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Nokia BSC/TCSM S11.5 Product Documentation

Commissioning TCSM2

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Summary of changes

Summary of changes

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

Changes between issues 1-2 and 2-0

Information on the TCSM2A-C removed.

Changes between issues 1-1 and 1-2

Structural corrections; no effect on the contents of the document.

Changes between issues 1-0 and 1-1

In ANSI environment, the following feature added: Text Telephony (TTY).

Changes for Issue 1-0

This document contains the information earlier presented in separate commissioning documents for the TSCM2E and TCSM2A. The following (optional) feature added: Adaptive Multirate (AMR). Online modifications made.

1 Commissioning TCSM2

This document explains the basic commissioning procedures for the TCSM2E or TCSM2A unit. Detailed installation and operating instructions are provided in the corresponding manuals.

This document describes how to configure the TCSM2E or TCSM2A transcoders and test the connections. The presumption is that the plug-in units are new or in factory equivalent condition, so that they will work as intended if properly configured.

This manual provides the following information:

- *Introduction to TCSM2 commissioning*
- *Checking the hardware functions*
- *Configuring the TCSM2 unit*
- *Testing the TCSM2 unit configurations*

2 Introduction to TCSM2 commissioning

Prerequisite

First make a T1/E1 time slot usage plan for each A interface T1 circuit (line) in the TCSM2A, and E1 circuit in the TCSM2E. The following issues are critical:

- how many speech channels are used
- how many through-connected channels, such as Common Channel Signalling (CCS) and X.25 are used

This usage plan must be co-ordinated with the configuration plans of the BSC and the MSC.

Testing environment

This commissioning manual is a stand-alone document, in the sense that it describes the tests on transcoders and associated transmission equipment that do not require the presence of the BSC or MSC. In practice, the tests are often performed with the operating BSC and MSC. Thus, making test calls as the final commissioning step is sometimes not necessary, because such tests are included in the commissioning of the BSC and MSC. Separate TCSM2E/TCSM2A commissioning test calls are, however, strongly recommended.

Extending an already working Base Station Subsystem (BSS) requires slightly different commissioning procedures and more care not to disturb traffic. For details, see the appropriate commissioning and integration manuals.

Equipment and module architecture

The figure below presents the general location of the TCSM2 in the operating environment of the GSM/PCS network. TCSM2 can be placed at the BSC or MSC site.

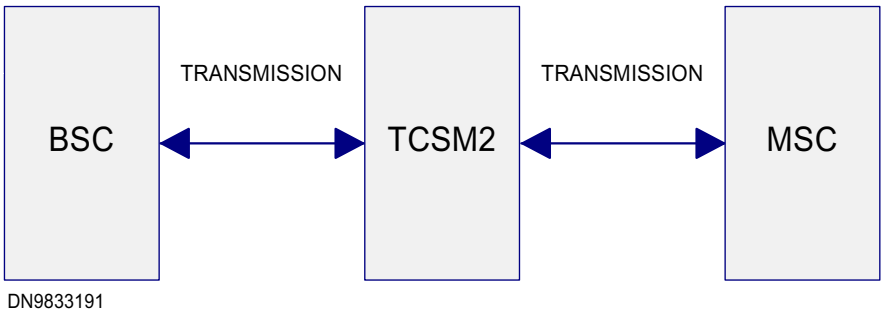

Figure 1. The operating environment of the TCSM2.

The TCSM2 equipment is housed in a dedicated rack TC2E.

Tools

Only ordinary commissioning tools are needed: a multimeter, thin tipped pliers for changing the jumpers, and a PC with terminal software and a connection cable.

Software settings

TCSM2 commissioning instructions are given in this manual, although some of the activities are linked with the BSC (which controls the TCSM2).

A PC is used to configure the TCSM2 plug-in units. The PC is connected to the local terminal interface on the front panel of the TRCO plug-in unit. The different ways to access the TCSM2 are described in the *TCSM2 User Commands.* .

All plug-in units are configured locally, using the PC. Final corrections and test settings can be done remotely, if a remote control path is available.

Testing

Commissioning procedures have been designed so that each site, transmission link and subnetwork can be commissioned autonomously and without multi-site personnel.

