (default terminal)

Operation in error situations

Any message unknown to the local user interface will be discarded. The program checks the semantics of the commands and the correctness of the parameters. If these are incorrect, an error message appears on the screen. If the command, for some reason, is unexecutable, an error message will also appear on the screen.

Line parameters and terminal settings

The normal settings for the local terminal line are:

- bit rate 9600 bit/s or 19200 bit/s
- 7 data bits
- even parity
- 1 stop bit

The terminal line does not, however, check the parity at reception, and 1 stop bit is sufficient.

For optimum results, note also the following:

- no automatic line feed (auto wrap off)
- tabulation at 16 character intervals
- xon/xoff protocol
- no local echoing (local echo off)
- sending of break character allowed (break on)

3 Getting started

Connect your terminal (PC or VDU) to the front panel connector of the TRCO plug-in unit. The connector is a 25-pin D connector. The cable used depends on your terminal. Cable connections (RS-232C) shows the pin configurations for the connection cables: PC - TCSM and VDU - TCSM.

Make sure that all the rack doors are closed during normal operation.

3.1 Session priority

A local session has a higher priority than a remote session.

- If you try to start a remote session while a local session is under way, it will not succeed and you will get a message stating that a local session is under way.
- If you start a local session while a remote session is under way, the remote session will be discontinued and you will get a message stating this.
- If you start a remote session while another remote session is under way, the earlier session will remain and you will get a message stating this.

You start a local session by giving a session start request by pressing ENTER. For a remote session, give a session start command from the BSC. Then you are prompted for user identification and password.

3.2 Starting and ending a local session

This section assumes that the terminal is connected to an operational TCSM2 unit.

To start a local session:

1. Switch on your computer terminal and set the <CAPS LOCK> on for commands.
2. Start your terminal session.
3. Type your user name: USERNAME> USER or USERNAME> EXPERT
4. Type your password: PASSWORD> SYSTEM
5. After the first logging in, change the password.
6. When the logging in procedure is complete, the terminal is ready for further commands and the display shows the LOCAL:LUC> command prompt or the TCSM_XXX:LUC> command prompt.

   In a local session, the command prompt is LOCAL:LUC> when no connection to the BSC is established. Once a connection is established to the BSC, the command prompt changes to TCSM_XXX:LUC>. `XXX' can be for example 032. The number is the index number of the transcoder unit concerned. In a remote session, the prompt is always TCSM_XXX:LUC>. In this manual, the TCSM_XXX:LUC> prompt is always shown.

When you type your user name and password correctly, the notice LOCAL USER LOGGED IN is obtained. The program checks the syntax and semantics of the commands entered and, after execution of the commands, the output is displayed on the screen.

To end a local session, give the main menu command `X` (EXIT):

```
TCSM_XXX:LUC> X
```

Then the notice LOCAL USER LOGGED IN is removed and the program waits for start requests.

3.3 Starting and ending a remote session through the BSC

A remote session to the TCSM2 is available through the same MML session that is used to manage the BSC itself. For information on the MML commands, see the BSC documentation.

To start a remote session:

1. Start your MML session
2. Type your user name: USERNAME>
3. Type your password: PASSWORD>
4. When the logging in procedure is complete, the terminal is ready for further commands and the display shows the TCSM_XXX:LUC> command prompt.
5. Type the command to establish the remote session to TCSM2:
   `ZDDT:TCSM,x;`
   (x = index for the TCSM2 concerned)

To end a remote session, give the main menu command X (EXIT):

```
TCSM_XXX:LUC> X
```

3.4 Menu commands

Available commands

The user interface is menu based. From the main menu you can go to various sub-menus and choose the required command by typing it. The sub-menus are grouped according to their usage.

Main menu commands

The main menu commands are shown below. They are described in more detail in section *TCSM2 commands*.

```
LOCAL USER COMMUNICATION COMMANDS OF TCSM2

? ..... MENU / HELP
A ..... ALARM HANDLING COMMANDS
C ..... DIAGNOSTICS COMMANDS
L ..... SYNCHRONIZATION COMMANDS
G ..... GENERAL CONFIGURATION COMMANDS
R ..... TRANSCODER CONFIGURATION COMMANDS
E ..... EXCHANGE TERMINAL SUPERVISION COMMANDS
U ..... UNIT RESTART AND STATE HANDLING COMMANDS
I ..... STATISTICS COMMANDS
D ..... MEMORY AND I/O HANDLING COMMANDS
O ..... OPERATING SYSTEM COMMANDS
S ..... SYSTEM MONITORING COMMANDS
T ..... SET AND DISPLAY TERMINAL
X ..... EXIT

TCSM_XXX:LUC>
```

Common commands

Each command group has a sub-menu opened by a one-letter command. All the menus have following two commands in common:

?	types the menu
Z	returns to the main menu

Help function

When you type ? and one of the command letters, you get a description of its parameters and syntax. For example, when you are in the menu SYNCHRONIZATION COMMANDS and give the command ?P, the following message is displayed:

```
CHANGE SYNCHRONIZATION INPUT PRIORITY
P:SIGNAL INDEX,PRIORITY;

SIGNAL INDEX        BYTE 1..8
                    1 = PCM-1
                    2 = PCM-2
                    3 = PCM-3

                    4 = PCM-4
                    5 = PCM-5
                    6 = PCM-6
                    7 = PCM-7
                    8 = EXTERNAL SIGNAL

PRIORITY            BYTE 1..15
```

Line editor

The line editor is available at all levels. It provides the following commands:

BACKSPACE	Deletes the previous character and the cursor (as well as the whole line) moves one position left.
ESC	Interrupts the display of commands when the local session is being used.
CTRL-C	Interrupts the display of commands when the remote session through the BSC is being used.

In a local session, there is a command history. The arrow keys (UP and DOWN) can be used to view the command history. The LEFT and RIGHT arrow keys move the cursor on the line.

Only CAPITAL LETTERS are acceptable in commands.

4 TCSM2 commands

Introduction to TCSM2 menus

The main menu includes the command alternatives which you can select when indicated by the > prompt. Possible sub-menus include command alternatives which are available at a particular subcommand level, indicated by another particular prompt.

The local user terminal provides eleven command groups and a command for terminal setting. There are two groups of users with different access rights: an ordinary user (USER) and an expert user (EXPERT). Ordinary users have access to the first eight command groups (A, C, L, G, R, E, U, I). Experts have access to these and to another three command groups (D, O, S).

```
LOCAL USER COMMUNICATION COMMANDS OF TCSM2

? ..... MENU / HELP
A ..... ALARM HANDLING COMMANDS
C ..... DIAGNOSTICS COMMANDS
L ..... SYNCHRONIZATION COMMANDS
G ..... GENERAL CONFIGURATION COMMANDS
R ..... TRANSCODER CONFIGURATION COMMANDS
E ..... EXCHANGE TERMINAL SUPERVISION COMMANDS
U ..... UNIT RESTART AND STATE HANDLING COMMANDS
I ..... STATISTICS COMMANDS
D ..... MEMORY- AND I/O HANDLING COMMANDS
O ..... OPERATING SYSTEM COMMANDS
S ..... SYSTEM MONITORING COMMANDS

T ..... SET AND DISPLAY TERMINAL
X ..... EXIT

TCSM_XXX:LUC>
```

When you change the configuration, note that the settings are not stored in the non-volatile memory automatically. You are asked if you want to save the setting change. The SAVE CONFIGURATION command can be used for saving all the changes made during one terminal session.

Some commands cannot be used without disturbing traffic or even disconnecting lines. When you issue such a command you are prompted for confirmation.

The main menu commands

The ZA? command in the main menu (TCSM_XXX:LUC>) displays the following sub-menu with alarm handling commands:

```
ALARM HANDLING COMMANDS

? ..... MENU / HELP
I ..... DISPLAY ALARMS CURRENTLY ON
W ..... WIRED ALARMS FROM OTHER TCSM2 UNITS
F ..... FAR END ALARM HANDLING
Z ..... RETURN TO MAIN LEVEL
TCSM_XXX:AHC>
```

The ZC? command in the main menu (TCSM_XXX:LUC>) displays the following sub-menu with diagnostics commands available for testing the plug-in unit and its parts:

```
DIAGNOSTICS COMMANDS

? ..... MENU / HELP
C ..... START COMPLETE DIAGNOSTICS
M ..... START MEMORY TEST
H ..... START HDLC CONTROLLER TEST
T ..... START LOOP TESTS
E ..... START EXCHANGE TERMINAL TEST
O ..... DISPLAY DIAGNOSTICS RESULTS
S ..... DISPLAY LAPD CHANNEL STATES
G ..... SET LOOPS FOR PCM LINE
L ..... SET LOOPS FOR TRAFFIC CHANNELS
D ..... DISPLAY LOOPS
R ..... REMOVE LOOPS
Z ..... RETURN TO MAIN LEVEL

TCSM_XXX:DIC>
```

The ZL? command in the main menu (TCSM_XXX:LUC>) displays the following sub-menu with synchronisation commands:

```
SYNCHRONIZATION COMMANDS

? ..... MENU / HELP
S ..... DISPLAY SYNCHRONIZATION INPUTS
C ..... CREATE SYNCHRONIZATION INPUT
D ..... DELETE SYNCHRONIZATION INPUT
P ..... CHANGE SYNCHRONIZATION INPUT PRIORITY
F ..... CHANGE SYNCHRONIZATION INPUT
O ..... SET SYNCHRONIZATION BLOCK OPERATING MODE
Z ..... RETURN TO MAIN LEVEL

TCSM_XXX:SUH>
```

The ZG? command in the main menu (TCSM_XXX:LUC>) displays the following sub-menu with general configuration commands:

```
GENERAL CONFIGURATION COMMANDS

? ..... MENU / HELP
T ..... DISPLAY TCSM2 HARDWARE CONFIGURATION
I ..... DISPLAY PROGRAM IDENTIFICATION CODES
L ..... SET PCM LINE TERMINAL TYPE
H ..... SET THROUGH CONNECTED CHANNELS
U ..... UPDATE SOFTWARE IN FLASH MEMORY
W ..... DISPLAY TRANSCODER SOFTWARE
S ..... SAVE CONFIGURATION
N ..... DOWNLOAD CONFIGURATION FROM PC
O ..... UPLOAD CONFIGURATION TO PC
V ..... SET HW IDENTIFICATION
P ..... CHANGE PASSWORD
```

```
C ..... SET DEFAULT COPNFIGURATION
Z ..... RETURN TO MAIN LEVEL

TCSM_XXX:GCC>
```

The ZR? command in the main menu (TCSM_XXX:LUC>) displays the following sub-menu with Transcoder configuration commands:

```
TRANSCODER CONFIGURATION COMMANDS

? ... MENU / HELP
C ... DISPLAY CHANNEL CONFIGURATION
X ... SET DOWNLINK DTX
A ... SET ADAPTIVE GAIN ADJUSTMENT IN DOWNLINK DIRECTION
F ... SET FIXED GAIN ADJUSTMENT
S ... SET TIME ALIGNMENT

U ... SET ACOUSTIC ECHO CANCELLATION (AEC)
Y ... SET NOISE SUPPRESSION (NS)
N ... SET TANDEM FREE OPERATION (TFO)
M ... START TRAFFIC CHANNEL MONITORING
T ... MODIFY ALARM LIMITS
O ... DISPLAY ALARM LIMITS
R ... SET TRANSCODER PCM TYPES
D ... DISPLAY TRANSCODER PCM TYPES
Z ... RETURN TO MAIN LEVEL

TCSM_XXX:TCC>
```

Commands ZRU, ZRN and ZRY are optional, and therefore not visible nor available if the customer has not purchased them.

The ZE? command in the main menu (LOCAL:LUC>) displays the following sub-menu with exchange terminal supervision commands:

```
EXCHANGE TERMINAL SUPERVISION COMMANDS

? ..... MENU / HELP
M ..... MODIFY ET PARAMETERS
O ..... DISPLAY ET PARAMETERS
A ..... MODIFY ALARM LIMITS
P ..... DISPLAY ALARM LIMITS

S ..... MODIFY STATISTICS COUNTER LIMITS
L ..... DISPLAY STATISTICS COUNTER LIMITS
U ..... MODIFY SLIP LIMITS
R ..... DISPLAY SLIP LIMITS
C ..... MODIFY FUNCTIONAL MODES
I ..... DISPLAY FUNCTIONAL MODES
Z ..... RETURN TO MAIN LEVEL

TCSM_XXX:ESC>
```

The ZU? command in the main menu (TCSM_XXX:LUC>) displays the following sub-menu with unit restart and state handling commands:

```
UNIT RESTART AND STATE HANDLING COMMANDS

? ..... MENU/HELP
C ..... CHANGE TCSM2 UNIT STATE
U ..... RESTART TCSM2 UNIT
P ..... RESTART PLUG-IN UNIT
B ..... BLOCK PLUG-IN UNIT
F ..... UNBLOCK PLUG-IN UNIT
Z ..... RETURN TO MAIN LEVEL

TCSM_XXX:USC>
```

The ZI? command in the main menu (TCSM_XXX:LUC>) displays the following sub-menu with statistics commands:

```
STATISTICS COMMANDS

? ..... MENU / HELP
F ..... DISPLAY PCM FAULT RATE COUNTERS
R ..... RESET PCM FAULT RATE COUNTERS
U ..... DISPLAY EXCHANGE TERMINAL RESET COUNTERS
P ..... RESET EXCHANGE TERMINAL RESET COUNTERS
T ..... DISPLAY TRANSCODER RESET COUNTERS
C ..... RESET TRANSCODER RESET COUNTERS
Z ..... RETURN TO MAIN LEVEL

TCSM_XXX:STA>
```

The ZD? command in the main menu (TCSM_XXX:LUC>) displays the following sub-menu with commands for memory and input/output (I/O) handling:

```
MEMORY AND I/O HANDLING COMMANDS

? ..... MENU / HELP
C ..... DISPLAY MEMORY BLOCK CONTINUOUSLY
D ..... DISPLAY MEMORY BLOCK
E ..... SEARCH FOR A STRING
F ..... FILL MEMORY BLOCK
I ..... INPUT PORT
M ..... MOVE MEMORY BLOCK
O ..... OUTPUT PORT
P ..... MEMORY BLOCK CHECKSUM
S ..... SUBSTITUTE MEMORY
V ..... MEMORY BLOCK COMPARATION
Z ..... RETURN TO MAIN LEVEL

TCSM_XXX:DEB>
```

The ZO? command in the main menu (TCSM_XXX:LUC>) displays the following sub-menu with operating system commands:

```
OPERATING SYSTEM COMMANDS


? ..... MENU / HELP
C ..... CREATE PROCESS
```

```
D ..... DESTROY PROCESS
G ..... CHANGE PRIORITY
H ..... DISPLAY PROCESS PCB
M ..... DISPLAY PROCESS STATE
P ..... P-OPERATION
R ..... RECEIVE MESSAGE
S ..... SEND MESSAGE
T ..... TEST IF MESSAGES COMING
U ..... RESTART PROCESS
V ..... V-OPERATION
Z ..... RETURN TO MAIN LEVEL

TCSM_XXX:OSC>
```

The ZS? command in the main menu (TCSM_XXX:LUC>) displays the following sub-menu with system monitoring commands:

```
SYSTEM MONITORING COMMANDS

? ..... MENU / HELP
C ..... PECTUS ERROR COUNTERS
L ..... PROCESSOR LOAD RATE
S ..... CALCULATE AND COMPARE CHECKSUMS
X ..... EXAMINE PROGRAM IDENTIFICATION CODES
Z ..... RETURN TO MAIN LEVEL

TCSM_XXX:SYS>
```

The ZT? command in the main menu (TCSM_XXX:LUC>) does not display a sub-menu, since it is a command by itself.

4.1 A: Alarm handling commands

Command group ZA? in the main menu (TCSM_XXX:LUC>) displays the following sub-menu with alarm handling commands:

```
ALARM HANDLING COMMANDS

? ..... MENU / HELP

I ..... DISPLAY ALARMS CURRENTLY ON
W ..... WIRED ALARMS FROM OTHER TCSM2 UNITS
F ..... FAR END ALARM HANDLING
Z ..... RETURN TO MAIN LEVEL

TCSM_XXX:AHC>
```

The following sections describe, in more detail, the alarm handling commands (TCSM_XXX:AHC>) available, their use, parameters, syntax. Some command examples are also given.

4.1.1 AI: Display alarms currently on

Command ZAI allows you to check all the alarms currently set on in the accessed unit. The display gives the number of the alarm, a textual alarm description and additional information fields relating to the alarm. Hitting the ESC key interrupts the execution of the command.

Syntax

```
ZAI;
```

Examples

- To display on the screen all the alarms currently on, give the command:

```
TCSM_XXX:AHC> I;

/* ALARMS CURRENTLY ON */

2915    FAULT RATE MONITORING
        AF 00 02 00 00

/* COMMAND EXECUTED */
```

4.1.2 AW: Wired alarms from other TCSM2 units

Command ZAW is used to turn on or off the wired alarms from other TCSM2 units. The state value is given as a parameter. If no parameter is given, the current state of wired alarm handling is displayed. With this command one unit in the rack is set to act as the master. It collects the alarms from the other units (up to 20) and sends them to the BSC. The wired alarms are: TRCO alarm, LAPD alarm, power supply alarm.

Parameters

```
State value;
```

The parameter's value indicates whether or not wired alarms are collected and sent to the BSC:

ON	wired alarms are sent to BSC
OFF	wired alarms are not sent to BSC

Syntax

```
ZAW(:state value);
```

Examples

- To display the current state of wired alarm handling, give the command:

```
TCSM_XXX:AHC> W;

/* WIRED ALARMS FROM OTHER TCSM2 */
/* UNITS ARE NOW DISCARDED */

/* COMMAND EXECUTED */
```

- To set wired alarm collection from other TCSM2 units on, give the command:

```
TCSM_XXX:AHC> W:ON;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

4.1.3 AF: Far end alarm handling

Command ZAF is used to set the TCSM2 behaviour when a far-end alarm is received in the BSC direction PCM circuit. The type of this alarm (to be sent to the MSC) is given as a parameter. If no parameter is given, the current state of far-end alarm handling is displayed.

Parameters

Alarm type

The parameter's value indicates which alarm is sent to the MSC:

OFF	Neither far-end alarm (FEA) nor AIS is sent to MSC
FEA	Far-end alarm is sent to MSC
AIS	AIS alarm is sent to MSC

Syntax

```
ZAF(:alarm type);
```

Examples

- To display the current state of far-end alarm handling, give the command:

```
TCSM_XXX:AHC> F;

/* TCSM2 IS NOT ALLOWED TO SEND */
/* AIS OR FAR END ALARM TO MSC */

/* COMMAND EXECUTED */
```

- To set TCSM2 to send an AIS to the MSC when a far-end alarm in the BSC direction PCM circuit is received, give the command:

```
TCSM_XXX:AHC> F:AIS;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/*** COMMAND EXECUTED ***/
```

If you give the answer “N”, the displayed message will be:
/*** COMMAND NOT EXECUTED ***/

4.2 C: Diagnostics commands

Command group ZC? in the main menu (TCSM_XXX:LUC>) displays the following sub-menu with diagnostics commands available for testing the plug-in unit and its parts:

```
DIAGNOSTICS COMMANDS

? ..... MENU/HELP
C ..... START COMPLETE DIAGNOSTICS
M ..... START MEMORY TEST
H ..... START HDLC CONTROLLER TEST
T ..... START LOOP TESTS
E ..... START EXCHANGE TERMINAL TEST
O ..... DISPLAY DIAGNOSTICS RESULTS
S ..... DISPLAY LAPD CHANNEL STATES
G ..... SET LOOPS FOR PCM LINE
L ..... SET LOOPS FOR TRAFFIC CHANNELS
D ..... DISPLAY LOOPS
R ..... REMOVE LOOPS
Z ..... RETURN TO MAIN LEVEL

TCSM_XXX:DIC>
```

The following sections describe the diagnostics commands (TCSM_XXX:DIC>) available in more detail, their use, parameters, syntax and command examples. Some commands interfere with normal operation. Table 2 shows which commands can be used while the unit is working and which ones can only be used when it is in test state.

	Working (WO) or Blocked (BL)	Testing (TE)
ZC	-	×
ZM	-	×
ZH	×	×
ZT	-	×
ZE	×	×
ZO	×	×
ZS	×	×
ZG	-	×
ZL	-	×
ZD	×	×
ZR	×	×

Table 2 The use of diagnostics commands.

4.2.1 CC: Start complete diagnostics

Command ZCC starts the complete diagnostics for the whole TCSM2 unit or one of the plug-in units (TRCO).

Parameters

`Plug-in unit identifier` (TRCO plug-in unit or TOTAL for the whole TCSM unit).

Syntax

```
ZCC: plug-in unit identifier;
```

Examples

- To start the diagnostics for the TCSM unit, give the command:

```
TCSM_XXX:DIC> C:TOTAL;

/* ALL CALLS WILL BE CANCELLED DUE */
/* TO GIVEN COMMAND */

   PLEASE CONFIRM (Y/N)

   EXECUTING COMPLETE DIAGNOSTICS ...
```

(at this point the unit restarts)

```
/* COMMAND EXECUTED */
```

- To start the diagnostics for the TRCO plug-in unit, give the command:

```
TCSM_XXX:DIC> C:TRCO;

/* ALL CALLS WILL BE CANCELLED DUE */
/* TO GIVEN COMMAND */

   PLEASE CONFIRM (Y/N)

   EXECUTING COMPLETE DIAGNOSTICS ...
```

(at this point the unit restarts)

```
/* COMMAND EXECUTED */
```

Functional notes

The diagnostics procedure for the TRCO plug-in unit includes a memory test (RAM, FLASH), a clock test, a loop test for the HDLC controller and a watchdog test. The diagnostics procedure for the whole TCSM unit also includes a loop test 1 and ET diagnostics. In this test, each transcoder sends data towards the BSC and MSC and the transmitted data is compared to the data looped back by the ET2A/ET2E plug-in units. The test lasts 5 to 7 minutes. After the restart the diagnostics results are displayed automatically on the local terminal. Later, the results can be displayed with a command (`ZCO;`).

Execution errors

```
/*** CANNOT PERFORM TEST ***/
/*** LAST DIAGNOSTICS NOT READY ***/
```

4.2.2 CM: Start memory test

Command ZCM starts the diagnostics for the RAM and FLASH memory circuits of the TRCO. The RAM test lasts 1.5 minutes.

Parameters

Memory type, which may be RAM or FLASH.

If you give no parameter, both types will be tested.

Syntax

```
ZCM(:memory type);
```

Examples

- To test the RAM memory of the TRCO plug-in unit, give the command:

```
TCSM_XXX:DIC> M:RAM;

/* UNIT MAY NOT WORK NORMALLY AFTER */
/* COMMAND HAS BEEN GIVEN */

   PLEASE CONFIRM EXECUTION (Y/N)

   EXECUTING MEMORY TEST ...