It is assumed that the BSS equipment is at least in partial operation during these tests. If the BSC and the transmission equipment are already commissioned, configuring the TCSM2 (see the chapters *Configuring the TCSM2 unit* and *Testing the TCSM2 unit configurations*) and testing it by making test calls is sufficient. Commissioning does not interfere with other operations.

Notes

In case of a problem, try the following corrective actions in this order:

- check the alarms
- check configuration settings
- check versions of loaded software packages
- check cabling
- check jumper settings (strappings)
- check firmware version
- check hardware version of the plug-in unit
- change the plug-in unit

If needed, the whole unit or any plug-in unit can be reset with a command.

Commissioning TCSM2

3 Checking the hardware functions

Checking the installation visually

A prerequisite for commissioning activity is that the on-site installation has been completed. The cabling must also be installed in advance.

Checking the interchangeability versions

Check the interchangeability versions of cartridges and plug-in units by comparing them to the *Hardware Revisions List* in the *Site Documents* .

Checking the firmware versions

Unplug the TRCO and ET2E/ET2A boards from the cartridge and check that the firmware (PROM) versions are approved for the application.

Checking the hardware versions and settings

Check that the hardware versions are as specified. Confirm that the hardware settings (strappings) of the plug-in units are in accordance with the jumper setting plan for each piece of equipment. It is assumed that the jumper settings of the plug-in units conform to the application. This may be verified by consulting the appropriate plug-in unit descriptions or the Jumper Setting Instructions.

Checking the power supply

First check that all plug-in units are disconnected from their rear connectors (the plug-in units may remain inside the cartridges).

Next, measure the supply voltages at the rear of the cartridges using a multimeter. Connectors available for power supply are:

- PL1 and PL2 in the TC1C cartridge
- PL1 and PL2 in the ET1TC cartridge

Typically the voltage is -48 V (-60 V), with a variance of about ±10 %. To verify the power supply connections, check the input voltage of each new TCSM2 unit of the rack.

Table 1. Voltage requirements.

Voltage	Nominal	Range
Feed voltage to converters	-48 V	-40.5 V to -57.0 V
	-60 V	-50.0 V to -72.0 V

When the power check is complete, insert the plug-in units (ET2E/A and TR12/16) into the cartridges. Insert the PSC1 plug-in units into the cartridges and switch the power on by flicking the power switch on the PSC1 front panel to the up position.

Checking the local terminal interface

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 (see the *TCSM2 User Commands* for details).

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 check the parity at reception and one 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)

Commissioning TCSM2

4 Configuring the TCSM2 unit

Commissioning TCSM2

4.1 Introduction

The TCSM2 equipment is delivered with the software pre-loaded into the TRCO, TR16/TR12 and ET2E/ET2A plug-in units at the factory. Software loading is, therefore, not usually required during commissioning.

Configuring the TCSM2 unit

4.2 Checking the PCM circuit terminal type

The unit is provided with the PCM circuit terminal type, which should be set to ETSI (TCSM2E) or ANSI (TCSM2A), when required.

TCSM2E (ETSI)

The unit is provided with the PCM circuit terminal type, which should be ETSI. If set to ANSI, change the PCM circuit terminal type to ETSI with the command:

```
 ZGL:ETSI;

     PLEASE CONFIRM (Y/N)

/* COMMAND EXECUTED                */
```

TCSM2A (ANSI)

- If required (set to ETSI) change the PCM circuit terminal to ANSI with the command:

```
ZGL:ANSI;

PLEASE CONFIRM (Y/N)
```

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

Configuring the TCSM2 unit

4.3 Automatic loading of the software

Start the TCSM2A by using a cold restart (by switching the power on) or warm restart (by giving a command). When the LAPD connection to the BSC is established, the TCSM2 checks the consistency of the TRCO, TR16/TR12 and ET2E/ET2A software with the BSC at the start-up command. If the software in the BSC is a newer version or the checksum is different, the software is loaded from the BSC.

Note

The TR16/TR12 software is always automatically loaded to location 1.

The loading takes about three minutes and the results are displayed on the screen. After the restart, the local user interface informs that it is ready with the following message:

```
TCSM LOCAL TERMINAL INTERFACE READY
```

Check the loaded software versions with the commands: ZGI:TRCO, ZGI:TR and ZGI:ET.

Configuring the TCSM2 unit

4.4 Loading the software from diskette

If a backup installation diskette has been purchased, the TCSM2 software delivered in the diskette can be loaded into the TRCO plug-in unit during commissioning, if connection to the BSC is not available. The TRCO is provided with boot software.

Note

Manual loading is impossible if the LAPD connection to the BSC is established and working.

Loading procedure

1. Check that the entire TCSM2 unit is installed properly in the rack and that the jumper (hardware) settings for the whole TCSM2 unit, ET2A/ET2E plug-in units and the PSAs at the top of the rack are set correctly.
2. Connect the PC to the local terminal interface on the front panel of the TRCO plug-in unit and insert the software diskette in drive A. Note that you should connect the PC to the main voltage through a protective transformer. Make sure that the data rates between the PC and TRCO match (see the TCSM2 User Commands, System requirements)
3. Switch the power on from the PSC1 plug-in unit
4. After the TRCO unit starts up and completes its initialization procedure, the boot software gives a message

```
THERE IS NO PROGRAM CODE ON TRCO UNIT.
TRCO IS READY TO RECEIVE PROGRAM CODE.
START KERMIT FILE TRANSFER FROM YOUR COMPUTER.
```

5. Start the Kermit data transfer program. The unit restarts automatically after the code loading and begins running the code from flash memory. See below for detailed instructions.
6. Load the other software components (ET2E/ET2A and DSP) by using the menu commands ZGU:TR and ZGU:ET.

Updating the software

This section describes how to update the software of the ET plug-in unit, the TRCO plug-in unit, and the transcoder TR16/TR12 in the flash memory.

1. Update the TRCO plug-in unit software.

```
ZGU:TRCO;
```

   Note that the unit restarts and the program is executed from the boot PROM.

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

```
(When the software is updated, the TRCO unit
restarts and begins to perform the program
code just loaded)
```

2. Update the ET plug-in unit software

```
 ZGU:ET;


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

PROGRAM TRANSFER SUCCESSFULLY COMPLETED

/* COMMAND EXECUTED                    */
```

3. Update transcoder TR16/TR12 software.

```
ZGU:TR;


PLEASE, CONFIRM (Y/N)

SELECT TRANSCODER SOFTWARE:

NBR ADDRESS    USED SW ID STRING
1.  4000.0000:    *    PID: TDL_PXMX.PRM  1.1-0 96/12/01
2.  5000.0000:         PID: TDL_PXMX.PRM  1.1-0 96/12/01
3.  6000.0000:         PID: TDL_PXMX.PRM  1.1-0 96/12/01

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

PROGRAM TRANSFER SUCCESSFULLY COMPLETED

/* COMMAND EXECUTED                    */
```

There may be several versions of the transcoder software in the flash memory. When updating the transcoder software, details of those versions are displayed for selection.

4. Display the software to be used in the transcoder from the versions in the Flash memory.

```
ZGW;

DISPLAY TRANSCODER SOFTWARE IN USE:
NBR ADDRESS    USED SW ID STRING
1.  4000.0000:    *    PID: TDL_PXMX.PRM  1.9-0 98/01/30
2.  5000.0000:         PID: TDL_PXMX.PRM  1.2-0 96/12/02
3.  6000.0000:         PID: TDL_PXMX.PRM  1.3-0 96/12/03

ENTER NUMBER : x

/* COMMAND EXECUTED                    */
```

Configuring the TCSM2 unit

4.5 Uploading and downloading the configuration files

The configuration files of the configured (commissioned) transcoder can be uploaded from the transcoder 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.

This feature can be used for configuring the other transcoders in the system when one transcoder is completed. You cannot read the files in your PC, but only download and upload the whole file. When you have downloaded the file to the new transcoder, you can modify the settings using the individual commands described in this document.

- To download the active configuration from the PC, give the command: ZGN
- To upload the active configuration to the PC, give the command: ZGO

Configuring the TCSM2 unit

4.6 Configuring the transcoder PCM types

Automatic configuration by the BSC

After a restart of the TCSM2A or after any LAPD breaks, the BSC automatically updates the TCSM2A's configuration settings: the number of plug-in units, the PCM types (FR, DR, HR) and the synchronization input. If the LAPD connection is not established or not working, you can use the local command (ZRR), see section Local configuration manually below.