/* COMMAND EXECUTED */
```

- To test both memory types (RAM and FLASH) of the TRCO plug-in unit, give the command:

```
TCSM_XXX:DIC> M;

/* EXECUTING MEMORY TEST */

/* COMMAND EXECUTED */
```

Execution errors

```
/*** CANNOT PERFORM TEST ***/
/*** LAST DIAGNOSTICS NOT READY ***/

/*** INCORRECT UNIT STATE FOR TEST ***/
```

4.2.3 CH: Start HDLC controller test

Command ZCH starts the HDLC controller test for the LAPD channels.

Parameters

Identification of the LAPD channel, which is a decimal number between 0 and 4.

0	LAPD channel for the BSC
1 - 4	LAPD channels for the ET2E/ET2A plug-in unit

If you give no parameter, all channels will be tested.

Syntax

```
ZCH(:Identification for the LAPD channel);
```

Examples

- To start the HDLC controller test for the BSC, give the command:

```
TCSM_XXX:DIC> H:0;

/* UNIT MAY NOT WORK NORMALLY AFTER */
/* COMMAND HAS BEEN GIVEN */

   PLEASE CONFIRM EXECUTION (Y/N)

/* COMMAND EXECUTED */
```

- To start the HDLC controller test for all channels (BSC and ETs), give the command:

```
TCSM_XXX:DIC> H;

/* UNIT MAY NOT WORK NORMALLY AFTER */
/* COMMAND HAS BEEN GIVEN */

   PLEASE CONFIRM EXECUTION (Y/N)

/* COMMAND EXECUTED */
```

Execution errors

```
/*** CANNOT PERFORM TEST ***/
/*** LAST DIAGNOSTICS NOT READY ***/
```

4.2.4 CT: Start loop tests

Command `ZCT` starts two different loop tests. Test 0 sends back the received data from the MSC after encoding and decoding. Looping is defined by the parameter. Test 1 starts the loop testing for certain transcoders, which send data towards the MSC and BSC interfaces and compare the received data with the transmitted data. The ET2E/ET2A plug-in units loop the data back automatically.

The command may apply to all the PCM channels of one MSC direction or all the channels of the whole unit.

Parameters

```
PCM circuit index / ALL channels selected, loop test, loop-back,
control time / test set OFF;
```

PCM circuit index:

Decimal number 1 - 7, the number of the tested PCM circuit towards MSC direction.

ALL channels selected:

Select the parameter instead of the PCM circuit index and timeslot if you want to perform a loop test on all channels of the unit; type ALL.

Loop test:

Defines one of the available loop tests 0 or 1, decimal number 0 or 1.

Loop-back:

Specifies where the actual loop-back takes place in loop test 0 (ET or NO).

ET Loop-back to ET2A/ET2E in BSC direction

NO No loop-back

This parameter is unnecessary for loop test 1.

Control time:

PERIOD = control time format: HH-MM

Specifies the duration of the loop test selected. The shortest allowed test period is 00-01 and the longest period is 18-00 (18 hours). The default is 30 seconds.

Test set OFF:

This can be the only parameter for the command, and then the active loop test will be stopped.

Syntax

`ZCT: (PCM circuit index) / ALL channels selected: TEST = <loop test>, LOOP = <loop-back>, PERIOD = <control time> );`

`ZCT: OFF;` the loop test set on discontinued

Examples

- To start loop test 1 for a channel on PCM circuit 3, give the command:

```
TCSM_XXX:DIC> T:3:TEST=1;

/* UNIT MAY NOT WORK NORMALLY AFTER */
/* COMMAND HAS BEEN GIVEN */

   PLEASE CONFIRM EXECUTION (Y/N)

/* COMMAND EXECUTED */
```

The test lasts for 30 seconds (default setting).

- To start loop test 1 on all channels on PCM circuit 4 for 18 hours, give the command:

```
TCSM_XXX:DIC> T:4:TEST=1,PERIOD=18-00;

/* UNIT MAY NOT WORK NORMALLY AFTER */
/* COMMAND HAS BEEN GIVEN */

   PLEASE CONFIRM EXECUTION (Y/N)

/* COMMAND EXECUTED */
```

- To start loop test 1 on all channels of the unit, give the command:

```
TCSM_XXX:DIC> T:ALL:TEST=1;

/* UNIT MAY NOT WORK NORMALLY AFTER */
/* COMMAND HAS BEEN GIVEN */
```

```
   PLEASE CONFIRM EXECUTION (Y/N)

/* COMMAND EXECUTED */
```

- To stop the loop test currently set on, give the command:

```
TCSM_XXX:DIC> T:OFF;

/* COMMAND EXECUTED */
```

- To start loop test 0 on all channels of the whole TCSM2 unit for one hour, and set the actual loop-back at the ET2A/ET2E unit, give the command:

```
TCSM_XXX:DIC>  T:ALL:TEST=0,LOOP=ET,PERIOD=01-00;

/* UNIT MAY NOT WORK NORMALLY AFTER */
/* COMMAND HAS BEEN GIVEN */

   PLEASE CONFIRM EXECUTION (Y/N)

/* COMMAND EXECUTED */
```

Additional information

Note that the whole BSC direction PCM circuit is looped.

Only one loop test at a time can be set on. An error message appears if you try to start another one.

Note also that when you start the command, all current calls on channels being tested will be discontinued. You are warned and prompted for confirmation.

Execution errors

```
/*** CANNOT PERFORM TEST ***/
/*** LAST DIAGNOSTICS NOT READY ***/
```

4.2.5 CE: Start Exchange Terminal test

Command `ZCE` starts the exchange terminal (ET) test.

Parameters

`ET plug-in unit identifier;`

0 - 3	number of the plug-in unit to be tested
ALL	all the plug-in units will be tested

Syntax

```
ZCE: ET plug-in unit identifier;
```

Examples

- To start the test on all ET plug-in units, give the command:

```
TCSM_XXX:DIC> E:ALL;


/* COMMAND EXECUTED */
```

- To start the test on ET plug-in units 0, give the command:

```
TCSM_XXX:DIC> E:0;

/* COMMAND EXECUTED */
```

Additional information

Only one exchange terminal test can be ongoing at any one time. If you try to initiate a new test, while the previous one is still ongoing, you will receive an error message.

Execution errors

```
/*** CANNOT PERFORM TEST ***/
/*** LAST DIAGNOSTICS NOT READY ***/

/*** INCORRECT UNIT STATE FOR TEST ***/

/*** NO EQUIPMENT ***/

/*** MESSAGE TIMEOUT ***/
```

4.2.6 CO: Display diagnostics results

Command ZCO displays the results of the latest diagnostics test.

Syntax

```
ZCO;
```

Examples

- To display the results of the latest test (the memory test) give the command:

```
TCSM_XXX:DIC> O;

/* DIAGNOSTICS RESULTS */

   RAM TEST OK
   FLASH TEST OK

/* COMMAND EXECUTED */
```

- To display the results of the latest test (the loop test of the HDLC controllers of channel 0), give the command:

```
TCSM_XXX:DIC> O;

/* DIAGNOSTICS RESULTS */

   HDLC CONTROLLER TEST
   FOR LAPD CHANNEL  0    1    2    3    4

                     OK   -    -    -    -

/* COMMAND EXECUTED */
```

- To display the results of the latest test (the ET memory test of ET 0) give the command:

```
TCSM_XXX:DIC> E:0;

/* DIAGNOSTICS RESULTS */

   ET MEMORY TEST
   FOR UNITS     0      1          2      3
                 OK     NOT TESTED -      -
```

- To display the results of the latest test, which is loop test 1 for all channels of the unit, give the command:

```
TCSM_XXX:DIC> ZCO

/* DIAGNOSTICS RESULTS */

     FAILED TIME SLOTS IN MSC DIRECTION IN LOOP TEST-1

     PCM-3 :    2  4  6  8 10 12 14 16 18 20 22 24 26 28 30

     FAILED TIME SLOTS IN BSC DIRECTION IN LOOP TEST-1

     PCM-3 :    2  4  6  8 10 12 14 16 18 20 22 24 26 28 30

/* COMMAND EXECUTED */
```

- Display the results of the latest test, which is the complete diagnostics of the whole TCSM2 unit.

```
TCSM_XXX:DIC> O;

/* DIAGNOSTICS RESULTS */

 RAM TEST OK
 FLASH TEST OK
 WATCHDOG TEST OK
 CLOCK TEST OK
 HDLC CONTROLLER TEST
 FOR LAPD CHANNEL   0      1      2      3      4
                    OK     OK     OK     OK     OK

     LOOP TEST-1 OK

ET MEMORY TEST
FOR UNITS        0      1      2      3
                 OK     OK     OK     OK
```

Diagnostics results

OK	Test passed
FAILURE	A fault
NOT TESTED	The unit was not tested

- This channel was not tested, or this unit is not included in the configuration

Execution errors

```
/*** NO DIAGNOSTICS RESULTS ***/
```

4.2.7 CS: Display LAPD channel states

Command ZCS displays the channel states of LAPD channels.

Syntax

```
ZCS;
```

Example

Display the LAPD channel states.

```
TCSM_XXX:DIC> S;

/* LAPD CHANNEL STATES */

LAPD CHANNEL TO

                BSC    : CONNECTION EXISTS
                ET2A-0 : CONNECTION EXISTS
                ET2A-1 : CONNECTION EXISTS
                ET2A-2 : NO CONNECTION
                ET2A-3 : NO CONNECTION

/* COMMAND EXECUTED */
```

The state may be NO CONNECTION or CONNECTION EXISTS.

4.2.8 CG: Set loops for PCM circuit

Command ZCG sets loops for a PCM circuit at the T1/E1 interface, either in the BSC or MSC direction.

Parameters

```
PCM circuit index, timeslot, control time
```

PCM circuit index:

The number of the PCM circuit to be set on loop; decimal number 0 - 7.

0	PCM circuit in BSC direction
1–7	one of the PCM circuits in MSC direction

Timeslot:

Timeslot	1 - 24 (ANSI) 1...31 (ETSI)

Timeslot can only be given in the ANSI (TCSM2A) application.

Control time:

PERIOD control time format HH-MM

The control time specifies the duration of the loop test selected. The default is 10 minutes.

Syntax

```
ZCG: PCM circuit index(,timeslot)(:PERIOD= <control time>);
```

Examples

- Set a loop for the whole signal of PCM circuit 2, for 30 minutes.

```
TCSM_XXX:DIC> G:2:PERIOD=00-30;

/* TEST LOOP ON ET UNIT */
/* PERIOD = 00-30 */
/* PCM-TIMESLOT = 2-ALL */

/* UNIT MAY NOT WORK NORMALLY AFTER */
/* COMMAND HAS BEEN GIVEN */

   PLEASE CONFIRM EXECUTION (Y/N) Y

/* COMMAND EXECUTED */
```

- Set a loop for PCM circuit 1, for 10 minutes (default):

```
TCSM_XXX:DIC> G:1;

/* TEST LOOP ON ET UNIT */

/* PERIOD = 00-10 */
/* PCM-TIMESLOT = 1-ALL */

/* UNIT MAY NOT WORK NORMALLY AFTER */
/* COMMAND HAS BEEN GIVEN */

   PLEASE CONFIRM EXECUTION (Y/N)

/* COMMAND EXECUTED */
```

Additional information

Information on the loops available is displayed on the screen and you are prompted for confirmation before execution of the command.

A maximum of five loops at a time, with individual control times, can be set on.

If one time slot is looped in the BSC direction, all speech channels in the same time slot towards the BSC will be cut.

Execution errors

```
/*** CANNOT PERFORM TEST ***/
/*** LAST DIAGNOSTICS NOT READY ***/
```

4.2.9 CL: Set loops for traffic channels

Command ZCL sets test loops for the transcoder traffic channels. It is available for one channel, all channels in one MSC direction, or all channels of the whole unit.

Parameters

```
(PCM circuit index, timeslot) / ALL channels selected, test loop
identifier, control time
```

PCM circuit index:

The parameter indicates in which MSC direction PCM circuit the required timeslot is located; decimal number 1- 7. If no parameter is given, a test loop is set for all channels of the unit.

Timeslot:

The parameter indicates to which timeslot-handling transcoder the test loop is set; decimal number 1 - 24 in ANSI, 1-31 in ETSI. If no parameter is given, the test loop is set for all channels of the PCM circuit in the chosen direction of the MSC.

Test loop identifier:

TESTL = identifier

The test loop identifier indicates which test loop is required to be set to the transcoder; decimal number 1 - 4.

1. Data from the BSC direction is sent straight back.
2. Data from the BSC kbit/s direction is sent back via the decoder and encoder.
3. Data from the MSC direction is sent back via the decoder and encoder.
4. Data from the MSC direction is sent straight back.

Control time:

PERIOD = control time in the format HH-MM

The control time indicates how long loop-back is kept on.

The parameter's default value is 10 minutes.

All channel selection:

Select this parameter instead of the PCM circuit index and timeslot if you want to perform a loop test on all channels of the unit; type ALL.

Syntax

```
ZCL: PCM circuit index,(timeslot) / all channel selection data:
TESTL = <test loop identifier> (,PERIOD = <control time>);
```

Examples

- Set test loop 3 on the transcoder handling timeslot 20 of PCM circuit 3 for one hour.

```
TCSM_XXX:DIC> L:3,20:TESTL=3,PERIOD=01-00;

/* TEST LOOP ON TRANSCODER */
/* 64 KBIT/S VIA ENCODER AND DECODER */
/* PERIOD = 01-00 */
/* PCM-TIMESLOT = 3-20 */

/* UNIT MAY NOT WORK NORMALLY AFTER */
```

```
/* COMMAND HAS BEEN GIVEN */

   PLEASE CONFIRM EXECUTION (Y/N)

/* COMMAND EXECUTED */
```

- Set test loop 1 on the transcoders handling all timeslots of PCM circuit 2 for one hour.

```
TCSM_XXX:DIC>  L:2:TESTL=1,PERIOD=01-00;

/* TEST LOOP ON TRANSCODER */
/* 8/16 KBIT/S DIRECT LOOP-BACK */
/* PERIOD = 01-00 */
/* PCM-TIMESLOT = 2-ALL */


/* UNIT MAY NOT WORK NORMALLY AFTER */
/* COMMAND HAS BEEN GIVEN */

   PLEASE CONFIRM EXECUTION (Y/N)

/* COMMAND EXECUTED */
```

- Set test loop 4 on all transcoders of the TCSM2 unit for 1 hour.

```
TCSM_XXX:DIC>  L:ALL:TESTL=4,PERIOD=01-00;

/* TEST LOOP ON TRANSCODER */
/* 64 KBIT/S DIRECT LOOP-BACK */
/* PERIOD = 01-00 */
/* PCM-TIMESLOT = ALL-ALL */

/* UNIT MAY NOT WORK NORMALLY AFTER */
/* COMMAND HAS BEEN GIVEN */

   PLEASE CONFIRM EXECUTION (Y/N)

/* COMMAND EXECUTED */
```

Additional information

After the command is entered, the program displays a message on the screen stating that all loops will be set on. The user must acknowledge this before the command is executed. There can be a maximum of 5 loops set on at the same time with this command, each with its own control time.

Execution errors

```
/*** CANNOT PERFORM TEST ***/
/*** LAST DIAGNOSTICS NOT READY ***/

/*** MAXIMUM NUMBER OF LOOPS SET  ***/
```

4.2.10 CD: Display loops

Command ZCD displays all current loops.

Syntax

```
ZCD;
```

Examples

- To display the current loops set on, give the command:

```
TCSM_XXX:DIC> D;
```

An example from an ANSI application:

```
/* TEST LOOPS IN TRANSCODERS */

PCM/TSL 1   3   5   7   9   11   13   15   17   19   21   23
PCM-1   - - - - - - - - - - - -  - -  - -  - -  - -  - -  - - -
PCM-2   1 1 1 1 1 1 1 1 1 1 1 1  1 1  1 1  1 1  1 1  1 1  1 1 1
PCM-3   - - - - - - - - - - - -  - -  - -  - -  - -  - -  - - -

/* TEST LOOPS IN ET UNITS */

PCM/TSL 1   3   5   7   9   11   13   15   17   19   21   23
PCM-0   - - - - - - - - - - - -  -  -  - - -  - -  - -  - -
PCM-1   X X X X X X X X X X X X  X  X  X X X  X X  X X  X X
PCM-2   - - - - - - - - - - - -  -  -  - - -  - -  - -  - -
PCM-3   - - - - - - - - - - - -  -  -  - - -  - -  - -  - -

/* COMMAND EXECUTED */
```

An example from an ETSI application:

```
LOCAL:DIC> D

/* TEST LOOPS IN TRANSCODERS */

PCM/TSL   0   2   4   6   8  10  12  14  16  18  20  22  24  26  28  30

PCM-1     1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
PCM-2     1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
PCM-3     1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
PCM-4     1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

/* TEST LOOPS IN ET UNITS */

PCM/TSL   0   2   4   6   8  10  12  14  16  18  20  22  24  26  28  30

PCM-0     - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
PCM-1     - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
PCM-2     - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
PCM-3     - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

/* COMMAND EXECUTED */
```

- To display all active loops when there are no loop-backs set, give the command:

```
TCSM_XXX:DIC> D;

/* TEST LOOPS IN TRANSCODER */

PCM/TSL 1   3   5   7   9   11  13  15  17  19  21  23
PCM-1   - - - - - - - - - - - - - - - - - - - - - - - -
PCM-2   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
PCM-3   - - - - - - - - - - - - - - - - - - - - - - - -

/* TEST LOOPS IN ET UNITS */

PCM/TSL 1   3   5   7   9   11  13  15  17  19  21  23
PCM-0   - - - - - - - - - - - - - - - - - - - - - - - -
PCM-1   - - - - - - - - - - - - - - - - - - - - - - - -
PCM-2   - - - - - - - - - - - - - - - - - - - - - - - -
PCM-3   - - - - - - - - - - - - - - - - - - - - - - - -

/* COMMAND EXECUTED */
```

An example from an ETSI application:

```
/* TEST LOOPS IN TRANSCODERS */

PCM/TSL 0   2   4   6   8  10  12  14  16  18  20  22  24  26 28 30
PCM-1    - - - - - - - - - - - - - - - - - - - - - - - - - - - -
PCM-2    - - - - - - - - - - - - - - - - - - - - - - - - - - - -