Local configuration manually

The same configuration settings of the TCSM2, which are automatically configured by the BSC, can be set here, provided that the link to the BSC is down. If the link to the BSC is up, the command will not be accepted. The command (ZRR) of the Transcoder Configuration Commands allows you to set the transcoder PCM type which are shown in the table below.

Table 2. Transcoder circuit types.

Circuit type	Supported channels and speech codings	Availability
A	FR & EFR & D144	Available when the BSC is provided with the Group Switch (GSW) or Bit Group Switch
B	HR	Available when the BSC is provided with the Bit Group Switch
C	EFR & FR & HR & D144	Available when the BSC is provided with the Bit Group Switch
D	EFR & FR & HR & HS2 & D144	Available when the BSC is provided with the Bit Group Switch
E	E = EFR & FR & HR & HS4 & D144	Available when the BSC is provided with the Bit Group Switch
F	AMR	Available when the BSC is provided with the Bit Group Switch
Explanations:	Explanations:	Explanations:
FR = Full Rate	EFR = Enhanced Full Rate AMR = Adaptive Multirate	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)

Examples

- To set the MSC direction E1/T1 (PCM) circuits 1-7 into the half rate mode, when the 8 kbit/s Bit Group Switch in the BSC is in use, type:

```
ZRR: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 display PCM types, type:

```
ZRD;


/* TRANSCODER PCM TYPES              */

GROUP SWITCH   GSW

PCM            TYPE

PCM-1          HR
PCM-2          HR
PCM-3          HR
PCM-4          NU
PCM-5          NU
PCM-6          NU
PCM-7          NU

/* COMMAND EXECUTED                  */
```

Configuring the TCSM2 unit

4.7 Configuring the synchronization

The TCSM2 may be synchronized with any E1/T1 (PCM) signal coming from the MSC (1-7) or with the external clock interface (G.703.10). The default settings should be appropriate.

If there is a connection to the BSC, the configuration for the synchronization will be transferred directly from the BSC, when resetting the program.

To display which synchronization sources are active and the state and priority of the synchronization signals, give the command:

```
ZLS;


/* 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                    */
```

The malfunction tolerance time is five minutes. This means that the control mechanism will not give an error message until the synchronization has been faulty for five minutes (continuously). The repaired synchronization observation time is ten minutes. The control mechanism will consider the synchronization as being correct only after it has been correct for ten minutes (continuously).

The synchronization unit handling commands (SUH>) allow you to:

- Create or delete synchronization input

  ```
  ZLC
  ZLD
  ```

- Change the priority of synchronization input

  ```
  ZLP
  ```

- Change synchronization input

  ```
  ZLF
  ```

- Set the operating mode (hierarchical or plesiochronous)

  ```
  ZLO
  ```

Configuring the TCSM2 unit

4.8 Configuring the E1 interfaces (ETSI)

The TCSM2E requires certain parameter settings for proper operation. For most parameters the available default settings assure proper operation. These settings may be required when the equipment is reconfigured or a faulty unit is replaced. The general configuration commands menu (GCC>) allows you to set and display some necessary parameters, and to add units (TR16s and ETs) to the configuration or to remove them.

The general configuration commands allow you to:

- Display TCSM2 hardware configuration (ZGT)
- Display program identification codes for all the plug-in units (ZGI)
- Set HW identification (ZGV)
- Change your password for a local session (ZGP)

Setting the through-connected channels in TCSM2E

It is possible to through-connect any channel in the BSC direction to any channel in the MSC direction. For example, to through-connect BSC direction E1 (PCM) circuit timeslot 16 to MSC direction E1 (PCM) circuit 4 timeslot 24, type:

```
ZGH:16,4,24;


/* THROUGH CONNECTED CHANNEL          */

     BSC PCM-TIMESLOT = 0-16
     MSC PCM-TIMESLOT = 4-24

     CONNECTION 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                   */
```

Note

The through-connection commands to the TCSM should be given at the BSC rather than the TCSM itself, because the through-connection commands given at the BSC will override those given at the TCSM.

Save the changes to non-volatile (Flash) memory using the save command.