PCM-3    - - - - - - - - - - - - - - - - - - - - - - - - - - - -
/* TEST LOOPS IN ET UNITS */

PCM/TSL 0   2   4   6   8  10  12  14  16  18  20  22  24  26 28 30
PCM-0    - - - - - - - - - - - - - - - - - - - - - - - - - - - -
PCM-1    - - - - - - - - - - - - - - - - - - - - - - - - - - - -
PCM-2    - - - - - - - - - - - - - - - - - - - - - - - - - - - -
PCM-3    - - - - - - - - - - - - - - - - - - - - - - - - - - - -

/* COMMAND EXECUTED */
```

4.2.11 CR: Remove loops

Command `ZCR` allows you to remove all the current loops set on. Loop-backs may be set through Exchange Terminals or Transcoders.

Syntax

```
ZCR;
```

Example

- To remove all the loops set on, give the command:

```
TCSM_XXX:DIC> R;

/* COMMAND EXECUTED */
```

4.3 L: Synchronisation commands

Command group ZL? in the main menu (TCSM_XXX:LUC>) displays the following sub-menu with synchronisation commands:

```
SYNCHRONIZATION COMMANDS

? ..... MENU / HELP
S ..... DISPLAY SYNCHRONIZATION INPUTS
C ..... CREATE SYNCHRONIZATION INPUT
D ..... DELETE SYNCHRONIZATION INPUT
P ..... CHANGE SYNCHRONIZATION INPUT PRIORITY
F ..... CHANGE SYNCHRONIZATION INPUT
O ..... SET SYNCHRONIZATION BLOCK OPERATING MODE
Z ..... RETURN TO MAIN LEVEL

TCSM_XXX:SUH>
```

The following sections describe the synchronisation commands (TCSM_XXX:SUH>) available in more detail, their use, parameters, syntax. Command examples are also given.

4.3.1 LS: Display synchronisation inputs

Command ZLS displays the synchronisation block working mode, and state and priority of the synchronisation signals. The unit can synchronize to all 7 PCM circuits in the MSC direction or to the external synchronisation interface. The display shows the states of the synchronisation input.

Syntax

```
ZLS;
```

Example

- To display the state information for synchronisation inputs, give the command:

```
TCSM_XXX:SUH> S;

/* SYNCHRONIZATION STATE INFO */

INPUT   STATE        USED INPUT  PRIORITY

PCM-1   USED                *         10
PCM-2   CONNECTED                      9
PCM-3   CONNECTED                      8
PCM-4   DISCONNECTED                   7
PCM-5   DISCONNECTED                   6
PCM-6   DISCONNECTED                   5
PCM-7   DISCONNECTED                   4
```

```
EXT     DISCONNECTED                    3

SYNCHRONIZATION BLOCK WORKING MODE = HIERARCHIC SYNCHRONIZATION

OSCILLATOR CONTROL WORD = 32768
OSCILLATOR CONTROL MODE = FAST

TIMER:SYNCHRONIZATION SIGNAL MALFUNCTION TOLERANCE TIME...5 MIN
TIMER:REPAIRED SYNCHRONIZATION INPUT OBSERVATION TIME...10 MIN

/* COMMAND EXECUTED */
```

4.3.2 LC: Create synchronisation input

Command `ZLC` adds the synchronisation input.

Parameters

`Signal index:`

The signal index indicates what synchronisation signal is to be added; decimal number 1 - 7, 8:

1 - 7 a PCM circuit in the MSC direction

8 external T1/E1 interface

Syntax

```
ZLC: signal index;
```

Example

- To add signal 3, give the command:

```
TCSM_XXX:SUH> C:3;

/* PCM-3 CONNECTED */
/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

4.3.3 LD: Delete synchronisation input

Command `ZLD` deletes the synchronisation input.

Parameters

`Signal index:`

The signal index indicates which synchronisation signal is to be deleted; decimal number 1 - 7, 8:

1 - 7 a PCM circuit in the MSC direction

8 external synchronisation interface;

Syntax

```
ZLD: signal index;
```

Example

- To delete signal 2, give the command:

```
TCSM_XXX:SUH> D:2;

/* PCM-2 DISCONNECTED */
/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

4.3.4 LP: Change synchronisation input priority

Command `ZLP` changes the priorities of the synchronisation signals.

Parameters

`Signal index, priority`

Signal index:

The signal index indicates what synchronisation signal priorities are to be changed; decimal number 1 - 7, 8.

1 - 7 a PCM circuit in the MSC direction

8 external synchronisation interface;

Priority:

Priority of the synchronisation signal concerned; decimal number 1 - 15.

Syntax

```
ZLP: signal index, priority;
```

Example:

- To change the priority of signal 3 to 7, give the command:

```
TCSM_XXX:SUH> P:3,7;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

Additional information

Input priority can be 1 - 15, 1 being the lowest and 15 the highest. Different inputs cannot have the same priority. If the given priority is already in use, an error message is produced.

Execution errors

```
/*** CANNOT SET SYNCHRONIZATION INPUT PRIORITY ***/
/*** PRIORITY ALREADY USED ***/
```

4.3.5 LF: Change synchronisation input

Command ZLF forces the required synchronisation input into use or removes forced control.

Parameters

`Signal index, forced control removal information`

Signal index:

Signal index indicates what synchronisation signal is forced into use. Its value can be 1–7, 8.

1 - 7 a PCM circuit in the MSC direction;

8 external T1/E1 interface;

Forced control removal information:

The parameter is selected if you want to remove forced control of the synchronisation signal; type OFF.

Syntax

```
ZLF: signal index/forced control removal information;
```

Examples

- To set signal 2 as forced, give the command:

```
TCSM_XXX:SUH> F:2;

/* COMMAND EXECUTED */
```

- To set all signals to unforced, give the command:

```
TCSM_XXX:SUH> F:OFF;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

4.3.6 LO: Set synchronisation block operating mode

Command ZLO determines the synchronisation block's operating mode (either hierarchical or plesiochronous), the oscillator control word and adjustment mode and the time parameters of the synchronisation signal.

Parameters

operating mode:

The parameter's value indicates if the operating state is to be changed to hierarchical or to plesiochronous; type:

H	hierarchical synchronisation
P	plesiochronous working mode

oscillator control mode specification (M):

NORM	normal
FAST	fast

oscillator control word specification (W):

A number between 0 and 65534 (for plesiochronous synchronisation only).

oscillator timing parameters:

A number between 1 and 240. This is the time in minutes.

TP	Time for tolerating malfunction in input signal.
TR	Observation time for repaired synchronisation.

Syntax

```
ZLO: operating mode, oscillator control, oscillator timing;
ZLO:M = oscillator control mode specification;

ZLO:W = oscillator control word specification;

ZLO:TP or TR = oscillator timing;
```

Parameter W can only be used in the plesiochronous working mode.

Example

- To select hierarchical synchronisation as the synchronisation block's working state, give the command:

```
TCSM_XXX:SUH> O:H;

/* SYNCHRONIZATION BLOCK WORKING MODE CHANGED TO */
/* HIERARCHICAL SYNCHRONIZATION */

/* COMMAND EXECUTED */
```

To select fast adjustment as the oscillator adjustment mode, give the command:

```
TCSM_XXX:SUH> O:M=FAST;

/* COMMAND EXECUTED */
```

- To select normal control as the oscillator control mode, give the command:

```
TCSM_XXX:SUH> O:M=NORM;

/* COMMAND EXECUTED */
```

- To modify the oscillator control word, give the command:

```
TCSM_XXX:SUH> O:W=10000;

/* COMMAND EXECUTED */
```

- To modify the oscillator timing parameter, give the command:

```
TCSM_XXX:SUH> O:TP=15;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

4.4 G: General configuration commands

Command group ZG? in the main menu (TCSM_XXX:LUC>) displays the following sub-menu with general configuration commands:

```
GENERAL CONFIGURATION COMMANDS


? ..... MENU / HELP
T ..... DISPLAY TCSM2 HARDWARE CONFIGURATION
I ..... DISPLAY PROGRAM IDENTIFICATION CODES
L ..... SET PCM LINE TERMINAL TYPE
H ..... SET THROUGH CONNECTED CHANNELS
U ..... UPDATE SOFTWARE IN FLASH MEMORY
W ..... DISPLAY TRANSCODER SOFTWARE
S ..... SAVE CONFIGURATION
N ..... DOWNLOAD CONFIGURATION FROM PC
O ..... UPLOAD CONFIGURATION TO PC
V ..... SET HW IDENTIFICATION
P ..... CHANGE PASSWORD
C ..... SET DEFAULT CONFIGURATION
Z ..... RETURN TO MAIN LEVEL

TCSM_XXX:GCC>
```

The following sections describe the general configuration commands (TCSM_XXX:GCC>) available in more detail, their use, parameters, syntax and command examples.

4.4.1 GT: Display TCSM2 hardware configuration

Command ZGT displays the TCSM2 unit's hardware configuration, working state, working standard and the companding law used.

Syntax

```
ZGT;
```

Parameters

Working standard:

ANSI	ANSI (US) standard
ETSI	ETSI (European) standard

Working state:

- NA, converter mode does not apply to ETSI standard

ON	converter mode on (ANSI-C)
OFF	converter mode off (ANSI)

Companding law:

A-LAW	A law
U-LAW	μ law

Example

- To display the TCSM2 unit's equipment data, give the command:

```
TCSM_XXX:GCC> T;

/* TCSM2 EQUIPMENT INFO */

STANDARD       CONVERTER    COMPANDING LAW
ANSI           OFF           U-LAW

UNIT         VERSION    INTERCHANGE-   STATE
TYPE                    ABILITY CODE

TRCO            1            A          TE-EX
ET2A-0          -            -
ET2A-1          -            -
ET2A-2          -            -
TR12-0          1            A
TR12-1          1            A
TR12-2          1            A
TR12-3          1            A
TR12-4          1            A
TR12-5          1            A
TR12-6          1            A
TR12-7          1            A

/* COMMAND EXECUTED */
```

Additional information

The version and interchangeability information is not available for the ET2 plug-in units, because they do not support that feature. If a TR unit is faulty, no version and interchangeability information is available either.

Execution errors

```
/*** FLASH MEMORY OPERATION FAILURE ***/
```

4.4.2 GI: Display program identification codes

Command ZGI displays the identification codes of programs in a unit. Hitting the ESC key interrupts the execution of the command.

Parameters

Plug-in unit type;

The type indicates what plug-in unit software identification codes are displayed.

TRCO	TRCO plug-in unit
ET	ET2A/ET2E plug-in unit
TR	TR12/TR16 plug-in unit

Syntax

```
ZGI: plug-in unit type;
```

Examples

- To display TRCO plug-in unit software identification codes, give the command:

```
TCSM_XXX:GCC> I:TRCO;

/* TRCO PROGRAM IDENTIFICATION */

FB04.002E          CID: TC1_PXMX.PAC  6.2-0 96/11/02

/* COMMAND EXECUTED */
```

- To display TR12/TR16 plug-in unit software identification code, give the command:

```
TCSM_XXX:GCC> I:TR;
```

The command now displays the running DSP_CODE separately for every PCM line.

```
/* TR PROGRAM IDENTIFICATION */

1. 4000.0005:  PID: TDL_PXMX.PRM  1.1-0  96/12/01
2. 4000.0005:  PID: TDL_PXMX.PRM  1.1-0  96/12/01
3. 4000.0005:  PID: TDL_PXMX.PRM  1.1-0  96/12/01
4. 4000.0005:  PID: TDL_PXMX.PRM  1.1-0  96/12/01
5. PCM_line not in use
6. PCM_line not in use
7. PCM_line not in use

/* COMMAND EXECUTED */
```

- To display ET2A/ET2E plug-in unit software identification code, give the command:

```
TCSM_XXX:GCC> I:ET;
```

```
/* ET PROGRAM IDENTIFICATION */

480A.0004    ET5RAMQK.PAC     4.5-0  99/10/12

/* COMMAND EXECUTED */
```

4.4.3 GL: Set PCM line terminal type

Command ZGL is used to choose the type of the TCSM2 unit's PCM line terminal type (towards the BSC), ANSI converter mode and the companding law used.

Parameters

PCM line type:

The type indicates the BSC-direction PCM line type. Type: ANSI/ETSI

ANSI converter mode:

Possible only if PCM line type is ANSI. Type: CONV

Companding law:

Possible only if the PCM line type is ANSI.

A_LAW A-law

U_LAW μ-law

Syntax

```
ZGL: PCM line type (, ANSI converter mode) (, companding law);
```

Examples

- To select ANSI as the BSC (PCM) circuit terminal type, give the command:

```
TCSM_XXX:GCC> L:ANSI;

/* ALL CALLS WILL BE CANCELLED DUE */
/* TO GIVEN COMMAND */

   PLEASE CONFIRM EXECUTION (Y/N)

/* COMMAND EXECUTED */
```

- To select ANSI as the BSC (PCM) circuit terminal type and set the converter mode on (companding law will then be A-law), give the command:

```
TCSM_XXX:GCC> L:ANSI:CONV;

/* ALL CALLS WILL BE CANCELLED DUE */
/* TO GIVEN COMMAND */

   PLEASE CONFIRM EXECUTION (Y/N)

/* COMMAND EXECUTED */
```

Additional information
The command restarts the whole TCSM2 unit.

Execution errors

```
/*** FLASH MEMORY OPERATION FAILURE ***/

/*** MESSAGE TIMEOUT ***/
```

4.4.4 GH: Set through connected channels

Command ZGH sets through-connection on or off for the selected channel.

Parameters

MSC direction PCM circuit index, timeslot, BSC direction PCM circuit timeslot

BSC direction PCM circuit timeslot:

The parameter selects a timeslot from the BSC direction PCM circuit to be through-connected; decimal number 2 - 24 (ANSI), 2-31 (ETSI).

MSC direction PCM circuit index:

The parameter indicates where in the MSC direction PCM circuit the selected channel is located; decimal number 1 - 7

Timeslot:

Timeslot indicates a certain channel of the MSC direction PCM circuit; decimal number 1 - 24 (ANSI), 1-31 (ETSI).

Syntax

```
ZGH:BSC direction PCM circuit timeslot, (MSC direction PCM
circuit index, timeslot);
```

Examples

- To set BSC direction PCM circuit timeslot 22 through-connected to MSC direction PCM circuit 2 timeslot 16, give the command:

```
TCSM_XXX:GCC> H:22,2,16;

/* THROUGH CONNECTED CHANNEL */

   BSC PCM-TIMESLOT = 0-22

   MSC PCM-TIMESLOT = 2-16
   CONNECTION ON

   PLEASE CONFIRM (Y/N)

/* COMMAND EXECUTED */
```

- To delete BSC direction PCM circuit timeslot 22 through-connection to the MSC direction PCM circuit 2 timeslot 16, give the command:

```
TCSM_XXX:GCC> H:22;

/* THROUGH CONNECTED CHANNEL */
```

```
   BSC PCM-TIMESLOT = 0-22
   CONNECTION OFF

   PLEASE CONFIRM (Y/N)

/* COMMAND EXECUTED */
```

4.4.5 GU: Update software in flash memory

Command ZGU updates the software of either the ET2A/ET2E, the TRCO or the TR12/TR16 plug-in unit in the Flash memory.

This command is available only when the LAPD connection to the BSC is not established or working.

Parameters

Plug-in unit type:

The parameter indicates which plug-in unit's software is updated.

TRCO	TRCO plug-in unit
TR	TR12/TR16 plug-in unit
ET	ET2A/ET2E(-S/C/SC) plug-in unit

Syntax

```
ZGU: plug-in unit type;
```

Examples

- To update TRCO plug-in unit software, first give the command below and then start the data transfer using Kermit protocol:

```
TCSM_XXX:GCC> U:TRCO;

READY TO RECEIVE PROGRAM CODE
(start data transfer using Kermit protocol)
```

The unit restarts and the program is executed from the boot EPROM. When the software is updated, the TRCO unit is restarted and it begins to perform the program code just loaded.

- To update ET2A/ET2E plug-in unit software, first give the command below and then start the data transfer using Kermit protocol:

```
TCSM_XXX:GCC> U:ET;

PLEASE CONFIRM (Y/N)

READY TO RECEIVE PROGRAM CODE
(start data transfer using Kermit protocol)

PROGRAM TRANSFER SUCCESSFULLY COMPLETED


/* COMMAND EXECUTED */
```

- To update transcoder software, first give the command below and then start data transfer using Kermit protocol:

```
TCSM_XXX:GCC> U:TR;

PLEASE CONFIRM (Y/N)

SELECT TRANSCODER SOFTWARE:

NBR ADDRESS    USED SW ID STRING
1.  4000.0000:       * PID: TDL_PXMX.PRM  1.1-0 95/12/01
2.  6000.0000:         PID: TDL_PXMX.PRM  1.2-0 95/12/02
3.  5000.0000:         FREE CODE MEMORY AREA

ENTER NUMBER : x

READY TO RECEIVE PROGRAM CODE
(start data transfer using Kermit protocol)

PROGRAM TRANSFER SUCCESSFULLY COMPLETED

/* COMMAND EXECUTED */
```

To update transcoder software in the *TCSM2A-C,* first give the command and then start the data transfer using Kermit protocol:

```
TCSM_XXX:GCC> U:ET;


PLEASE CONFIRM (Y/N)
SELECT EXCHANGE TERMINAL SOFTWARE:

NBR  ET TYPE       ID STRING
1.   ET2E         ET2RAMQA.PAC 1.25-1 96/10/02
2.   ET2A         ET5RAMQA.PAC 1.15-1 96/02/14

ENTER NUMBER : x

READY TO RECEIVE PROGRAM CODE
(start data transfer using Kermit protocol)

PROGRAM TRANSFER SUCCESSFULLY COMPLETED

/* COMMAND EXECUTED */
```

Additional information

There may be several versions of the transcoder software in the Flash memory. When updating the transcoder software, after entering the command, details of those versions are displayed and the user selects one of them. This selected version of the software is replaced by a new version.

A message is displayed when the TCSM2 unit is ready to start receiving the program code. After the message, data transfer is started from the PC according to Kermit pro-

tocol. Parameters relating to the protocol are set as fixed at the receiving end and must be selected correspondingly at the transmission end before starting data transfer. On completion of data transfer a transfer successful message is displayed.

TRCO Kermit supports:
- packet length up to 1000 bytes
- check sum: 1- byte, 2-byte or CRC (default setting)
- zip packing of the identical consecutive characters

Execution errors

```
/*** PROGRAM TRANSFER FAILED ***/

/*** FLASH MEMORY OPERATION FAILURE ***/

/*** COMMAND NOT ALLOWED  ***/
/*** LAPD IS WORKING ***/
```

4.4.6 GW: Display transcoder software

Command ZGW displays the software to be used in the transcoder from the versions in the Flash memory.

Syntax

```
ZGW;
```

Example

- To display the software to be used in the transcoder, give the command:

```
TCSM_XXX:GCC> W;

SELECT TRANSCODER SOFTWARE:
NBR ADDRESS    USED SW ID STRING
1.  4000.0000:       * PID: TDL_PXMX.PRM  1.1-0 96/12/01
2.  6000.0000:         PID: TDL_PXMX.PRM  1.2-0 96/12/02
3.  5000.0000:         PID: TDL_PXMX.PRM  1.3-0 96/12/03

/* COMMAND EXECUTED */
```

Additional information

After the command is given, version data of transcoder software is displayed.

4.4.7 GS: Save configuration

Command ZGS saves configuration changes to the Flash memory.

Syntax

```
ZGS;
```

Example

- To save configuration data to non-volatile (Flash) memory, give the command:

```
TCSM_XXX:GCC> S;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

Additional information

Configuration changes made with other commands are saved in RAM memory.

The local application program reads the configuration data of the plug-in units from the RAM memory and saves them to non-volatile memory. The local application program requires the user to confirm the operation before it will perform it.

4.4.8 GN: Download configuration from PC

The command ZGN is used to receive information from the configuration file of the PC using Kermit protocol. This command is only possible in a local session.

Syntax

```
ZGN;
```

Examples

- To receive the active configuration from the PC, first give the command below and then start the data transfer using Kermit protocol:

```
TCSM_XXX:GCC> N;

/* UNIT MAY NOT WORK NORMALLY DUE */
/* TO GIVEN COMMAND */

   PLEASE, CONFIRM EXECUTION (Y/N)


THE TRCO IS READY TO RECEIVE THE CONFIGURATION FILE.
START KERMIT FILE SEND FROM YOUR COMPUTER.

/* CONFIGURATION FILE UPLOAD */
/* SUCCESSFULLY COMPLETED */

/* COMMAND EXECUTED */
```

Execution errors

```
/*** PROGRAM TRANSFER FAILED ***/
/*** FLASH MEMORY OPERATION FAILURE ***/
```

```
/*** KERMIT TRANSFER FAILED ***/
/*** TOO MANY RETRIES ***/
```

4.4.9 GO: Upload configuration to PC

The command ZGO is used to send the present active configuration to the PC using Kermit protocol. The command combines the active files in the RAM memory (ETCONF, TR1CON and CLKCON) into one file and sends it to the PC. The command is only possible in a local session.

Syntax

```
ZGO;
```

Example

- To send the active configuration to the PC, first give the command below and then start the data transfer using Kermit protocol:

```
TCSM_XXX:GCC> O;

/* UNIT MAY NOT WORK NORMALLY */
/* AFTER COMMAND HAS BEEN GIVEN */

   PLEASE CONFIRM (Y/N)

THE TRCO IS READY TO SEND THE CONFIGURATION FILE
START KERMIT FILE RECEIVE FROM YOUR COMPUTER

/* CONFIGURATION FILE UPLOAD */
/* SUCCESSFULLY COMPLETED */

/* COMMAND EXECUTED */
```

Execution errors

```
/*** PROGRAM TRANSFER FAILED ***/

/*** FLASH MEMORY OPERATION FAILURE ***/

/*** KERMIT TRANSFER FAILED ***/
/*** TOO MANY RETRIES ***/
```

4.4.10 GV: Set HW identification

Command ZGV sets the TRCO plug-in unit's version and interchangeability code.

Parameters

```
Version type, interchangeability type
```

Version type:

Version type indicates the plug-in unit's version data; decimal number.

Interchangeability type:

Interchangeability type indicates the plug-in unit's interchangeability data; any letter.

Syntax

```
ZGV: version type, interchangeability type;
```

Example

- To set plug-in unit's version data as 2 and interchangeability code C, give the command:

```
TCSM_XXX:GCC> V:2,C;

/* COMMAND EXECUTED */
```

4.4.11 GP: Change password

Command ZGP changes the local application session password. The user-names USER and EXPERT both have their own password and the change applies to the password with which the local application session was opened.

Syntax

```
ZGP;
```

Example

- To change the local application session password, give the command:

```
TCSM_XXX:GCC> P;
OLD PASSWORD>
NEW PASSWORD>
VERIFICATION>

/* COMMAND EXECUTED */
```

Additional information

After entering the command, the user is asked for the old password. If it is given correctly, the new password is asked for twice. The user's passwords are not displayed on screen. The new password is then valid.

4.4.12 GC: Set default configuration

Command ZGC sets the default configuration (= factory settings) for the TCSM2 unit.

Syntax

```
ZGC;
```

Example

To set the default configuration, give the command:

```
TCSM_XXX:GCC> C;

/* ALL CALLS WILL BE CANCELLED */
/* DUE TO GIVEN COMMAND */

   PLEASE CONFIRM EXECUTION (Y/N)

   RESTARTING TCSM UNIT ...
```

4.5 R: Transcoder configuration commands

Command group ZR? in the main menu (TCSM_XXX:LUC>) displays the following sub-menu with transcoder configuration commands:

```
TRANSCODER CONFIGURATION COMMANDS

? ..... MENU / HELP
C ..... DISPLAY CHANNEL CONFIGURATION
X ..... SET DOWNLINK DTX
A ..... SET ADAPTIVE GAIN ADJUSTMENT IN DOWNLINK DIRECTION
F ..... SET FIXED GAIN ADJUSTMENT
S ..... SET TIME ALIGNMENT
U ..... SET ACOUSTIC ECHO CANCELLATION (AEC)
Y ..... SET NOISE SUPPRESSION (NS)
N ..... SET TANDEM FREE OPERATION (TFO)
M ..... START TRAFFIC CHANNEL MONITORING
T ..... MODIFY ALARM LIMITS
O ..... DISPLAY ALARM LIMITS
R ....  SET TRANSCODER PCM TYPES
D ..... DISPLAY TRANSCODER PCM TYPES
Z ..... RETURN TO MAIN LEVEL

TCSM_XXX:TCC>
```

The following sections describe the transcoder configuration commands (TCSM_XXX:TCC>) available in more detail, their use, parameters, syntax and command examples.

4.5.1 RC: Display channel configuration

Command ZRC displays the TR12/TR16 plug-in units' channel-specific parameters.

Parameters

```
PCM circuit index, timeslot, parameter;
```

PCM circuit index:

The identifier indicates which MSC direction PCM circuit channel parameters are to be displayed; decimal number 1 to 7. In ANSI-C mode decimal number between 2 and 7.

Timeslot:

Timeslot shows a certain PCM circuit channel; decimal number 1 to 24 (ANSI), 1 to 31 (ETSI).

Parameter:

Parameter shows the channel-specific parameter; decimal number 1 - 12.

1	through connection
2	downlink DTX
3	loop test 0
4	loop test 1
5	channel state
6	time alignment
7	fixed gain adjustment
8	adaptive gain adjustment in downlink direction
9	Echo Cancellation parameters (optional)
10	Acoustic Echo Cancellation parameters (optional)
11	Tandem Free Operation parameters (optional)
12	Noise Suppression parameters (optional)

Syntax

```
ZRC: PCM circuit index, timeslot; or PCM circuit index: parameter;
```

Examples

- To display channel-specific parameters of the transcoder handling PCM circuit 5 timeslot 12, give the command:

```
TCSM_XXX:TCC> C:5,12;

/* CHANNEL CONFIGURATION PARAMETERS */
/* PCM-TIMESLOT = 5-12 */

THROUGH CONNECTION ...........  OFF
DOWNLINK DTX .................  ON
LOOP TEST-0 ..................  OFF
LOOP TEST-1 ..................  OFF
CHANNEL STATE ................  FREE
TIME ALIGNMENT ...............  OFF
FIXED GAIN ADJUSTMENT
        UPLINK ...............  2 dB
        DOWNLINK .............  4 dB
ADAPTIVE GAIN ADJUSTMENT......  ON
        MIN ..................  2 dB
        MAX ..................  5 dB

(If AEC is allowed, the following is
also displayed)

ACOUSTIC ECHO CANCELLATION      FR/--/---/--
        DELAY ................  0 ms

TANDEM FREE OPERATION ........  FR/--/---
```

```
NOISE SUPPRESSION .............  FR/--/---/--
        LEVEL .................  2
CIRCUIT TYPE ..................  A


TCSM_XXX:TCC> C:1:1

/* THROUGH CONNECTION */
/* PCM-1  */

TSL        0       1       2       3       4       5       6       7
VALUE      -     OFF     OFF     OFF     OFF     OFF     OFF     OFF

TSL        8       9      10      11      12      13      14      15
VALUE    OFF     OFF     OFF     OFF     OFF     OFF     OFF     OFF

TSL       16      17      18      19      20      21      22      23
VALUE    OFF     OFF     OFF     OFF     OFF     OFF     OFF     OFF

TSL       24      25      26      27      28      29      30      31
VALUE    OFF     OFF     OFF     OFF     OFF     OFF     OFF     OFF

/* COMMAND EXECUTED */
```

- To display through connections of transcoders handling timeslots of PCM circuit 1, give the command:

```
TCSM_XXX:TCC> C:1:1;

/* THROUGH CONNECTION */
/* PCM-1 */

TSL       0    1    2    3    4    5    6    7
VALUE     -  OFF  OFF  OFF  OFF  OFF  OFF  OFF

TSL       8    9   10   11   12   13    14   15
VALUE    OFF  OFF  OFF  OFF  OFF  OFF  OFF  OFF

TSL      16      17   18   19   20    21   22   23
VALUE   TSL-29   OFF  OFF  OFF  OFF  OFF  OFF  OFF

TSL       24     25   26   27   28    29   30   31
VALUE     OFF    OFF  OFF  OFF  OFF   OFF  OFF  OFF

/* COMMAND EXECUTED */
```

This is an example from an ETSI application.

Additional information

A certain parameter can be displayed in connection with either one channel or all channels of one PCM circuit in the MSC direction. All channel-specific parameters of one channel can also be displayed.

Execution messages

```
/* COMMAND EXECUTED */


/* CHANNEL CONFIGURATION PARAMETERS */
/* PCM-TIMESLOT= PCM circuit-timeslot */

THROUGH CONNECTION ............
DOWNLINK DTX ..................
LOOP TEST 0 ...................
LOOP TEST 1 ...................
CHANNEL STATE .................
TIME ALIGNMENT ................
FIXED GAIN ADJUSTMENT
        UPLINK ................
        DOWNLINK ..............
ADAPTIVE GAIN ADJUSTMENT.......
        MIN ...................
        MAX ...................

/* parameter */
/* PCM CIRCUIT = PCM circuit */

TSL    0    1    2    3    4    5    6    7
VALUE  XX   XX   XX   XX   XX   XX   XX   XX

TSL    8    9   10   11   12   13   14   15
VALUE  XX   XX  XX   XX   XX   XX   XX   XX

TSL   16   17   18   19   20   21   22   23
VALUE XX   XX   XX   XX   XX   XX   XX   XX

TSL   24   25   26   27   28   29   30    31
VALUE XX   XX   XX   XX   XX   XX   XX    XX
```

The texts “parameter” and “xx” can be any of the following:

Parameter xx

TROUGH CONNECTION TSLnn/OFF

DOWNLINK DTX ON/OFF
LOOP TEST_0 ON/OFF

LOOP TEST_1 ON/OFF

TIME ALIGNMENT ON/OFF

FIXED LEVEL ADJUSTMENT UL:DL ul_value:dl_value

ADAPTIVE GAIN ADJUSTMENT min:max/OFF

Channel states are presented in the table below.

Active speech calls	Active data calls	Other
FR	4.8DFR	FREE
HR	9.6DFR	SLEEP (TR16 plug-in unit blocked)
EFR	14.4DFR	FAIL (TR16 plug-in unit faulty)
AHS475	4.8DHR	- (no call)
AHS515	9.6HS2	
AHS590	14.4HS2	
AHS670	9.6HS3	
AHS740	14.4HS3	
AFS475	9.6HS4	
AFS515	14.4HS4	
AFS590		
AFS670		
AFS740		
AFS795		
AFS102		
AFS122		

Table 3 Channel states.

"FREE" and "-" mean the same thing but are used in different places. `ZRC:1,1` uses "FREE" and `ZRM:1` uses "-".

'TFO' at the end of the string means that Tandem Free Operation feature is used. For example, "FR-TFO".

In ANSI environment, an additional 'T' at the end of channel state string indicates that Text Telephony (TTY) has been activated during the call. Note, however, that once TTY is activated 'T' will not be removed from the end of the string even if TTY is no longer used during the call.

AMR modes are represented with six characters as follows:

- first three characters denote channel mode (AHS is an acronyme for AMR Half rate Speech and AFS is an acronyme for AMR Full rate Speech)
- last three characters denote codec mode bit rate from 4.75 kbit/s to 12.2 kbit/s.

AMR speech codec is an adaptive system, which means that channel and codec modes can recurrently change during the call. If fast link adaptation is used in base station subsystem, codec mode can change so rapidly that channel monitoring can not show all of the changes.

Please note that in AMR call downlink codec mode can vary independently from uplink codec mode. However, monitoring can only show active channel and codec mode in UPLINK direction.

Displayed values for AHS/AFS are only approximate, the codec can change modes faster than the monitor display. The channel mode stays the same (AHS or AFS) but the codec mode or bit rate varies.

In the case of AEC, also the following is displayed in addition to the title:

```
/* F=ENABLED WITH FR CODEC, H=ENABLED WITH HR CODEC */
/* E=ENABLED WITH EFR CODEC */
```

and `xx' is in the form

```
ACOUSTIC ECHO CANCELLATION   F/H/E/A  or -/-/-/-
        DELAY ..............  0 ms
```

“nn” is the BSC direction PCM circuit timeslot number.

4.5.2 RX: Set downlink DTX

Command ZRX sets downlink DTX on or off for selected channels.

The command is for testing purposes only, and it should always be set off.

Parameters

```
PCM circuit index, timeslot, setting;
```

PCM circuit index:

The parameter indicates which MSC direction PCM circuit channels' parameters are to be set on.

1 - 7	a certain MSC direction PCM circuit;
ALL	all MSC direction PCM circuits;

Timeslot:

Timeslot indicates a certain PCM circuit channel; decimal number 1 - 24 (ANSI), 1-31 (ETSI).

Setting (DTX info):

Channel-specific parameter value; type ON = downlink DTX on, or OFF = downlink DTX off.

Syntax

```
ZRX: PCM circuit index (,timeslot) : setting;
```

Examples

- To set DTX on for all channels of the unit, give the command:

```
TCSM_XXX:TCC> X:ALL:ON;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

- To set DTX off for all channels of PCM circuit 3, give the command:

```
TCSM_XXX:TCC> X:3:OFF;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

- To set DTX on for PCM circuit 3 timeslot 22's channel, give the command:

```
TCSM_XXX:TCC> X:3,22:ON;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

Additional information

The command can apply to one channel, all channels of an MSC direction PCM circuit or all channels of the whole unit.

4.5.3 RA: Set adaptive gain adjustment in the downlink direction

Command `ZRA` sets the adaptive gain adjustment in the downlink direction on or off for selected channels.

Parameters

`PCM circuit index, timeslot, setting;`

PCM circuit index:

The identifier indicates which parameters of which MSC direction PCM circuit channels are set.

1 - 7	a certain MSC direction PCM circuit;
ALL	all PCM circuits;

Timeslot:

Timeslot indicates a certain PCM circuit channel; decimal number 1 to 24 (ANSI), 1 to 31 (ETSI).

Setting:

Channel-specific parameter value; type ON or OFF.

Value limits:

The gain can be adjusted with minimum and maximum limits:

Min. value	decimal number 0 - 6
Max. value	decimal number 0 - 9

Syntax

```
ZRA: PCM circuit index (,timeslot) : setting (: min value, max
value);
```

Examples

- To set adaptive gain adjustment on for all channels of the unit, give the command:

```
TCSM_XXX:TCC> A:ALL:ON;

WARNING: EXCESSIVE FIXED OR ADAPTIVE DOWNLINK GAIN VALUE
         SETTINGS CAN REDUCE THE PERFORMANCE OF ACOUSTIC
         ECHO CANCELLATION. VALUES BELOW 4 dB ARE RECOMMENDED
         WITH ACOUSTIC ECHO CANCELLATION.

     PLEASE CONFIRM (Y/N)

/* DO YOU WANT CONFIGURATION CHANGES TO BE   */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY? */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

- To set adaptive gain adjustment off for all channels of PCM circuit 3, give the command:

```
  TCSM_XXX:TCC> A:3:OFF;


  /* DO YOU WANT CONFIGURATION CHANGES TO BE */
  /* PERMANENT BY SAVING THEM IN FLASH MEMORY */

     PLEASE ANSWER (Y/N)

  /* COMMAND EXECUTED */
```

- To set adaptive gain adjustment on for channel in timeslot 22 PCM circuit 3 (limits adjusted with minimum value of 2 and maximum value of 8) give the command:

```
TCSM_XXX:TCC> A:3,22:ON:2,8;

WARNING: EXCESSIVE FIXED OR ADAPTIVE DOWNLINK GAIN VALUE
         SETTINGS CAN REDUCE THE PERFORMANCE OF ACOUSTIC
         ECHO CANCELLATION. VALUES BELOW 4 dB ARE RECOMMENDED
         WITH ACOUSTIC ECHO CANCELLATION.

     PLEASE CONFIRM (Y/N)

/* DO YOU WANT CONFIGURATION CHANGES TO BE   */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY? */

   PLEASE ANSWER (Y/N)


/* COMMAND EXECUTED */
```

Additional information

The command can apply to one channel, all channels of a PCM circuit in MSC direction or all channels of the unit.

4.5.4 RF: Set fixed gain adjustment

Command ZRF sets values for fixed gain adjustment in both uplink and downlink directions at whole number intervals between +6 dB and -6 dB.

Parameters

PCM circuit index, timeslot, uplink, downlink

PCM circuit index:

The identifier indicates which MSC direction PCM circuit channel parameters are set.

1 - 7 a certain MSC direction PCM circuit;

ALL all PCM circuits;

Timeslot:

Timeslot indicates a certain PCM circuit channel; decimal number 1 to 24 (ANSI), 1 to 31 (ETSI).

Uplink:

The parameter indicates gain value in uplink direction; decimal number -6 to +6.

Downlink:

The parameter indicates gain value in downlink direction; decimal number -6 to +6.

Syntax

```
ZRF: PCM circuit index (,timeslot) : uplink, downlink;
```

Examples

- To set fixed gain adjustment on for all channels of the whole unit in uplink direction to the value 2 dB and in downlink direction to the value 4 dB, give the command:

```
TCSM_XXX:TCC> F:ALL:2,4;

WARNING: EXCESSIVE FIXED OR ADAPTIVE DOWNLINK GAIN VALUE
         SETTINGS CAN REDUCE THE PERFORMANCE OF ACOUSTIC
         ECHO CANCELLATION. VALUES BELOW 4 dB ARE RECOMMENDED
         WITH ACOUSTIC ECHO CANCELLATION.

     PLEASE CONFIRM (Y/N)

/* DO YOU WANT CONFIGURATION CHANGES TO BE   */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY? */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

- To set fixed gain adjustment of all channels of PCM circuit 1 to 3dB in uplink direction and to -1dB in downlink direction, give the command:

```
TCSM_XXX:TCC> F:1:3,-1;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

- To set fixed gain adjustment of PCM circuit 2 timeslot 5's channel to 1 dB in uplink direction and to 4 dB in downlink direction, give the command:

```
TCSM_XXX:TCC> F:2,5:1,4;

WARNING: EXCESSIVE FIXED OR ADAPTIVE DOWNLINK GAIN VALUE
         SETTINGS CAN REDUCE THE PERFORMANCE OF ACOUSTIC

         ECHO CANCELLATION. VALUES BELOW 4 dB ARE RECOMMENDED
         WITH ACOUSTIC ECHO CANCELLATION.

     PLEASE CONFIRM (Y/N)

/* DO YOU WANT CONFIGURATION CHANGES TO BE   */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY? */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

Additional information
The command can apply to one channel, all channels of one MSC direction PCM circuit or all channels of the whole unit.

4.5.5 RS: Set time alignment

Command `ZRS` sets time alignment on or off for selected channels.

The time alignment is only set off with the Abis satellite connection.

Parameters

`PCM circuit index, timeslot, setting;`

PCM circuit index:

The parameter indicates which MSC direction PCM circuit channel parameters are set.

1 - 7	a certain MSC direction PCM circuit;
ALL	all MSC direction PCM circuits;

Timeslot:

Timeslot indicates a certain PCM circuit channel; decimal number 1 to 24 (ANSI), 1 to 31 (ETSI).

Setting:

Channel-specific parameter value; type ON or OFF.

Syntax

```
ZRX: PCM circuit index (,timeslot) : setting;
```

Examples

- To set time alignment on for all channels of the whole unit, give the command:

```
TCSM_XXX:TCC> S:ALL:ON;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

- To set time alignment off for PCM circuit 3 channels, give the command:

```
TCSM_XXX:TCC> S:3:OFF;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

- To set time alignment on for PCM circuit 3 timeslot 22's channel, give the command:

```
TCSM_XXX:TCC> S:3,22:ON;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

Additional information:

The command can apply to one channel, all channels of one MSC direction PCM circuit or all channels of the whole unit.

4.5.6 RU: Set Acoustic Echo Cancellation (AEC)

Command `ZRU` sets Acoustic Echo Cancellation (AEC) on or off for selected channels. Delay can also be set using this command. Note that this command is optional and available for those customers who have purchased this option.

Parameters

```
PCM circuit index, timeslot, codec, setting, AEC delay
```

PCM circuit index:

Identifies which MSC-direction PCM-line's channel parameters are displayed.

1 to 7 (2 to 7 in ANSI-C) Identifies the MSC-direction PCM-line

ALL All the PCM-lines

Timeslot:

Identifies the channel of a certain PCM-line; decimal number: 1 to 24 (ANSI), 1 to 31 (ETSI).

Codec:

FR full rate (16 kbit/s)

HR half rate (8 kbit/s)

EFR enhanced full rate (16 kbit/s)

AMR adaptive multirate (16 kbit/s)

Setting (Usage):

Value of the channel specific parameter; ON/OFF.

AEC delay:

0 - 620 ms. Any value can be given in multiples of 20 ms.

Syntax

```
ZRU: PCM circuit index (,timeslot):codec=setting (,codec=
setting, ...);
ZRU: PCM circuit index (,timeslot):delay=AEC delay;
```

Examples

- To set FR-codec echo cancellation on for all channels of the unit, give the command:

```
TCSM_XXX:TCC> U:ALL:FR=ON;

WARNING: EXCESSIVE FIXED OR ADAPTIVE DOWNLINK GAIN VALUE
         SETTINGS CAN REDUCE THE PERFORMANCE OF ACOUSTIC
         ECHO CANCELLATION. VALUES BELOW 4 dB ARE RECOMMENDED
         WITH ACOUSTIC ECHO CANCELLATION.