```
ZGS;


/* CURRENT CONFIGURATION CHANGES WILL */
/* BE PERMANENT DUE TO GIVEN COMMAND  */

     PLEASE CONFIRM (Y/N)
```

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

Modifying the E1 functional modes in TCSM2E

You can modify the E1 functional mode from the default (normal) mode, if required.

The functional mode parameter can have the following values:

- NORM normal mode
- SATR through connection of Sa bits
- V11 V.11 mode
- TRSP transparent mode

If the functional mode is TRSP, frame alignment mode cannot be given.

The frame alignment mode parameter can have the following values:

- DBLF double frame mode
- CRC4 mode (default setting)

To display functional modes of all full rate E1 (PCM) circuits (PCM-0 and PCM-1 connected to ET2E-0, PCM-2 and PCM-3 to ET2E-1), type:

```
 ZEI:ALL;

/* ETSI PCM FUNCTIONAL MODES          *

PCM       FUNCTIONAL       FRAME ALIGNMENT    SA-BITS FOR
          MODE             MODE               Q.1 USE

PCM-0     NORM             CRC                   -
PCM-1     NORM             CRC                   -
PCM-2     NORM             CRC                   -
PCM-3     NORM             CRC                   -

/* COMMAND EXECUTED                  *
```

To modify the functional mode to Normal and the frame alignment mode to DBLF for E1 (PCM) circuit 3 connected to ET2E, type:

```
ZEC:3:NORM,DBLF;

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

     PLEASE ANSWER (Y/N)
```

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

CRC setting:

The default functional mode activates the CRC, and if there are alarms due to remote end incompatibility, the CRC should be cancelled. The only way to cancel it is to choose the DBLF setting for frame alignment mode.

Note

After the program loading of the ETs, the program settings override the jumper settings.

Configuring the TCSM2 unit

4.9 Configuring the T1 interfaces (ANSI)

The TCSM2A requires certain parameter settings for proper operation. For most parameters the available default settings assure proper operation. These settings may be required when the equipment is reconfigured or a faulty unit is replaced. The general configuration commands menu (GCC>) allows you to set and display some necessary parameters, and to add units (TR12s and ETs) to the configuration or to remove them.

The general configuration commands allow you to:

- Display TCSM2 hardware configuration (ZGT)
- Display program identification codes for all the plug-in units (ZGI)
- Set HW identification (ZGV)
- Change your password for a local session (ZGP)

Setting the through-connected channels in TCSM2A

It is possible to through-connect any channel in the BSC direction to any channel in the MSC direction. For example, to through-connect BSC direction T1 (PCM) circuit timeslot 16 to MSC direction T1 (PCM) circuit 4 timeslot 24, type:

```
ZGH:16,4,24;
```

```
/* THROUGH CONNECTED CHANNEL          */

     BSC PCM-TIMESLOT = 0-16
     MSC PCM-TIMESLOT = 4-24

     CONNECTION 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                   */
```

Note

The through-connection commands to the TCSM should be given at the BSC rather than the TCSM itself, because the through-connection commands given at the BSC will override those given at the TCSM.

Save the changes to non-volatile (Flash) memory using the save command.

```
ZGS;


/* CURRENT CONFIGURATION CHANGES WILL */
/* BE PERMANENT DUE TO GIVEN COMMAND  */

     PLEASE CONFIRM (Y/N)

/* COMMAND EXECUTED                   */
```

Modifying the T1 functional modes in TCSM2A

You can modify the T1 functional mode, if required. The default mode is ESF.

The superframe mode parameter can have the following values:

"ESF" Extended superframe mode

"SF" Superframe mode

Note

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

The line code 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

- Display functional modes of the T1 (PCM) circuits (ET2A-0, (ET2A-1, (ET2A-2).

```
ZEI:ALL;


/* ET FUNCTIONAL MODES                */

PCM       SUPERFRAME       LINECODE        OUTGOING SIGNAL
          MODE             TYPE              LEVEL (dB)

PCM-0     ESF              B8ZS                     0
PCM-1     ESF              B8ZS                     0
PCM-2     ESF              B8ZS                     0
PCM-3     ESF              B8ZS                     0
PCM-4     ESF              B8ZS                     0

/* COMMAND EXECUTED                   */
```

- Modify superframe mode to ESF, line code to AMI and outgoing signal level to 15 dB for T1 (PCM) circuit 3 connected to ET2A.