WARNING: IF SATELLITE CONNECTIONS ARE USED IN THE BSS (BETWEEN
         TRANSCODER AND BTS), AEC DELAY MUST BE SET EQUAL TO
         THE ADDITIONAL TWO-WAY SATELLITE DELAY. OTHERWISE AEC
         DELAY WILL BE 0 ms.

     PLEASE CONFIRM (Y/N)

/* DO YOU WANT CONFIGURATION CHANGES TO BE   */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY? */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

- To set FR-coded echo cancellation off for all channels of PCM-line 3, give the command:

```
TCSM_XXX:TCC> U:3:FR=OFF;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
```

```
     /* PERMANENT BY SAVING THEM IN FLASH MEMORY */

        PLEASE ANSWER (Y/N)

     /* COMMAND EXECUTED */
```

- To set HR-codec echo cancellation on for the channel of timeslot 22 of PCM-line 3, give the command:

```
TCSM_XXX:TCC> U:3,22:HR=ON;

WARNING: EXCESSIVE FIXED OR ADAPTIVE DOWNLINK GAIN VALUE
         SETTINGS CAN REDUCE THE PERFORMANCE OF ACOUSTIC
         ECHO CANCELLATION. VALUES BELOW 4 dB ARE RECOMMENDED
         WITH ACOUSTIC ECHO CANCELLATION.


WARNING: IF SATELLITE CONNECTIONS ARE USED IN THE BSS (BETWEEN
         TRANSCODER AND BTS), AEC DELAY MUST BE SET EQUAL TO
         THE ADDITIONAL TWO-WAY SATELLITE DELAY. OTHERWISE AEC
         DELAY WILL BE 0 ms.

     PLEASE CONFIRM (Y/N)

/* DO YOU WANT CONFIGURATION CHANGES TO BE   */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY? */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

- To set acoustic echo cancellation (for all codecs) on for all the channels of the whole unit, give the command:

```
TCSM_XXX:TCC> U:ALL:FR=ON,HR=ON,EFR=ON;

WARNING: EXCESSIVE FIXED OR ADAPTIVE DOWNLINK GAIN VALUE
         SETTINGS CAN REDUCE THE PERFORMANCE OF ACOUSTIC
         ECHO CANCELLATION. VALUES BELOW 4 dB ARE RECOMMENDED
         WITH ACOUSTIC ECHO CANCELLATION.


WARNING: IF SATELLITE CONNECTIONS ARE USED IN THE BSS (BETWEEN
         TRANSCODER AND BTS), AEC DELAY MUST BE SET EQUAL TO
         THE ADDITIONAL TWO-WAY SATELLITE DELAY. OTHERWISE AEC
         DELAY WILL BE 0 ms.

     PLEASE CONFIRM (Y/N)

/* DO YOU WANT CONFIGURATION CHANGES TO BE   */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY? */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

Codec:

FR	full rate (16 kbit/s);
HR	half rate (8 kbit/s)
EFR	enhanced full rate (16 kbit/s);

Setting:

Value of the channel specific parameter; ON/OFF.

0 - 620. Any value can be given in multiples of 20 ms.

Syntax

```
ZRN: PCM circuit index (,timeslot):codec=setting (,codec=
setting, ...);
```

Examples

- To set FR-codec tandem free operation on for all channels of the unit, give the command:

```
TCSM_XXX:TCC> N:ALL:FR=ON;

     PLEASE CONFIRM (Y/N)

/* DO YOU WANT CONFIGURATION CHANGES TO BE   */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY? */

   PLEASE ANSWER (Y/N)


/* COMMAND EXECUTED */
```

- To set FR-coded tandem free operation off for all channels of PCM-line 3, give the command:

```
TCSM_XXX:TCC> N:3:FR=OFF;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

- To set HR-codec tandem free operation on for the channel of timeslot 22 of PCM-line 3, give the command:

```
TCSM_XXX:TCC> N:3,22:HR=ON;

     PLEASE CONFIRM (Y/N)

/* DO YOU WANT CONFIGURATION CHANGES TO BE   */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY? */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

Timeslot:

Identifies the channel of a certain PCM-line; decimal number: 1 to 24 (ANSI), 1 to 31 (ETSI).

Codec:

FR	full rate (16 kbit/s)
HR	half rate (8 kbit/s)
EFR	enhanced full rate (16 kbit/s)
AMR	adaptive multirate (16 kbit/s)

Setting:

Value of the channel specific parameter; type U, D, B, or OFF

U	Noise suppression enabled in uplink direction
D	Noise suppression enabled in downlink direction
B	Noise suppression enabled in both directions
OFF	Disable noise suppression

Noise Suppression NS level§:

The degree of noise suppression can be set with this parameter.

1	Mild noise suppression
2	Medium noise suppression
3	Strong noise suppression

Syntax

```
ZRY: PCM circuit index (,timeslot):codec=setting (,codec=
setting, ...);

ZRY: PCM circuit index (,timeslot): ns=suppression;
```

Examples

- To set FR codec noise suppression in uplink and downlink directions on for all channels of the unit, give the command:

```
TCSM_XXX:TCC> Y:ALL:FR=B;

     PLEASE CONFIRM (Y/N)


/* DO YOU WANT CONFIGURATION CHANGES TO BE   */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY? */

   PLEASE ANSWER (Y/N)


/* COMMAND EXECUTED */
```

- To set FR-coded noise suppression off for all channels of PCM-line 3, give the command:

```
TCSM_XXX:TCC> Y:3:FR=OFF;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */
```

```
   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

- To set HR-codec noise suppressionn on for the channel of timeslot 22 of PCM-line 3, give the command:

```
TCSM_XXX:TCC> Y:3,22:HR=B;

     PLEASE CONFIRM (Y/N)

/* DO YOU WANT CONFIGURATION CHANGES TO BE   */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY? */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

- To set noise suppression (for uplink FR, downlink HR and uplink/downlink EFR) on for all the channels of the whole unit, give the command:

```
TCSM_XXX:TCC> Y:ALL:FR=U,HR=D,EFR=B;

     PLEASE CONFIRM (Y/N)

/* DO YOU WANT CONFIGURATION CHANGES TO BE   */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY? */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

- To set noise suppression on (for uplink FR and downlink HR codecs) for the channel of timeslot 22 of PCM-line 3, give the command:

```
TCSM_XXX:TCC> Y:3,22:FR=U,HR=D;

     PLEASE CONFIRM (Y/N)

/* DO YOU WANT CONFIGURATION CHANGES TO BE   */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY? */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

Additional information

The command can apply to one channel, all channels of one MSC direction PCM circuit or all channels of the whole unit. The degree of noise suppression is global for all codecs and directions.

Execution errors

```
/*** FLASH MEMORY OPERATION FAILURE ***/

/*** MESSAGE TIMEOUT ***/
```

4.5.9 RM: Start traffic channel monitoring

Command ZRM monitors selected channels for a certain time and displays, in real time, whether the channel has traffic or is free. The continuous monitoring can be disconnected by hitting the ESC key.

Parameters

```
PCM circuit index, period;
```

PCM circuit index:
The identifier indicates in which MSC direction PCM circuit the channel to be monitored is located; decimal number 1 - 7.

Period:

PERIOD = monitoring period in the format HH-MM

The period indicates in minutes how long a channel's state is monitored on a local terminal screen. The parameter's default value is 10 minutes.

Syntax

```
ZRM: PCM circuit index (:PERIOD=<monitoring time>);
```

Example

- To monitor the channels in MSC direction PCM circuit 3 timeslots for 15 minutes, give the command:

```
TCSM_XXX:TCC> M:3:PERIOD=00-15;

/* TRAFFIC CHANNEL MONITORING */
/* PCM CIRCUIT = 3 */

TSL    1  2  3  4  5  6  7  8
STATE  FR -  -  -  -  -  -  -

TSL    9  10 11 12 13 14 15 16
STATE  -  FR  - FR FR -  -  -

TSL    17 18 19 20 21 22 23 24
STATE  FR -  -  -  -  -  -  -

/* COMMAND EXECUTED */
```

Additional information

Interrogation messages are sent at regular intervals by time supervision and data is repeatedly displayed on screen. In the example above:

- = channel free

FR = Full Rate

EFR = Enhanced Full Rate

Further information and a complete list of possible channel states can be found in section ZRC: Display channel configuration.

In ANSI environment, an additional 'T' at the end of channel state string indicates that Text Telephony (TTY) has been activated during the call. Note, however, that once TTY is activated 'T' will not be removed from the end of the string even if TTY is no longer used during the call.

4.5.10 RT: Modify alarm limits

Command `ZRT` modifies the signal processors' alarm filtering times (cancellation time = 2 × filtering time) or the alarms are masked. Filtering times can be modified per PCM circuit interface, in other words the signal processors handling different PCM circuit timeslots can have different filtering times.

Parameters

`PCM circuit index, synchronization error alarm filtering time, memory alarm masking`

PCM circuit index:

The identifier indicates which parameters of signal processors handling MSC direction PCM circuit timeslots are to be modified.

1 - 7 a certain MSC direction PCM circuit;

ALL all MSC direction PCM circuits;

Transcoder synchronization alarm filter time:

SYNCA = synchronization alarm filter time in seconds; decimal number 1 - 100. Masking data is OFF.

Memory alarm masking:

MEMOA = masking data OFF or ON.

Syntax

```
ZRT: PCM circuit index: SYNCA = transcoder synchronization alarm
filter time;

ZRT: PCM circuit index: SYNCA = masked info;
ZRT: PCM circuit index: SYNCA = memory alarms masked info;
```

Examples

- To change all the signal processor synchronisation error alarm filtering times of the TCSM2 unit to 1 s, give the command:

```
TCSM_XXX:TCC> T:ALL:SYNCA=1;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)
```

```
/* COMMAND EXECUTED */
```

- To mask memory alarm of signal processors handling MSC direction PCM circuit 3, give the command:

```
TCSM_XXX:TCC> T:3:MEMOA=OFF;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

- To remove memory alarm masking in all signal processors of the TCSM2 unit, give the command:

```
TCSM_XXX:TCC> T:ALL:MEMOA=ON;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

4.5.11 RO: Display alarm limits

Command ZRO displays filtering and cancellation times of signal processor alarms.

Parameters

PCM circuit index:

The PCM circuit index indicates which PCM circuit parameters are to be displayed.

1 - 7	one PCM circuit in the MSC direction;
ALL	all MSC direction PCM circuits;

Syntax

```
ZRO: PCM circuit index;
```

Examples

- To display alarm filtering and cancellation times of signal processors handling timeslots of MSC direction PCM circuit 2 connected to the ET2A/ET2E, give the command:

```
TCSM_XXX:TCC> O:2;

/* TRANSCODER ALARM FILTERING AND */
/* CANCELLING TIMES */

PCM          SYNCA      SYNCC      MEMOA
LINE         (S)        (S)        (S)
```

```
PCM-2        1           2         MASKED

/* COMMAND EXECUTED */
```

- To display alarm filtering and cancellation times of signal processors of all MSC direction PCM circuit timeslots, give the command:

```
TCSM_XXX:TCC> O:ALL;

/* TRANSCODER ALARM FILTERING */
/* AND CANCELLING TIMES */

PCM         SYNCA       SYNCC       MEMOA
LINE        (S)         (S)


PCM-1        1           2          ALLOWED
PCM-2        MASKED      -          ALLOWED
PCM-3        1           2          ALLOWED
PCM-4        MASKED      -          MASKED

/* COMMAND EXECUTED */
```

4.5.12 RR: Set transcoder PCM types

Command ZRR is used to set various transcoder PCM types. It sets the number and type of PCM circuits, the number of plug-in units, the number of synchronisation inputs and the type of the Group Switch. Group Switch type, MSC direction PCM circuit index and PCM type are given as parameters.

Parameters

Group Switch, MSC direction PCM circuit index, PCM type

Group Switch type in the BSC:

GSW Group Switch (64 kbit/s)

GSWB Bit Group Switch (8 kbit/s)

PCM circuit index:

The circuit index indicates which MSC direction PCM circuits are to be set; decimal number 1 to 7 (2 to 7 for the TCSM2A-C).

PCM types:

A = FR & EFR & D144 Available when the BSC is provided with the Group Switch (GSW) or Bit Group Switch (GSWB)

B = HR Available when the BSC is provided with the Bit Group Switch (GSWB)

C = EFR & FR & HR & D144 Available when the BSC is provided with the Bit Group Switch (GSWB)

D = EFR & FR & HR & HS2 & D144 Available when the BSC is provided with the Bit Group Switch (GSWB)

E = EFR & FR & HR & HS4 & D144 Available when the BSC is provided with the Bit Group Switch (GSWB)

F = AMR Available when the BSC is provided with the Bit Group Switch (GSWB)

where:

FR = Full Rate

EFR = Enhanced Full Rate

HR = Half Rate

D144 = 14.4 kbit/s GSM Data Service

HS2 = High Speed Circuit Switched Data (HSCSD) (2 × FR, 32 kbit/s)

HS4 = High Speed Circuit Switched Data (HSCSD) (4 × FR, 64 kbit/s)

AMR Adaptive Multirate

Syntax

```
ZRR: group switch: PCM index = PCM type(, PCM index= PCM
type,...);
```

Examples

- To set MSC direction PCM circuits 1-7 into Half Rate mode when the 8 kbit/s Bit Group Switch (in the BSC) is in use, give the command:

```
TCSM_XXX:TCC>  R:GSWB:1=B,2=B,3=B,4=B,5=B,6=B,7=B;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

- To set MSC direction PCM circuits 1-3 into full rate mode when the 8 kbit/s Bit Group Switch (in the BSC) is in use, give the command:

```
TCSM_XXX:TCC> R:GSWB:1=A,2=A,3=A;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

4.5.13 RD: Display transcoder PCM types

Command `ZRD` displays the selected transcoder PCM types.

Syntax

```
ZRD;
```

Example

- To display transcoder PCM types, give the command:

```
TCSM_XXX:TCC> D;

/* TRANSCODER PCM TYPES */

GROUP SWITCH   GSWB

PCM            TYPES

PCM-1          FR & EFR & D144
PCM-2          FR & EFR & D144
PCM-3          FR & EFR & D144
PCM-4          NU

PCM-5          NU
PCM-6          NU
PCM-7          NU

/* COMMAND EXECUTED */
```

NU = not used

4.6 E: Exchange Terminal supervision commands

Command group ZE? in the main menu (TCSM_XXX:LUC>) displays the following sub-menu with exchange terminal supervision commands:

```
EXCHANGE TERMINAL SUPERVISION COMMANDS

? ..... MENU / HELP
M ..... MODIFY ET PARAMETERS
O ..... DISPLAY ET PARAMETERS
A ..... MODIFY ALARM LIMITS
P ..... DISPLAY ALARM LIMITS
S ..... MODIFY STATISTICS COUNTERS LIMITS
L ..... DISPLAY STATISTICS COUNTERS LIMITS
U ..... MODIFY SLIP LIMITS
R ..... DISPLAY SLIP LIMITS
C ..... MODIFY FUNCTIONAL MODES
I ..... DISPLAY FUNCTIONAL MODES
Z ..... RETURN TO MAIN LEVEL

TCSM_XXX:ESC>
```

The following sections describe the exchange terminal supervision commands (TCSM_XXX:ESC>) available in more detail, their use, parameters, syntax. Command examples are also given.

4.6.1 EM: Modify ET parameters

Command ZEM modifies an ET-connected PCM circuit threshold value and shift, and delay in cancellation of disturbance observation alarm.

Parameters

PCM circuit index, disturbance observation class, cancellation of disturbance observation alarm;

PCM circuit index:

The identifier indicates which PCM circuit parameters are to be modified.

0	BSC direction PCM circuit
1 - 7	a certain MSC direction PCM circuit
ALL	all PCM circuits

CAT = FRM category, catalogue index, which corresponds to a certain fault ratio and reaction time; decimal number 0 - 16.

Different combinations for Fault Ratio (FR) and Reaction Time (RT) to permanent fault:

INDEX	FR	RT	INDEX	FR	RT	INDEX	FR	RT
1	10E-4	38	6	10E-3	111	11	10E-2	185
2	10E-4	30	7	10E-3	65	12	10E-2	102
3	10E-4	20	8	10E-3	37	13	10E-2	55
4	10E-4	12	9	10E-3	20	14	10E-2	28
5	10E-4	6	10	10E-3	10	15	10E-2	13

0	no reaction
16	immediate reaction

Remote end type RTYPE:

NO	no alarms
CCITT	international standard (default)
NC30	Nokia NC30, old product, not used
DAS	digital announcing system

Remote end type RTYPE parmeter is not allowed in ANSI or ANSI-C.

Disturbance observation alarm cancel delay:

CTIME = FRM alarm cancel delay in minutes; decimal number 1 - 60.

Syntax

```
ZEM: PCM circuit index: RTYPE = <remote end type>, CAT = <FRM
category>, CTIME = <FRM alarm cancel delay> ;
```

Examples

- To modify the MSC side PCM circuit 1, connected to ET2A/ET2E, by changing the disturbance observation class to 5 (fault ratio = 10E-4, reaction time 6 seconds), give the command:

```
TCSM_XXX:ESC> M:1:CAT=5;


/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */
```

```
   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

- To modify the MSC side PCM circuit 3, connected to ET2A/ET2E, by changing the disturbance observation class to 4 (fault ratio = 10E-4, reaction time 12 seconds) and disturbance observation alarm cancellation time to 20 minutes, give the command:

```
TCSM_XXX:ESC> M:3:RTYPE=NO,CAT=4,CTIME=20;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

4.6.2 EO: Display ET parameters

Command ZEO displays parameters of a PCM circuit connected to the ET.

Parameters

PCM circuit index;

PCM circuit index:

The identifier indicates which PCM circuit parameters are to be displayed.

0	BSC direction PCM circuit;
1 - 7	a certain MSC direction PCM circuit;
ALL	all PCM circuits;

Syntax

```
ZEO: PCM circuit index;
```

Examples

- To display parameters of all PCM circuits connected to the ET2A/ET2E, give the command:

```
TCSM_XXX:ESC> O:ALL;
```

An example from an ANSI application:

```
/* ET PARAMETER INFO */

PCM      FAULT RATE  REACTION TIME TO    FRM ALARM CANCEL
                     PERMANENT FAULT (S)     DELAY (MIN)

PCM-0       10E-3      NO RESPONSE                 1
PCM-1       10E-3      IMMEDIATE RESPONSE          1
PCM-2       10E-3              37                  1
PCM-3       10E-3              37                  1
```

PCM circuit index:

The identifier indicates which PCM circuit parameters are to be modified.

0	BSC direction PCM circuit
1 - 7	a certain MSC direction PCM circuit
ALL	all PCM circuits

Alarm filtering time:

ATIME = alarm filtering time in milliseconds; decimal number 50 - 2000.

Bit error ratio alarm-setting limit value:

BERAL = bit error ratio alarm-setting limit value, with which the alarm is set.

The value can be between 15 and 254 errors/5 seconds. The parameter is obligatory, if the BERCL is required; decimal number 15 - 254.

Bit error ratio alarm cancellation limit value:

BERCL = bit error ratio alarm limit value, with which an alarm is cancelled.

The value can be between 1 and 208 errors/5 seconds so that the highest allowed value is calculated from the given alarm-setting limit value. The calculation formula used is MAX_BERCL = (0,85 × BERAL) - 7. The BERCL must be given if the BERAL is given; decimal number 1 - 208.

CRC bit error ratio alarm-setting limit value:

CRCAL = CRC bit error ratio alarm limit value with which an alarm is set

The value can be between 5 and 130 errors/minute. The parameter is obligatory if the CRCCL is required; decimal number 5 - 130.

CRC bit error ratio alarm cancellation limit value:

CRCCL = CRC bit error ratio alarm limit value with which the alarm is cancelled

The value can be between 2 and 65 errors/minute so that the highest allowed value is half of the alarm setting limit value.

The CRCCL must be given if the CRCAL is given; decimal number 2 - 65.