```
ZEC:3:ESF,AMI,15;


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

     PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED                    */
```

CRC setting:

Note that the default functional mode (ESF) sets the CRC in use, and if there are alarms due to remote end incompatibility, the CRC should be cancelled. The only way to cancel it is to choose another setting for functional mode, which is SF.

Configuring the TCSM2 unit

4.10 Other transcoder configuration procedures (ETSI, ANSI)

The Transcoder Configuration Commands allow you to set transcoder-specific parameters.

Display channel configuration

To check the default channel configuration parameters for each channel (timeslot) individually, type:

```
 ZRC:3,12;


/* CHANNEL CONFIGURATION PARAMETERS */
/* PCM-TIMESLOT = 2-1               */

THROUGH CONNECTION ..... OFF
DOWNLINK DTX ..........  OFF
LOOP TEST 0 ...........  OFF
LOOP TEST 1 ...........  OFF
CHANNEL STATE .........  FREE
TIME ALIGNMENT ........  ON
FIXED GAIN ADJUSTMENT
        UPLINK ........  0 dB
        DOWNLINK ......  0 dB
ADAPTIVE GAIN ADJUSTMENT......  OFF
        MIN ...........  0 dB
        MAX ...........  6 dB
ACOUSTIC ECHO CANCELLATION ...  --/--/--
         DELAY ........   0 ms
TANDEM FREE OPERATION ........  FR/--/---
NOISE SUPPRESSION .....  FR/--/---
        LEVEL .........  2
CIRCUIT TYPE ..........  A

/* COMMAND EXECUTED                 */
```

Transcoder configuration commands

Use the transcoder configuration commands below to modify the channel configuration parameters, as required:

- Set downlink DTX (ZRX). This setting is only for testing purposes and it should always be set OFF.
- Set adaptive gain adjustment in downlink direction (ZRA). Set when required.
- Set fixed gain adjustment for uplink and downlink (ZRF). Set when required.
- Set time alignment (ZRS). This is usually set on, but if the Abis link involves a satellite link it should be set off.
- Start traffic channel monitoring (ZRM).

To modify (ZRT) and display (ZRO) alarm limits for signal processors, type:

```
ZRO:ALL


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

PCM          SYNCA     SYNCC      MEMOA
LINE         (S)       (S)

PCM-1        10        20       ALLOWED
PCM-2        10        20       ALLOWED
PCM-3        10        20       ALLOWED

/* COMMAND EXECUTED                  */
```

Supervision commands for ET2A/ET2E units

The exchange terminal supervision commands enable you to modify and display several parameters, alarm limits and statistics counter limits.

Modify (ZEM) and display (ZEO) ET parameters:

```
ZEO:ALL;


/* ET PARAMETERS INFO                */

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

PCM-0      10E-3          37                      1
PCM-1      10E-3          37                      1
PCM-2      10E-3          37                      1
PCM-3      10E-3          37                      1

/* COMMAND EXECUTED                  */
```

Modify (ZEA) and display alarm limits (ZEP):

```
ZEP:ALL;


/* PCM DEFINED ALARM LIMITS          */

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

PCM-0   100    200    80       40      63         31
PCM-1   100    200    80       40      63         31
PCM-2   100    200    80       40      63         31
PCM-3   100    200    80       40      63         31

/* COMMAND EXECUTED                  */
```

Modify (ZES) and display (ZEL) statistics counter limits:

```
ZEL: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                  */
```

Modify (ZEU) and display (ZER) slip limits:

```
 ZER: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                  */
```

Configuring the TCSM2 unit

4.11 Configuring Acoustic Echo Cancellation (optional)

The transcoder configuration commands allow you to set an optional feature, which is Acoustic Echo Cancellation (AEC).

Acoustic Echo Cancellation (AEC) is aimed at removing acoustic echo in the uplink direction. This feature also needs uplink DTX to be activated from the BSC in order to cancel acoustic echo. If uplink DTX is off, the AEC feature will also be off.

- Set FR- and EFR-codec echo cancellations on for all channels of the unit.

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


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

        PLEASE ANSWER (Y/N)

/*    COMMAND EXECUTED             */
```

Configuring the TCSM2 unit

4.12 Configuring Tandem Free Operation (optional)

The transcoder configuration commands allow you to set an optional feature, which is Tandem Free Operation (TFO).