Syntax:

```
ZEA: PCM circuit index:
```

ATIME = alarm filtering time,

BERAL = bit error ratio alarm-setting limit value,

BERCL = bit error ratio alarm cancellation limit value,
CRCAL = CRC bit error ratio alarm-setting limit value,

CRCCL = CRC bit error ratio alarm cancellation limit value;

Examples:

- To modify filtering time to 100 ms for alarms of BSC direction PCM circuit 0 connected to ET2A/ET2E-0, give the command:

```
TCSM_XXX:ESC> A:0:ATIME=100;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */
```

```
   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

- To modify the MSC side PCM circuit 3, connected to ET2E/ET2A-1, by changing the setting limit value to 150 errors/5 seconds and cancellation limit value to 100 errors/5 seconds for bit error ratio alarms, give the command:

```
TCSM_XXX:ESC> A:3:BERAL=150,BERCL=100;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

- To modify the MSC side PCM circuit 4, connected to ET2E/ET2A-2, by changing the alarm filtering time to 250 ms, CRC bit error ratio alarms limit value to 70 errors per minute and cancellation limit value to 25 errors per minute, give the command:

```
TCSM_XXX:ESC> A:4:ATIME=250,CRCAL=70,CRCCL=25;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

4.6.4 EP: Display alarm limits

Command `ZEP` displays alarm filtering and cancellation times and bit error ratio alarm limit values.

Parameters

`PCM circuit index;`

PCM circuit index:

The identifier indicates which PCM circuit parameters are to be displayed.

0	BSC direction PCM circuit
1 - 7	a certain MSC direction PCM circuit
ALL	all PCM circuits

Syntax

```
ZEP: PCM circuit index;
```

Examples

- To display alarm limit values of MSC direction PCM circuit 2 connected to ET2E/ET2A-1, give the command:

```
TCSM_XXX:ESC> P:2;

/* PCM DEFINED ALARM VALUES */

PCM  ATIME CTIME  BERAL    BERCL    CRCAL      CRCCL
TRUNK (MS) (MS) (ERR/5 S) (ERR/5 S) (ERR/MIN) (ERR/MIN)

PCM-2  100   200    80        40        63         31

/* COMMAND EXECUTED */
```

4.6.5 ES: Modify statistics counters limits

Command ZES modifies limit values of frame alignment signal errors and short disturbance statistics counters.

Parameters

PCM circuit index, frame alignment signal error limit values, short disturbance limit values

PCM circuit index:

The identifier indicates which PCM circuit parameters are to be modified.

0	BSC direction PCM circuit
1 - 7	a certain MSC direction PCM circuit
ALL	all PCM circuits

Frame alignment signal error limit values:

FLIM = frame alignment signal error statistics counters limit values in the format x1-x2-x3

Three values are always given. The lowest acceptable is 2 and the highest 254 errors/5 s. Limit values are given in order of size (the lowest first), and the same value cannot be given twice.

Short disturbance limit values:

DLIM = short disturbance statistics counters limit values are in the format x1-x2-x3-x4

Four values are always given. The lowest acceptable is 10 and the highest 9999 ms.

Limit values are given in order of size (the lowest first), and the same value cannot be given twice.

Syntax

```
ZES: PCM circuit index: FLIM = <frame alignment signal error limit
values>, DLIM = <short disturbance limit values>;
```

Examples

- To modify to 10, 40 and 80 the limit values of MSC direction PCM circuit 2's frame alignment signal error statistics counters connected to ET2E/ET2A-1, give the command:

```
TCSM_XXX:ESC> S:2:FLIM=10-40-80;
```

```
/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

- To modify to 10, 50, 200 and 1000 the limit values of BSC direction PCM circuit 0's short disturbance statistics counters connected to ET2E/ET2A-0, give the command:

```
TCSM_XXX:ESC> S:0:DLIM=10-50-200-1000;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

4.6.6 EL: Display statistics counters limits

Command ZEL displays limit values of statistics counters of frame alignment signal errors and short disturbances.

Parameters

PCM circuit index, statistics counter type;

PCM circuit index:

The identifier indicates which PCM circuit parameters are to be displayed.

0	BSC direction PCM circuit
1 - 7	a certain MSC direction PCM circuit
ALL	all PCM circuits

Statistics counter type:

The type indicates which statistics counters' limit values are to be displayed:

FLIM	frame alignment signal errors
DLIM	short disturbances

Syntax

ZEL: PCM circuit index : statistics counter type;

Examples

- To display limit values of short disturbance statistics counters of all ETs, give the command:

```
TCSM_XXX:ESC> L:ALL:DLIM;

/* PCM STATISTICS COUNTER */

/* DISTURBANCES */
```

```
PCM          COUNTER LIMITS (MS)

PCM-0        10-50      50-200     200-1000   1000-
PCM-1        10-50      50-200     200-1000   1000-
PCM-2        10-50      50-200     200-1000   1000-
PCM-3        10-50      50-200     200-1000   1000-

/* COMMAND EXECUTED */
```

- To display statistics counters' limit values of frame alignment signal errors of MSC direction PCM circuit 3 connected to ET2E/ET2A-1, give the command:

```
TCSM_XXX:ESC> L:3:FLIM;

/* PCM STATISTICS COUNTER */
/* FRAME ALIGNMENT SIGNAL ERRORS */

PCM           COUNTER LIMITS (ERRORS/5 SECONDS)

PCM-3         1-9       10-39      40-79     80-

/* COMMAND EXECUTED */
```

4.6.7 EU: Modify slip limits

Command `ZEU` modifies slip disturbance and alarm limits.

Parameters

`PCM circuit index, slip disturbance onset threshold value, slip alarm onset threshold value`

PCM circuit index:

The identifier indicates which PCM circuit parameters are to be modified.

0	BSC direction PCM circuit
1 - 7	a certain MSC direction PCM circuit
ALL	all PCM circuits

Slip disturbance onset threshold value:

SLIDL = slip disturbance limit value, with which the disturbance is set.

The value to be given can be between 1 and 23 slips/24 h; decimal number.

Slip alarm onset threshold value:

SLIAL = slip alarm onset threshold value with which the alarm is set.

The value to be given can be between 1 and 60 slips/h; decimal number.

Syntax

`ZEU: PCM circuit index: SLIDL = <slip disturbance onset threshold value>, SLIAL = <slip alarm onset threshold value>;`

Example

- To change to 2 slips/24h the onset threshold of the slip disturbance and 7 slips/h the onset threshold of the slip alarm of PCM circuits connected to all ETs, give the command:

```
TCSM_XXX:ESC> U:ALL:SLIDL=2,SLIAL=7;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

4.6.8 ER: Display slip limits

Command ZER displays slip disturbance and alarm limits.

Parameters

PCM circuit index;

PCM circuit index:

The identifier indicates which PCM circuit parameters are to be displayed.

0	BSC direction PCM circuit
1 - 7	a certain MSC direction PCM circuit
ALL	all PCM circuits

Syntax

```
ZER: PCM circuit index;
```

Example

- To display slip disturbance and alarm limits of all PCM circuits connected to ETs, give the command:

```
TCSM_XXX:ESC> R:ALL;

/* PCM DEFINED SLIP DISTURBANCE AND ALARM VALUES */

PCM             SLIDL (SLIPS/24H)    SLIAL (SLIPS/H)

PCM-0                    5                   30
PCM-1                    5                   30
PCM-2                    5                   30
PCM-3                    5                   30

/* COMMAND EXECUTED /
```

4.6.9 EC: Modify functional mode – ETSI mode

The command ZEC modifies the E1 exchange terminal's functional modes, in other words the values of the programmable jumpers.

Parameters

```
PCM circuit index, operating mode, frame locking mode, use of Sa
bits;
```

PCM circuit index:

The identifier indicates which PCM circuit parameters are to be modified.

0	BSC direction PCM circuit
1 - 7	a certain MSC direction PCM circuit
ALL	all PCM circuits

Operating mode:

The parameter can have the following values:

NORM	normal mode
SATR	Sa-bit through connection mode
V11M	V.11 mode
TRSP	transparent mode

Frame locking mode:

This parameter is not given in transparent mode.

The parameter can have the following values:

DBLF	double frame mode
CRC4	CRC4 mode

Use of Sa-bits:

This parameter can only be given if the value of “operating mode” has been given as V11M.

The parameter can have the following values:

B56	Sa-bits 5 and 6 are in Q.1 use
B5678	Sa-bits 5, 6, 7 and 8 are in Q.1 use

Examples

To change the operating mode of the PCM circuit 3, which is connected to ET 2 to V.11 and the frame locking mode to CRC4-mode and bits 5 to 8 to Q1-use, give the command:

```
TCSM_XXX:ESC> C:3:V11M,CRC4,B5678;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

To change the operating mode of PCM circuit 1, which is connected to ET 1 to through-connection of Sa-bits and frame locking mode to double frame mode, give the command:

```
TCSM_XXX:ESC> C:1:SATR,DBLF;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

4.6.10 EC: Modify functional mode – ANSI mode

The command ZEC modifies the T1 exchange terminal's functional modes, in other words the values of the programmable jumpers.

Parameters

PCM circuit index, multiframe mode, line code, outgoing signal level;

PCM circuit index:

The identifier indicates which PCM circuit parameters are to be modified.

0	BSC direction PCM circuit
1 - 7	a certain MSC direction PCM circuit
ALL	all PCM circuits

Superframe mode:

The parameter can have the following values:

ESF	extended superframe mode;
SF	superframe mode;

Line code:

If the superframe mode is SF, ZBTSI cannot be given as the line code.

The parameter can have the following values:

B8ZS	“Bipolar with 8 Zero Substitution” line code
ZBTSI	“Zero-Byte Time Slot Interchange” line code
AMI	“Alternate Mark Inversion” line code

Outgoing signal level:

The parameter can have the values 0, 7.5, 15, or 22.5 decibels.

Syntax

```
ZEC: PCM circuit index:
      (ESF (B8ZS    (0
       SF), ZBTSI,  7.5;
            AMI)    15
                    22.5)
```

Example

- To modify superframe mode to ESF, line code to AMI and outgoing signal level to 15 dB for PCM circuit 3 connected to ET number 2, give the command:

```
TCSM_XXX:ESC> C:3:ESF,AMI,15;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

4.6.11 EC: Modify functional mode – ANSI-C mode

The command ZEC is used to change both E1 and T1 exchange terminal operating modes, in other words the values of programmable jumpers.

Parameters

```
T1 PCM circuit index, superframe mode, line code, outgoing signal
level;
```

or

```
E1 PCM circuit index, operating mode, frame alignment mode, use
of Sa-bits;
```

PCM circuit index:

Identifies the PCM-line whose parameters are going to be changed.

0	BSC side PCM-line;

Superframe mode:

The parameter can have the following values:

ESF	Enhanced superframe mode
SF	Superframe mode

Line code:

If the superframe mode is SF, ZBTSI cannot be given as the line code.

The parameter can have the following values:

B8ZS	“Bipolar with 8 Zero Substitution” line code
ZBTSI	“Zero-Byte Time Slot Interchange” line code
AMI	“Alternate Mark Inversion” line code

Outgoing signal level:

The parameter can have the values 0, 7.5, 15 or 22.5 decibels.

E1 PCM circuit index:

Identifies which PCM-line parameters are going to be changed.

2-7	a given MSC-direction PCM-line
ALL	all MSC-direction PCM-lines

Operating mode:

The parameter can have the following values:

NORM	normal mode
SATR	Sa-bit through connection mode
V11M	V.11-mode
TRSP	transparent mode

Frame alignment mode:

In transparent operation mode, this parameter does not have a significance, i.e. if the operating mode is given as TRSP, this parameter is not given.

The parameter can have the following values:

DBLF	double frame mode
CRC4	CRC4-mode

Use of Sa-bits:

The Q.1-use of Sa-bits is possible only in V.11 operating mode, so this parameter can be given only if the parameter “operating mode” value has been given as V11M.

In this case, the parameter can have the following values:

B56	SA-bits 5 and 6 are in Q.1-use;
B5678	SA-bits 5, 6, 7 and 8 are in Q.1-use;

Syntax:

```
ZEC: PCM circuit index:
     (ESF  (B8ZS   (0
     SF),   ZBTSI,  7.5;
            AMI)    15
                    22.5)
```

or

```
ZEC: PCM circuit index:
     (NORM  (DBLF  (B56
      SATR,  CRC4)  B5678);
             V11M
             TRSP)
```

Examples:

- To change the parameters of PCM-line 0, which is connected to ET number 0. Change over frame mode to ESF, line code to AMI and outgoing signal level to 15 dB, give the command:

```
TCSM_XXX:ESC> C:0:ESF,AMI,15;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

- To change the parameters of PCM-line 3, which is connected to ET number 1. Change the operating mode to V.11, the frame alignment mode to CRC4-mode and put Sa-bits 5 to 8 to Q1-use, give the command:

```
TCSM_XXX:ESC> C:3:V11M,CRC4,B5678;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

- To change the parameters of PCM-line 4, which is attached to ET number 2 (change the working/operating mode to the through-connection of Sa-bits and the frame alignment mode to double frame mode), give the command:

```
TCSM_XXX:ESC> C:4:SATR,DBLF;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

4.6.12 EI: Display functional modes

The command ZEI displays the T1 exchange terminal's functional modes.

Parameters

PCM circuit index;

PCM circuit index:

The identifier indicates which PCM circuit parameters are to be displayed.

0	BSC direction PCM circuit
1-7	a certain MSC direction PCM circuit
ALL	all PCM circuits

Syntax

```
ZEI: PCM circuit index;
```

Example

An example from an ANSI application:

- To display functional modes of MSC direction PCM circuit 1 connected to ET2E/ET2A-1, give the command:

```
TCSM_XXX:ESC> I:1;

/* T1 FUNCTIONAL MODES */
```

```
PCM    SUPERFRAME    LINECODE         OUTGOING SIGNAL
       MODE          MODE             LEVEL (dB)

PCM-1  ESF           B8ZS             7.5

/* COMMAND EXECUTED */
```

An example from an ETSI application:

To display functional modes of MSC direction E1 (PCM) circuit 1 connected to ET2E-0, give the command:

```
TCSM_XXX:ESC> I:1;

/* PCM DEFINED FUNCTIONAL MODES */

PCM     FUNCTIONAL      FRAME ALIGNMENT      SA-BITS FOR
        MODE            MODE                    Q.1 USE

PCM-1   NORM            CRC                     -

/* COMMAND EXECUTED */
```

4.7 ZU: Unit restart and state handling commands

Command group ZU? in the main menu (TCSM_XXX:LUC>) displays the following sub-menu with unit restart and state handling commands:

```
UNIT RESTART AND STATE HANDLING COMMANDS

? ..... MENU/HELP
C ..... CHANGE TCSM2 UNIT STATE
U ..... RESTART TCSM2 UNIT
P ..... RESTART PLUG-IN UNIT
B ..... BLOCK PLUG-IN UNIT
F ..... UNBLOCK PLUG-IN UNIT
Z ..... RETURN TO MAIN LEVEL

TCSM_XXX:USC>
```

The following sections describe the unit restart and state handling commands (TCSM_XXX:USC>) available in more detail, their use, parameters, syntax and command examples.

4.7.1 UC: Change TCSM2 unit state

Command ZUC allows you to change the working states of the TCSM2, which are working (WO-EX) or testing (TE-EX).

This command can be executed only in the local session, and it is not available if the LAPD link to the BSC is working.

Parameters
Working state:

The type identifies the type of the unit which is going to be restarted:

WO change the working state of the unit to working mode;

TE change the state of the unit to test mode;

Syntax

```
ZUC:working state;
```

Example

To change the state of the unit to executing state, give the command:

```
TCSM_XXX:USC> ZUC:WO

   PLEASE CONFIRM (Y/N)

   RESTARTING TCSM UNIT ...
```

The unit will restart and give the prompt:

```
TCSM_XXX:USC>
```

- To change the state of the unit to test state, give the command:

```
TCSM_XXX:USC> C:TE;

/* COMMAND EXECUTED */
```

Execution errors

```
/*** COMMAND NOT POSSIBLE IN REMOTE SESSION ***/

/*** COMMAND NOT ALLOWED ***/
/*** LAPD IS WORKING ***/
```

The LAPD-connection is working. The BSC determines the working state of the TCSM2-unit.

4.7.2 UU: Restart TCSM2 unit

Command `ZUU` restarts the whole TCSM2.

Syntax

```
ZUU;
```

Example

- To restart the whole TCSM2, give the command:

```
TCSM_XXX:USC> U;

/* ALL CALLS WILL BE CANCELLED DUE */
/* TO GIVEN COMMAND */

  PLEASE CONFIRM (Y/N)

/* COMMAND EXECUTED */
```

4.7.3 UP: Restart plug-in unit

Command ZUP restarts a selected plug-in unit.

Parameters

Plug-in unit type, plug-in unit index;

Plug-in unit type:

Type indicates the plug-in unit type to be restarted:

TR TR12/16 plug-in unit;

ET ET2A/ET2E plug-in unit;

Plug-in unit index:

The parameter indicates the index of the plug-in unit to be restarted; decimal number.
0 - 3 ET2A/ET2E plug-in unit index;

0 - 13 TR12/TR16 plug-in unit index;

Syntax

ZUP: plug-in unit type, plug-in unit index;

Examples

- To restart ET2A/ET2E plug-in unit 2, give the command:

```
TCSM_XXX:USC> P:ET,2;

SYSTEM IS LOADING PLUG-IN UNIT ...

/* PLUG-IN UNIT ET2E-2  RESTARTED */

/* COMMAND EXECUTED */
```

- To restart TR12 plug-in unit 4, give the command:

```
TCSM_XXX:USC> P:TR,4;

SYSTEM IS LOADING PLUG-IN UNIT ...

/* PLUG-IN UNIT TR12-4 RESTARTED */

/* COMMAND EXECUTED */
```

4.7.4 UB: Block plug-in unit

Command ZUB blocks a selected plug-in unit.

Parameters

Plug-in unit type, plug-in unit index;

Plug-in unit type:

The type indicates the plug-in unit type to be blocked:

TR TR12/TR16 plug-in unit;

ET ET2A/ET2E plug-in unit;

Plug-in unit index:

The parameter indicates the index of the plug-in unit to be blocked; decimal number.

0 - 3 ET2A/ET2E plug-in unit index;

0 - 13 TR12/TR16 plug-in unit index;

Syntax

```
ZUB: plug-in unit type, plug-in unit index;
```

Examples

- To block ET2A/ET2E plug-in unit 1, give the command:

```
TCSM_XXX:USC> B:ET,1;

/* PLUG-IN UNIT ET2A-1 BLOCKED */

/* COMMAND EXECUTED */
```

- To block TR12/TR16 plug-in unit 4, give the command:

```
TCSM_XXX:USC> B:TR,4;

/* PLUG-IN UNIT TR12-4 BLOCKED */

/* COMMAND EXECUTED */
```

4.7.5 UF: Unblock plug-in unit

Command `ZUF` unblocks a blocked plug-in unit.

Parameters

```
Plug-in unit type, plug-in unit index;
```

Plug-in unit type:

The type indicates the plug-in unit type to be unblocked:

TR TR12/TR16 plug-in unit;

ET ET2A/ET2E plug-in unit;

Plug-in unit index:

The index indicates which plug-in unit is to be unblocked; decimal number.

0 - 3 ET2A/ET2E plug-in unit index;

0 - 13 TR12/16 plug-in unit index;

Syntax

```
ZUF: plug-in unit type, plug-in unit index;
```

Examples

- To unblock the blocked ET2A/ET2E plug-in unit 1, give the command:

```
TCSM_XXX:USC> F:ET,1;

SYSTEM IS LOADING PLUG-IN UNIT ...

/* PLUG-IN UNIT ET2E-1  UNBLOCKED */

/* COMMAND EXECUTED */
```

- To unblock the blocked TR12/TR16 plug-in unit 4, give the command:

```
TCSM_XXX:USC> F:TR,4;

/* PLUG-IN UNIT TR12-4 UNBLOCKED */

/* COMMAND EXECUTED */
```

4.8 I: Statistics commands

Command group ZI? in the main menu (TCSM_XXX:LUC>) displays the following sub-menu with statistics commands:

```
STATISTICS COMMANDS

? ..... MENU / HELP
F ..... DISPLAY PCM FAULT RATE COUNTERS
R ..... RESET PCM FAULT RATE COUNTERS
U ..... DISPLAY EXCHANGE TERMINAL RESET COUNTERS
P ..... RESET EXCHANGE TERMINAL RESET COUNTERS
T ..... DISPLAY TRANSCODER RESET COUNTERS
C ..... RESET TRANSCODER RESET COUNTERS
Z ..... RETURN TO MAIN LEVEL

TCSM_XXX:STA>
```

The following sections describe the statistics commands (TCSM_XXX:STA>) available in more detail, their use, parameters, syntax. Command examples are also given.

4.8.1 IF: Display PCM fault rate counters

Command ZIF displays one PCM circuit's short disturbance distribution, frame alignment signal error distribution, slip quantity and CRC errors of that moment's measurement period.

Parameters

PCM circuit index;

The identifier indicates which PCM circuit's restart counters are to be displayed; decimal number 0 - 7.

0	BSC direction PCM circuit
1 - 7	a given MSC direction PCM circuit

Additional information

The display title indicates trunk circuit statistics counters and values calculated from the start of a permanent measurement period.

The display then shows disturbances stored in the measurement, their title indicating whether they are short disturbances, frame alignment signal errors, slips or CRC errors, in that order, so that only disturbance statistics given in the command are displayed.

In the case of short disturbances, the first column shows the disturbance type (DISTTYPE): NOINSGN = incoming signal missing, AIS = AIS state (continuous 1-state) detected in incoming line signal, FALOST = frame alignment lost, REMOTE = remote end disturbances. There are four counters to each disturbance type, where the number of detected disturbances are recorded according to their length.

Frame alignment signal errors: when calculating bit error ratio, the number of defective frame alignment signals is counted for a certain integration time. The results are classified according to the number of defective frame alignment signals detected during integration time and stored in four counters.

Detected positive and negative slips are displayed for the completed observation period.

When displaying CRC errors, the parameter table lists the following values showing circuit use to both the local end and remote end:

- TOTAL TIME, for measurement
- AVAIL TIME, available and running
- UNVAIL TIME, unavailable not running
- EFS, error-free seconds
- ES, erroneous seconds
- SES, severely erroneous seconds
- degraded minutes

4.8.2 IR: Reset PCM fault rate counters

Command `ZIR` resets a selected PCM circuit's statistics counters.

Parameters

`PCM circuit index;`

The identifier indicates which PCM circuit's statistics counters are to be reset; decimal number 0 - 7.

0	BSC direction PCM circuit;
1 - 7	a certain MSC direction PCM circuit;
ALL	all PCM circuits;

Syntax

```
ZIR: PCM circuit index;
```

Example

- To reset PCM circuit 3's statistics counters, give the command:

4.8.5 IT: Display transcoder reset counters

Command ZIT displays the signal processor unit reset counters.

It only displays the reset counters of ETs in the configuration.

Parameters

PCM circuit index

The identifier indicates which signal processor unit reset counters handling MSC direction PCM circuit timeslots are to be displayed; decimal number 1 - 7.

Syntax

```
ZIT: PCM circuit index;
```

Example

- To display signal processor unit reset counters handling MSC direction PCM circuit 3's timeslots, give the command:

```
TCSM_XXX:STA> T:3;

/* DSP RESET COUNTERS */
/* PCM CIRCUIT = 3 */

TSL       1    2    3    4    5    6    7    8
VALUE     1    1    1    1    1    1    1    1

TSL       9    10   11   12   13   14   15   16
VALUE     1     1    1    1    1    1    1    1

TSL       17   18   19   20   21   22   23   24
VALUE      1    1    1    1    1    1    1    1

/* COMMAND EXECUTED */
```

4.8.6 IC: Reset transcoder reset counters

Command ZIC resets signal processor unit reset counters.

It only resets the reset counters of PCMs in the configuration.

Parameters

PCM circuit index, timeslot

PCM circuit index:

The identifier indicates which signal processor unit reset counters handling MSC direction PCM circuit timeslots are to be reset; decimal number 1 - 7 or all.

If all is chosen, timeslot cannot be given.

Timeslot:

The timeslot shows the signal processor unit handling a certain PCM circuit channel; decimal number 1 to 24 (ANSI), 1 to 31 (ETSI).

Syntax

```
ZIC: (PCM circuit index (,timeslot));
```

Examples

- To reset the whole unit's signal processor unit reset counters, give the command:

```
TCSM_XXX:STA> C:ALL;

/* COMMAND EXECUTED */
```

- To reset signal processor unit reset counters handling MSC direction PCM circuit 3's timeslots, give the command:

```
TCSM_XXX:STA> C:3;

/* COMMAND EXECUTED */
```

- To reset signal processor unit reset counter handling MSC direction PCM circuit 1's timeslot 10, give the command:

```
TCSM_XXX:STA> C:1,10;

/* COMMAND EXECUTED */
```

4.9 D: Memory and I/O handling commands

Command group `ZD?` in the main menu (TCSM_XXX:LUC>) displays the following sub-menu with memory and I/O (input/output) handling commands:

```
MEMORY AND I/O HANDLING COMMANDS

? ..... MENU / HELP
C ..... DISPLAY MEMORY BLOCK CONTINUOUSLY
D ..... DISPLAY MEMORY BLOCK
E ..... SEARCH FOR A STRING
F ..... FILL MEMORY BLOCK
I ..... INPUT PORT
M ..... MOVE MEMORY BLOCK
O ..... OUTPUT PORT
P ..... MEMORY BLOCK CHECKSUM
S ..... SUBSTITUTE MEMORY
V ..... MEMORY BLOCK COMPARISON
Z ..... RETURN TO MAIN LEVEL

TCSM_XXX:DEB>
```

The following sections describe the memory and I/O handling commands (TCSM_XXX:DEB>) available in more detail, their use, parameters and syntax. Command examples are also given.

4.9.1 DC: Display memory block continuously

Command ZDC continuously displays a memory block which fills the screen. The command is used in the same way as command D. The window to be displayed can be moved with the cursor control keys as follows:
ARROW KEY DOWN takes you half a screen forward

ARROW KEY UP takes you half a screen backwards

Execution errors:

```
/*** CHOSEN AREA DOES NOT FIT ONTO DISPLAY ***/

/*** START ADDRESS BIGGER THAN STOP ADDRESS ***/
```

4.9.2 DD: Display memory block

Command ZDD displays up to 64 kbytes memory in bytes (D), in words (DW), double words (DD) or pointers (DP). You can exit the display by hitting the ESC key. In the byte display the corresponding ASCII characters are shown on the right side of the screen. The default display shows 16 bytes, 8 words or 4 double words/pointers on one line. These values can be changed as required. If the value given is greater than the default line length, the line is displayed with the default length.

Syntax

```
ZDD(W/P/D):start pointer(,end offset(,row length));
```

Examples

- To display in bytes the memory block 40.0 - 40.2, give the command:

```
TCSM_XXX:DEB> D:40.0,2;

0040.0000:  00 28 C0                .(.
```

- To display memory word 40.3300, give the command:

```
TCSM_XXX:DEB> DW:40.3300;

0040.3300:  0000
```

- To display as pointer memory block F800.0 - F800.A. Maximum 3 pointers per row, give the command:

```
TCSM_XXX:DEB> DP:F800.2,A,3;

F800.0002:  FFFF.FFFF FFFF.FFFF FFFF.FFFF
```

- To display as double words the memory block 0.0 - 0.F, give the command:

```
TCSM_XXX:DEB> DD:0.0,F;

0000.0000:  FF040687 FF040687 FF040687 E2001C43
```

Execution errors:

```
/*** START ADDRESS BIGGER THAN STOP ADDRESS ***/
```

4.9.3 DE: Search for a string

Command ZDE searches for a string or for data in a given memory block address. The string can be 1 to 16 characters long. The search can be interrupted with the ESC key.

Syntax

```
ZDE: start pointer, < end pointer/end
offset>,<data((,data)*15)/'character ((character)* 15>;
```

Examples

- To search for data AB,05,EF in memory block 0.0 - 4000.FF, give the command:

```
TCSM_XXX:DEB> E:0.0,4000.FF,AB,05,EF;

FOUND AT: 0000.CBB2
FOUND AT: 3000.0000

SEARCHED
```

- To search for ASCII character string 'ABCDEF' in memory block 4000.0 - 7000.0, give the command:

```
TCSM_XXX:DEB> E:4000.0,7000.0,'ABCDEF;

SEARCHED
```

Execution errors:

```
/*** START ADDRESS BIGGER THAN STOP ADDRESS ***/
```

4.9.4 DF: Fill memory block

Command ZDF fills the memory block with a bit string of maximum 16 bytes long. The bit string is given either in HEX bytes separated by commas or as ASCII characters. Upon execution, the success of the command is checked. If the start address is greater than the end address, the filling is not performed.

Syntax

```
ZDF:start pointer,<end pointer/end offset>,
<data((,data)*15)/'character ((character)*15)>;
```

Examples

- To fill memory block 3000.0 - 3000.F with byte string 1,2,3,4, give the command:

```
TCSM_XXX:DEB> F:3000.0,3000.F,1,2,3,4;

FILLED
```

- To attempt to fill memory block 0.FF - 0.0 with byte string 1,2,3,4, give the command:

```
TCSM_XXX:DEB> F:0.FF,0.0,1,2,3,4;

/*** START ADDRESS BIGGER THAN STOP ADDRESS ***/
```

- To fill memory block 3000.0 - 3000.4F with ASCII character string 'DEBUGGER', give the command:

```
TCSM_XXX:DEB> F:3000.0,4F,'DEBUGGER;

FILLED
```

- To attempt to fill memory block 3000.0 - 3000.FF with a too long ASCII character string, give the command:

```
TCSM_XXX:DEB> F:3000.0,FF,'ALLTOOLONGSEQUENCE;

F:3000.0,FF,'<== SYNTAX ERROR
```

- To fill memory block F800.0 - F800.FF with byte BB, give the command:

```
TCSM_XXX:DEB> F:F800.0,FF,BB;

/*** CANNOT WRITE TO F800.0000 ***/
```

Execution errors

```
/*** CANNOT WRITE TO: <address> ***/
/*** START ADDRESS BIGGER THAN STOP ADDRESS ***/
```

4.9.5 DI: Input port

Command `ZDI` continuously reads a given port's contents either in bytes (I) or words (IW).

Syntax

`ZDI(W):port address;`

Execute the command by hitting the spacebar: <SPACE>.

Escape by hitting <ENTER>.

Examples

- To read bytes in I/O port FE80, give the command:

```
TCSM_XXX:DEB> I:FE80 <SPACE>

12 1B 41 41
```

- To read words in I/O port EFF6, give the command:

```
TCSM_XXX:DEB> IW:EFF6 <SPACE>

FF47 FE45 FF47
```

4.9.6 DM: Move memory block

Command `ZDM` copies a memory block to another address. Upon execution the success of the command is checked. If the source start address is greater than the source end address, copying is not performed. If the target start address is between the source start address and the source end address, copying is done from the block's end towards its beginning. Otherwise copying is done from the block's beginning.

Syntax

```
ZDM: source pointer, <end pointer/end offset>,destination
pointer;
```

Examples

- To copy memory block 400.0 - 400.FFF to the address 800.0, give the command:

```
TCSM_XXX:DEB> M:400.0,FFF,800.0;

MOVED
```

- To copy memory block 400.0 - 400.FFF to the address 400.10, give the command:

```
TCSM_XXX:DEB> M:400.0,FFF,400.10;

MOVED
```

- To copy memory block F800.0 - F800.FF to the address F900.0, give the command:

```
TCSM_XXX:DEB> M:F800.0,FF,F900.0;

/*** CANNOT WRITE TO F900.0000 ***/
```

- To copy memory block 2000.0 - 4000.FFFF to the address 8000.0, give the command:

```
TCSM_XXX:DEB> M:2000.0,4000.FFFF,8000.0;

MOVED
```

- To attempt to copy memory block 400.FF - 400.0 to the address 800.0, give the command:

```
TCSM_XXX:DEB> M:400.FF,0,800.0;

/*** START ADDRESS BIGGER THAN STOP ADDRESS ***/
```

Execution errors

```
/*** CANNOT WRITE TO <address> ***/
/*** START ADDRESS BIGGER THAN STOP ADDRESS ***/
```

4.9.7 DO: Output port

Command `ZDO` outputs selected data to a given port either in bytes (O) or words (OW). It outputs to the port every time the <SPACE BAR> is pressed. You would normally give a number and then press the <SPACE BAR>. Zero (0) is the default value if no value is given. If some other value is given, it is used as the default value for the duration of the command execution.

Syntax

```
ZDO(W):port (data)*;
```

Execute the command by hitting the spacebar: <SPACE>.

Escape by hitting <ENTER>

Examples

To output bytes to I/O port EFF0, give the command:

```
TCSM_XXX:DEB> O:EFF0 <SPACE>

-3 -44 -A1 - - - - -33
```

To output words to I/O port F200, give the command:

```
TCSM_XXX:DEB> OW:F200 <SPACE>

-100 -400
```

4.9.8 DP: Memory block check sum

Command ZDP calculates the word check sum in a byte memory block.

Syntax

```
ZDP: start pointer,<end pointer/end offset>;
```

Examples

- To calculate memory block 1000.0 - 1000.FFF's check sum, give the command:

```
TCSM_XXX:DEB> P:1000.0,FFF;

CHECK SUM: DE45
```

- To calculate memory block 4000.0 - 4000.7FFF's check sum, give the command:

```
TCSM_XXX:DEB> P:4000.0,7FFF;

CHECK SUM: 522F
```

Execution errors

```
/*** START ADDRESS BIGGER THAN STOP ADDRESS ***/
```

4.9.9 DS: Substitute memory

Command ZDS can check and/or substitute memory in bytes or ASCII characters (S), words (SW), double words (SD) or pointers (SP). The <SPACE BAR> keeps the user in the same address, the <ARROW KEY RIGHT> moves forward and the <ARROW KEY LEFT> moves backwards. It is also possible to make changes to the FLASH memory. The value can be 0 or 1. The default value is 0. For a complete list of default values, see the *TCSM2A/TCSM2E Commissioning*.

Syntax

```
ZDS(W/P/D): start pointer(,flash page);
```

Examples

- To substitute memory in bytes starting from the address 0.0, give the command:

```
TCSM_XXX:DEB> S:0.0
```

```
0000.0000:   87 .  <-
0000.0001:   06 .  <-
0000.0002:   04 .  <-  27
```

- To substitute memory in words starting from the address 3000.0, give the command:

```
TCSM_XXX:DEB> SW:3000.0;

3000.0000:   BBAA  <-  AAAA
3000.0000:   AAAA  <-
```

- To substitute memory in pointers starting from the address 1000.200, give the command:

```
TCSM_XXX:DEB> SP:1000.200;

1000.200:   FFFF.0000  <-  F600.0
```

- To substitute memory in double words starting from the address 3000.0, give the command:

```
TCSM_XXX:DEB> SD:3000.0;

3000.0000:   BBBBAAAA  <-  DDDDCCCC
2000.FFFC:   03FFFFFF  <-  FFFFEEEE
2000.FFF8:   03FF7FFF  <-  0
```

Execution errors

```
/*** CANNOT WRITE TO <address> ***/


/*** FLASH OPERATION ERROR ***/
/*** ILLEGAL FLASH PAGE ***/
```

4.9.10 DV: Memory block comparation

Command `ZDV` compares two memory blocks and displays possible differences. If the qualifier N is given, differences are not displayed. On completion of the comparison, however, the number of differences is always displayed.

Syntax

`ZDV(N): start pointer,<end pointer/end offset>, destination pointer;`

Examples

- To compare memory blocks 0.0 - 0.3 and 3000.0 - 3000.3. Display differences, give the command:

```
TCSM_XXX:DEB> V:0.0,0.3,3000.0;

0000.0000 87  3000.0000 00
0000.0001 06  3000.0001 00
0000.0002 04  3000.0002 00
0000.0003 FF  3000.0003 00
000004H DIFFERENCES
```

- To compare memory block 0.0 - 0.FF to itself. Display differences, give the command:

```
TCSM_XXX:DEB> V:0.0,FF,0.0;

000000H DIFFERENCES
```

- To compare memory blocks 0.0 - 0.FFFF and E800.0 - E800.FFFF, give the command (differences are not displayed):

```
TCSM_XXX:DEB> VN:0.0,FFFF,E800.0;

00F6ACH DIFFERENCES
```

Execution errors

```
/*** START ADDRESS BIGGER THAN STOP ADDRESS ***/
```

4.10 O: Operating system commands

Command group ZO? in the main menu (TCSM_XXX:LUC>) displays the following sub-menu with operating system commands:

```
OPERATING SYSTEM COMMANDS

? ..... MENU / HELP
C ..... CREATE PROCESS
D ..... DESTROY PROCESS
G ..... CHANGE PRIORITY
H ..... DISPLAY PROCESS PCB
M ..... DISPLAY PROCESS STATE
P ..... P-OPERATION
S ..... SEND MESSAGE
R ..... RECEIVE MESSAGE
T ..... TEST IF MESSAGES COMING
U ..... RESTART PROCESS
V ..... V-OPERATION
Z ..... RETURN TO MAIN LEVEL

TCSM_XXX:OSC>
```

The following sections describe the operating system commands (TCSM_XXX:OSC>) available in more detail, their use, parameters and syntax. Command examples are also given.

4.10.1 OC: Create process

Command ZOC creates a new process. Parameters are process identifier, priority, code start address, data segment value. If process creation is successful, its PCB address is displayed on the screen. If only the process identifier is given, the program fetches the other details from the program table.

Syntax

```
ZOC:process identification(,priority, start pointer, data
sequence);
```

Examples

- To create process; identifier C1, priority 2, start address F400.0, data segment C80, give the command:

```
TCSM_XXX:OSC> C:C1,2,F280.0,C80;

C1 CREATED, PCB AT 0040.0C00
```

- To create process C1, details for which to be fetched from the program table, give the command:

```
TCSM_XXX:OSC> C:C1;

C1 CREATED; PCB AT 00400.0C00
```

- To create process; identifier E4, priority 25, start address 8010.2, data segment D80, give the command:

```
TCSM_XXX:OSC> C:E4,25,8010.2,D80;

E4 CREATED, PCB AT 0040.1300
```

Execution errors

```
/*** ERROR 84: PCB ALREADY EXISTS ***/
/*** <process> NOT FOUND FROM PROGRAM TABLE ***/
```

4.10.2 OD: Destroy process

Command `ZOD` destroys a process. The identifier of the process to be destroyed is given as parameter.

Syntax

```
ZOD:process identifier;
```

Example

- To destroy process A0, give the command:

```
TCSM_XXX:OSC> D:A0;

A0 DESTROYED
```

Execution errors

```
/*** <process> NOT FOUND FROM PROGRAM TABLE ***/
```

4.10.3 OG: Change priority

Command `ZOG` changes a process's priority. The process identifier and new priority are given as parameters.

Syntax

```
ZOG:process identifier, priority;
```

Example

- To change process A0 priority to 0, give the command:

```
TCSM_XXX:OSC> G:A0,0;

PRIORITY CHANGED
```

Execution errors

```
/*** <process> NOT FOUND FROM PROGRAM TABLE ***/
```

4.10.4 OH: Display process PCB

Command `ZOH` displays a process's PCB. The process identifier is given as a parameter. Command ZOHC continuously displays the PCB. A continuous display can be terminated with the ESC key. When displaying a process's stack area with the * option, all values in the stack are displayed. This makes it possible to establish the depth of the largest stack in use and to examine previous stack values.