Tandem Free Operation is a procedure, which can be used to enhance speech quality in mobile-to-mobile (MS-MS) calls. The speech coding methods normally used in the GSM network are lossy, and so the speech signal is degraded every time it is encoded and decoded. But when a MS-MS call is formed with the TFO, the speech signal is not decoded and encoded between two transcoders thus resulting a call in which speech encoding and decoding is made in mobile stations only.

- Set FR and EFR-codec tandem free operations on for all channels of the unit.

```
TCC> ZRN:ALL:FR=ON, EFR=ON;

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

        PLEASE ANSWER (Y/N)
```

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

Configuring the TCSM2 unit

4.13 Configuring Noise Suppression (optional)

The transcoder configuration commands allow you to set an optional feature, which is Noise Suppression (NS).

NS is a procedure, which is used to reduce background noise level during speech calls. When activated, the noise suppression algorithm (ALWE) processes the uplink and downlink speech samples in order to reduce noise. The algorithm estimates background noise power spectrum based on input speech samples and voice activity detection. The speech signal spectrum is then modified based on the estimate and additional constraints. This procedure can be activated separately for each speech codec (FR/HR/EFR) and transmission direction (uplink/ downlink) using TCSM2 MMI.

Note

NS cannot be used with Text Telephony (TTY) in ANSI environment.

- Set FR and EFR-codec noise suppression on for all channels of the unit.

```
TCC> ZRY:ALL:FR=ON, EFR=ON;

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

         PLEASE ANSWER (Y/N)

/*     COMMAND EXECUTED              */
```

Configuring the TCSM2 unit

4.14 Alarm handling

Wired alarm handling

The wired alarm handling command allows you to display the current status of all the wired alarms (ZAW) and to turn on or off the wired alarms from other TCSM2 units.

To set the wired alarms of other TCSM2 units on:

```
ZAW:ON;


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

     PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED                    */
```

Far-end alarm handling (ETSI)

Command F is used to set the TCSM2E behaviour when a far-end alarm is received in the BSC direction PCM circuit. TCSM2 can send an AIS or a far end alarm to the MSC. 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. The alarms are listed below:

2902 PCM LINE REMOTE END ALARM

2900 INCOMING SIGNAL MISSING

2909 AIS RECEIVED

2925 SLIP FREQUENCY LIMIT EXCEEDED

2910 FRAMING ERROR

2912 BIT ERROR RATE OVER LIMIT

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

OFF far end alarm or AIS not sent to MSC.

FEA far end alarm sent to MSC.

AIS AIS alarm sent to MSC.

To set the TCSM2 to send an AIS to the MSC behaviour when a far-end alarm is received in the BSC direction PCM circuit.

```
ZAF:AIS;

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

     PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED                        */
```

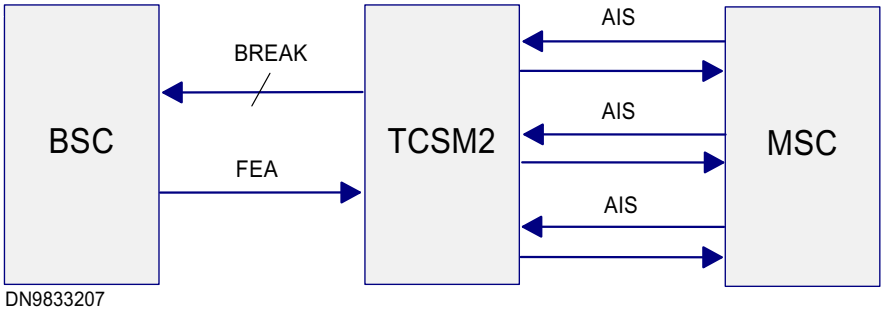

Figure 2. A far-end alarm handling example, AIS is sent to the MSC.

The figure above gives an example where the E1 (PCM) circuit towards the BSC is broken. The BSC sends a far-end alarm to the TCSM2E, and the TCSM2E sends an AIS signal (as selected with the command) on each E1 (PCM) line to the MSC.

Far-end alarm handling (ANSI)

Command F is used to set the TCSM2A behaviour when a far-end alarm is received in the BSC direction PCM circuit. TCSM2 can send an AIS or a far-end alarm to the MSC. 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. The alarms are listed below.