Syntax

```
ZOH(C):(*,) process identifier;
```

Example

- To display process A0's PCB, give the command:

```
TCSM_XXX:OSC> H:A0;

0040.0E00: A0 DE 0EE2  FFFF  0000  0E0D  0000  00 FF 0E00
0040.0E10: 00 FF 0000  FFFF  330F  0000  0F FE 00 00 00 00
0040.0E20: ----  ----  ----  ----  ----  ----  ----  ----
0040.0E30: ----  ----  ----  ----  ----  ----  ----  ----
0040.0E40: ----  ----  ----  ----  ----  ----  ----  ----
0040.0E50: ----  ----  ----  ----  ----  ----  ----  ----
0040.0E60: ----  ----  ----  ----  ----  ----  ----  ----
0040.0E70: ----  ----  ----  ----  ----  ----  ----  ----
0040.0E80: ----  ----  ----  ----  ----  ----  ----  ----
0040.0E90: ----  ----  ----  ----  ----  ----  ----  ----
0040.0EA0: ----  ----  ----  ----  ----  ----  ----  ----
0040.0EB0: ----  ----  ----  ----  ----  ----  ----  ----
0040.0EC0: ----  ----  ----  ----  ----  ----  ----  ----
0040.0ED0: ----  ----  ----  ----  ----  ----  ----  ----
0040.0EE0: ----  044B  06AD  0564  0EFE  2E00  0066  F92F
0040.0EF0: F246  00D2  D300  000A  2E00  00FF  0000  0000
```

In the example below, the asterisks show where the stack pointer points.

```
TCSM_XXX:OSC> H:*,A0;

0040.0E00: A0 DE 0EE2  FFFF  0000  0E0D  0000  00 FF 0E00
0040.0E10: 00 FF 0000  FFFF  4420  0000  0F 0E 00 00 00 00
```

```
0040.0E20: 0000  0000  0000  0000  0000  0000  0000  0000
0040.0E30: 0000  0000  0000  0000  0000  0000  0000  0000
0040.0E40: 0000  0000  0000  0000  0000  0000  0000  0000
0040.0E50: 0000  0000  0000  0000  0000  0000  0000  0000
0040.0E60: 0000  0000  0000  0000  0000  0000  0000  0000
0040.0E70: 0000  0000  0000  0000  0000  0000  0000  0000
0040.0E80: 0000  0000  0000  0000  0000  0000  0000  0000
0040.0E90: 0000  0000  0000  0000  0000  0000  0000  0000
0040.0EA0: 0A0D  08BB  411D  000A  0301  0494  0682  090D
0040.0EB0: 0301  411D  0040  F200  0901  0000  3117  310D
0040.0EC0: 0494  0682  054C  0EE2  2E00  0061  F92F  F216
0040.0ED0: 067C  D300  0ED8  0040  000A  01E6  0F00  0000
0040.0EE0: 0000 *044B* 06AD  0564  0EFE  2E00  0066  F92F
0040.0EF0: F246  00D2  D300  000A  2E00  00FF  0000  0000

TCSM_XXX:SYS> H:F1

/*** ERROR 83:  PCB NOT FOUND ***/
```

Execution errors

```
/*** ERROR 83:  PCB NOT FOUND ***/
```

4.10.5 OM: Display process state

Command ZOM displays a certain process's state, the process's last message and the first 14 bytes of the first five messages in the message queue. The process identifier is given as a parameter. Command MC continuously displays the above-mentioned data. Continuous display can be terminated with the ESC key.

Syntax

```
ZOM(C):process identifier;
```

Example

- To display process A0's state, give the command:

```
TCSM_XXX:OSC> M:A0;

PROCESS STATE:           NORMAL MESSAGE WAITING
PCB OFFSET:              2F00
STACK POINTER:           2FEA
LAST HANDLED MESSAGE:    NO MESSAGE
PECTUS TIME-OUT COUNTER: 0064

FIRST FIVE MESSAGES FROM QUEUE
----.----: ---- ------------------------------------
----.----: ---- ------------------------------------
----.----: ---- ------------------------------------
----.----: ---- ------------------------------------
----.----: ---- ------------------------------------
```

Execution errors

```
/*** ERROR 83:  PCB NOT FOUND ***/
```

4.10.6 OP: P-Operation

Command ZOP makes a P operation on a certain semaphore. The semaphore address is given as a parameter. The operating system requires that semaphores be located in its data segment, so that no more than the offset part of the semaphore address is required. In a P operation, a time control parameter can also be given, when required. If no V operation is performed on a semaphore during time control, the operating system performs it. Time control length is given in multiples of 100 ms. If the address is given correctly, the screen displays the semaphore's value before the P operation. When using time control the command also displays how much time control was left when the V operation was performed.

Syntax

```
ZOP:semaphore offset(,maximum waiting time);
```

Examples

- To perform a P operation on a semaphore with offset part address 521, give the command:

```
TCSM_XXX:OSC> P: 521;

SEMAPHORE VALUE BEFORE P-OPERATION = 00
```

- To perform a P operation on a semaphore with offset part address 521. V operation will be waited for 500 ms, maximum, give the command:

```
TCSM_XXX:OSC> P: 521,5;

SEMAPHORE VALUE BEFORE P-OPERATION = 00
TIME OUT
```

4.10.7 OR: Receive message

Command ZOR receives messages of 125 bytes maximum length from a certain process

(selective reception) or from any process (general reception). Command RA immediately returns the message as it was received. When a message arrives, it is displayed on the screen. The parameter given is a process identifier in selective reception and FF in general reception. In addition, a time control parameter can be given. Or if it is not given, the R command operation can be terminated by hitting the ESC key. If there is no incoming message during time control, the text TIME OUT is displayed on the screen. Otherwise, the message received is displayed together with how much time control was left. Time control length is given in multiples of 100 ms.

Syntax

```
ZOR(A)(:process identification(,time control));
```

Examples

- To receive a message from the A0 process, give the command:

```
TCSM_XXX:OSC> R:A0;

RECEIVED MESSAGE = 0A 05 A0
0004 05 06 07 08 09
```

- To receive a message from the A0 process. Wait 500 ms, maximum. The received message is returned, give the command:

```
TCSM_XXX:OSC> RA:A0,5;

RECEIVED MESSAGE = 0A 05 A0
0004 05 06 07 08 09
TIME LEFT 0002
SEND OK
```

- To receive a message from the A0 process. Wait 500 ms, maximum, give the command:

```
TCSM_XXX:OSC> R:A0,5;

TIME OUT
```

- To receive a message from any process, give the command:

```
TCSM_XXX:OSC> R;

RECEIVED MESSAGE = 03 75 AA
```

4.10.8 OS: Send message

Command `ZOS` sends messages to other processes. Maximum message length is 35 bytes. The message to be sent can be typed on the screen the moment it is sent (S) or written in advance to memory and the message address (SM) given at the moment of sending. A third alternative is to return the message most recently received (SA). The first byte in the message indicates the message length. At the moment the message being written is sent the length can be given as *, whereon the program counts the number of bytes given). The second byte indicates the receiving computer. At the moment the message being written is sent the receiving computer can be given as *. The message is always sent to one's own unit. The third byte indicates the receiving process. The first 0-30 bytes of the message may be given.

Syntax

```
ZOS<A/M:message address/:<message length>/*>,<computer
identification /*>,program identification, (message
identifier)(,(data))*30>;
```

Examples

- To send a message (6 bytes long) to the A0 process, give the command:

```
TCSM_XXX:OSC> S:*,*,A0,0001,0F;
```

```
SEND OK  06 00 A0
0001 0F
```

- To send an A-byte message (10 bytes long) to the A0 process, give the command:

```
TCSM_XXX:OSC> S:A,*,A0,0001,0F;

SEND OK  0A 00 A0
0001 0F 00 00 00 00
```

- To send an A-byte message (10 bytes long) to the A0 process, give the command:

```
TCSM_XXX:OSC> S:A,*,A0,0001,0F,1,,2,;

SEND OK  0A 00 A0
0001 0F 01 00 02 00
```

- To send a message to the A0 process, give the command:

```
TCSM_XXX:OSC> S:*,*,A0,1,2,3,4,5,6,7;

SEND OK  0B 00 A0
0001 02 03 04 05 06 07
```

- To send a message from the address 1234.5678, give the command:

```
TCSM_XXX:OSC> SM:1234.5678;

SEND OK  06 00 A0
0001 02
```

- To send back the latest received message, give the command:

```
TCSM_XXX:OSC> SA;

SEND OK  09 00 C0
0001 02 03 04 05
```

Execution errors

```
/*** ERROR 83: PCB NOT FOUND ***/
```

4.10.9 OT: Test if messages coming

Command `ZOT` checks if the required message type has arrived. Command TA immediately returns the message as it was received. The parameter given is the identifier of the sender's process (selective reception) or the command is given without parameters (general reception). If a message has arrived, it is displayed on the screen; if not, the text NO MESSAGE will be displayed.

Syntax:

```
ZOT(A)(:process identifier);
```

Examples:

- To check if there is a message from the A0 process, give the command:

```
TCSM_XXX:OSC> T:A0;
```

```
RECEIVED MESSAGE = 06 00 A0
0003 04
```

- To check if there is a message from the A0 process and send it back if there is one, give the following command:

```
TCSM_XXX:OSC> TA:A0;

RECEIVED MESSAGE = 06 00 A0
0003 04
SEND OK
```

- To check if there is a message from the A0 process, give the command:

```
TCSM_XXX:OSC> T:A0;

NO MESSAGE
```

- To check if there are any messages, give the command:

```
TCSM_XXX:OSC> T;

NO MESSAGE
```

- To check if there are any messages and send them back if there are any, give the following command:

```
TCSM_XXX:OSC> TA;

NO MESSAGE
```

4.10.10 OU: Restart process

Command `ZOU` restarts a process. The parameter given is the identifier of the process to be restarted.

Syntax

```
ZOU:process identifier;
```

Example

- To restart process A0, give the command:

```
TCSM_XXX:OSC> U:A0;

A0 RESTARTED
```

Execution errors

```
/*** <process> NOT FOUND FROM PROGRAM TABLE ***/
```

4.10.11 OV: V-Operation

Command `ZOV` performs a V operation on a certain semaphore. The semaphore address is given as a parameter. The operating system requires that semaphores be located in its data segment, so that no more than the offset part of the semaphore

address is required. If the address is given correctly, the screen displays the semaphore's value before the V operation.

Syntax

```
ZOV:semaphore off;
```

Example

- To perform a V operation on a semaphore with offset part address 521, give the command:

```
TCSM_XXX:OSC> V:521;

SEMAPHORE VALUE BEFORE V-OPERATION = 00
```

4.11 S: System monitoring commands

Command group `ZS?` in the main menu (TCSM_XXX:LUC>) displays the following submenu with system monitoring commands:

```
SYSTEM MONITORING COMMANDS

? ..... MENU / HELP
C ..... PECTUS ERROR COUNTERS
L ..... PROCESSOR LOAD RATE
S ..... CALCULATE AND COMPARE CHECKSUMS
U ..... BLACKBOX

X ::::: EXAMINE PROGRAM IDENTIFICATION CODES
Z ::::: RETURN TO MAIN LEVEL

TCSM_XXX:SYS>
```

The following sections describe the system monitoring commands (TCSM_XXX:SYS>) available in more detail, their use, parameters and syntax. Command examples are also given.

4.11.1 SC: Pectus error counters

Command `ZSC` displays the readings of the operating system's error counters.

Additionally it displays the identifiers of the last three processes having an error. The command CC prints continuously. It can be terminated with the ESC key.

Syntax

```
ZSC(C);
```

Example

```
TCSM_XXX:SYS> C;

ERR  DECLARATION               COUNT  GUILTY LIST

80:  INCORRECT MESSAGE LENGTH  0000   00 00 00
81:                            0000   00 00 00
```

```
82:                              0000   00 00 00
83:  PCB NOT FOUND               0000   00 00 00
84:  PCB ALREADY EXISTS          0000   00 00 00
85:                              0000   00 00 00
86:                              0000   00 00 00
87:                              0000   00 00 00
88:                              0000   00 00 00
89:                              0000   00 00 00
8A:                              0000   00 00 00
8B:  P-OPERATION LINK ERROR      0000   00 00 00
8C:  V-OPERATION LINK ERROR      0000   00 00 00
8D:                              0000   00 00 00
8E:                              0000   00 00 00
8F:  INCORRECT PARAMETER         0000   00 00 00
```

4.11.2 SL: Processor load rate

Command ZSL is used to print the processor load rate. The load rate is printed at intervals of one second both as a percentage and as a column. The command is ended by hitting the ESC key. Using the command LS you can print the processor load rate just one single time.

Syntax

```
ZSL(S)(:integration time);
```

Example

- To display load rate of processor linked to the service terminal (integration time is 1 s), give the command:

```
TCSM_XXX:SYS> L:1;

45%           XXXXXXXXXXXX
50%           XXXXXXXXXXXXX
55%           XXXXXXXXXXXXXXX
60%           XXXXXXXXXXXXXXXX
0004 SAMPLES  00%  20%  40%  60%  80%  100%  CPU
```

Execution errors

```
/*** CANNOT SEND A MESSAGE TO LOAD METERING PROCESS ***/
```

4.11.3 SS: Calculate and compare check sums

Command ZSS calculates and compares the check sums of a microcomputer unit. calculated check sums are stored in places reserved for them in the programs. The Command SC prevents the check sums from being stored.

Syntax

```
ZSS((C):start pointer, end pointer);
```

Examples

- To look for computer program PIDs, calculate check sums and compare them to those found in the code, give the command:

```
TCSM_XXX:SYS> S;

FA00.0011:      PID: PECTUSPP.COM 1.1-1 97/09/29
CHECKSUM IN MEM = A8EF  CALCULATED = A8EF
FF00.0011:      PID: POPEDAQL.COM 6.2-0 96/11/04
CHECKSUM IN MEM = 98E6  CALCULATED = 98E6
F8F0.0011:      PID: PEELNKQL.COM 7.4-0 98/01/14
CHECKSUM IN MEM = 34F8  CALCULATED = 34F8
E100.0011:      PID: PELLETQL.COM 6.1-1 97/09/29
CHECKSUM IN MEM = F2DD  CALCULATED = F2DD
F280.0011:      PID: PETITEPP.COM 1.1-1 97/09/29

CHECKSUM IN MEM = 9FAC  CALCULATED = 9FAC
F280.0011:      PID: PETITEPP.COM 1.1-1 97/09/29
CHECKSUM IN MEM = 9FAC  CALCULATED = 9FAC
DC00.0011:      PID: LPRECEQL.COM 1.4-1 97/09/29
CHECKSUM IN MEM = 8FE2  CALCULATED = 8FE2
...
```

- To calculate program check sums in memory block 8000.0 - 9000.FFFF and store them in the locations provided, give the command:

```
TCSM_XXX:SYS> S:8000.0,9000.FFFF;

CHECKSUM INSERTED TC2ADJMX: D5F2 AT 8000.0100
CHECKSUM INSERTED TC3ETSMX: 5E4B AT 8000.3000
CHECKSUM INSERTED TC4SENMX: EC56 AT 8000.C000
CHECKSUM INSERTED T2LOADQL: 4F33 AT 9000.5000
CHECKSUM INSERTED DISTCSQL: DAEE AT 9000.8A00
```

- To calculate program check sums in memory block 8000.0 - 9000.FFFF and compare them to the ones found, give the command:

```
TCSM_XXX:SYS> SC:8000.0,9000.FFFF;

CHECKSUM TC2ADJMX: D5F2 AT 8000.0100  CALCULATED = D5F2
CHECKSUM TC3ETSMX: 5E4B AT 8000.3000  CALCULATED = 5E4B
CHECKSUM TC4SENMX: EC56 AT 8000.C000  CALCULATED = EC56
CHECKSUM T2LOADQL: 4F33 AT 9000.5000  CALCULATED = 4F33
CHECKSUM DISTCSQL: DAEE AT 9000.8A00  CALCULATED = DAEE
```

Execution errors

```
/*** CANNOT INSERT CHECK SUM ***/
```

4.11.4 SX: Examine program identification codes

Command `ZSX` displays microcomputer unit software version details, address details, etc.

4.12 T: Set and display terminal

Command `ZT` sets the type of terminal connected to the service terminal line and the baud rate used. The terminal type number and the baud rate are given as parameters.

If no parameters are given, the terminal type is displayed.

Parameters

Terminal type:

Permitted terminal types and their corresponding numbers are:

DUMMY: 0

VT52: 1

VT100: 2

Baud rate:

Permitted baud rate values are:

- 9600
- 19200

Syntax

```
ZT(:terminal type(:B=baud rate));
```

Examples

- To display the terminal type in use, give the command:

```
TCSM_XXX:LUC> T;


TERMINAL IS SET TO VT100
BAUD RATE IS SET TO 9600
```

- To set terminal type to VT100 (number 2) and baud rate to 9600, give the command:

```
TCSM_XXX:LUC> T:2:B=9600;

/* DO YOU WANT CONFIGURATION CHANGES TO BE */
/* PERMANENT BY SAVING THEM IN FLASH MEMORY */

   PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED */
```

Execution errors

```
/*** ILLEGAL PARAMETER VALUE ***/
```

5 Error messages in TCSM2 user commands

The semantic error messages that can be displayed on the screen can be found below.

```
/*** SEMANTIC ERROR ***/ /*** Error text (see below) ***/
```

The error text describes the error in more detail.

```
/*** EXCESSIVE PARAMETER ***/
```

There is an extra parameter or too many parameters in the command.

```
/*** ILLEGAL PARAMETER VALUE ***/
```

The parameter entered is undefined and illegal.

```
/*** MISSING PARAMETER ***/
```

Obligatory parameter or parameters missing.

6 Additional information to TCSM2 user commands

Alarm list in TCSM2 user commands

0630 SYNCHRONIZATION SIGNAL CHANGED

1900 DEGRADED SLIP FREQUENCY

2202 ET FAILURE

2205 ET2 FAILURE

2374 FILE SPACE ERROR IN PREPROCESSOR UNIT

2375 DYNAMIC FLAGPOOL FULL IN PREPROCESSOR UNIT

2631 OPERATION MODE CHANGED TO PLESIOCHRONOUS

2632 OSCILLATOR FAILURE

2636 FAILURE IN OUTGOING CLOCK SIGNAL

2641 FAILURE IN SYNCHRONIZATION SIGNAL

2900 INCOMING SIGNAL MISSING

2909 AIS RECEIVED

2910 FRAMING ERROR

2912 BIT ERROR RATE OVER LIMIT

2915 FAULT RATE MONITORING

2923 CRC BIT ERROR RATIO OVER LIMIT

2924 REMOTE END CRC BIT ERROR RATIO OVER LIMIT

2925 SLIP FREQUENCY LIMIT EXCEEDED

2943 BLUE ALARM

2944 YELLOW ALARM

2950 TRCO FAILURE

2951 LOCAL USER LOGGED IN

2952 TRANSCODER PLUG-IN UNIT FAILURE

2954 NO TRAU FRAME SYNCHRONIZATION

2955 TRANSCODER CHANNEL FAILURE

2956 PLUG-IN UNIT LOCALLY BLOCKED

2958 FAULTY TIME SLOT IN TESTING OF TCSM UNIT

2959 THROUGH CONNECTED CHANNEL FAILURE

2960 WIRED ALARM FROM ANOTHER TCSM2

2962 SW PACKAGE MISSING

Cable connections (RS-232C)

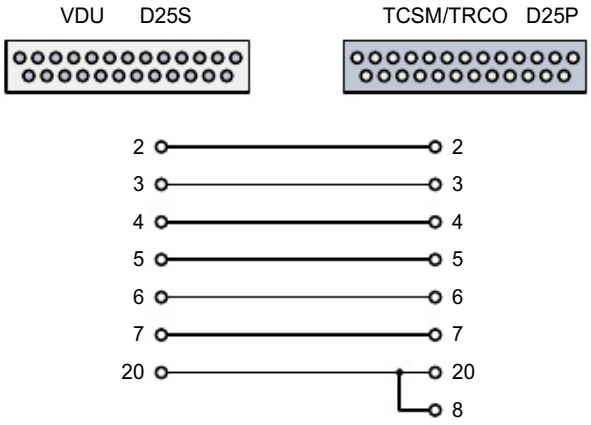
A) Connections for cable: VDU to TCSM/TRCO

No handshaking signals are available at the TCSM end of the cable. Only pins 2, 3 and 7 are connected.

B) Connections for cable: PC to TCSM/TRCO

No handshaking signals are available at the TCSM end of the cable. Only pins 2, 3 and 7 are connected.

A) VDU TO TCSM

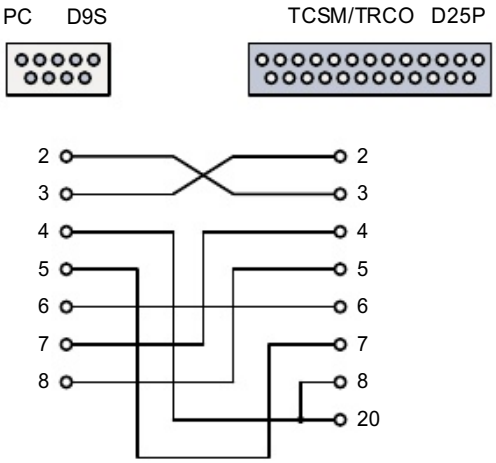


VDU TO TCSM

VDU		TCSM	
Socket	Signal	Pin	Signal
2	TxD	2	RxD
3	RxD	3	TxD
4	RTS	4	*)CTS
5	CTS	5	*)RTS
6	DSR	6	*)DSR
7	GND	7	GND
20	DTR	20	*)DTR

*) NOT USED IN TCSM

B) PC TO TCSM



PC TO TCSM

PC		TCSM	
Socket	Signal	Pin	Signal
2	RxD	3	TxD
3	TxD	2	RxD
4	DTR	20	*)DSR
5	GND	7	GND
6	DSR	6	*)DTR
7	RTS	4	*)CTS
8	CTS	5	*)RTS

*) NOT USED IN TCSM