2944 YELLOW ALARM

2900 INCOMING SIGNAL MISSING

2943 BLUE ALARM

2925 SLIP FREQUENCY LIMIT EXCEEDED

2910 FRAMING ERROR

2912 BIT ERROR RATE OVER LIMIT

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

OFF far end alarm or AIS not sent to MSC.

FEA far end alarm sent to MSC.

AIS AIS alarm sent to MSC.

To set the TCSM2 to send an AIS to the MSC behaviour when a far-end alarm is received in the BSC direction PCM circuit.

```
ZAF:AIS;


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

     PLEASE ANSWER (Y/N)

/* COMMAND EXECUTED                         */
```

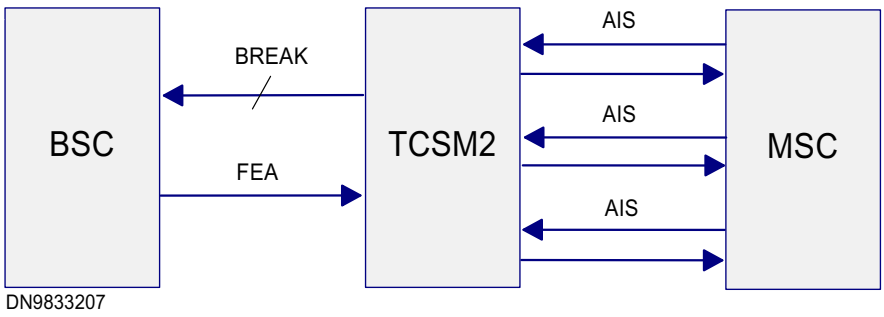

Figure 3. A far-end alarm handling example, AIS is sent to the MSC.

The figure above gives an example where the T1 circuit towards the BSC is broken. The BSC sends a far-end alarm to the TCSM2A, and the TCSM2A sends an AIS signal (as selected with the command) on each T1 line to the MSC.

Configuring the TCSM2 unit

4.15 Saving the configuration

Save the configuration changes to non-volatile (Flash) memory using the save configuration command.

The local application program reads the configuration data of the plug-in units from RAM memory and saves them to non-volatile memory. The local application program prompts for confirmation before performing the operation:

```
ZGS;

/* CURRENT CONFIGURATION CHANGES WILL */
/* BE PERMANENT DUE TO GIVEN COMMAND  */

     PLEASE CONFIRM (Y/N)

/* COMMAND EXECUTED                   *
```

Configuring the TCSM2 unit

5 Testing the TCSM2 unit configurations

The commissioning is divided into the following subtasks:

- local diagnostics
- traffic channels of the TCSM2

Commissioning TCSM2

5.1 Running the diagnostics tests

Local diagnostics

When the configuration procedure is completed, you should test the entire TCSM2A unit. This diagnostics procedure tests the:

- TRCO plug-in unit
- memory (RAM, FLASH)
- clock
- timer service
- HDLC controller loop
- ET diagnostics

A loop test 1 is also performed, in which each transcoder sends data in the BSC and MSC directions, and the transmitted data is compared with the data looped back by the ET plug-in units.

To perform local diagnostics, first make sure that the PC is connected to the local terminal interface on the front panel of the TRCO plug-in unit.

To start the diagnostics for the TCSM2 unit, give the command:

```
ZCC:TOTAL;
```

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

     PLEASE CONFIRM (Y/N)

/* COMMAND EXECUTED                  */
```

Display the results of the latest test (the complete diagnostics test) by giving the command:

```
ZCO;


/* DIAGNOSTICS RESULTS                  */
RAM TEST OK
FLASH TEST OK
WATCHDOG TEST OK
CLOCK TEST OK
HDLC CONTROLLER TEST OK
FOR LAPD CHANNEL  1   2   3   4
                 OK  OK   OK  OK
LOOP TEST-1 OK

/* COMMAND EXECUTED                   */
```

If the E1/T1 lines are live and connected to the MSC and BSC, no alarms should be visible on your PC. If any alarms appear, excluding alarm number 2951 (local user logged in), take the appropriate action to clear the alarm situations.

The selftest of the TCSM2 involves a fairly comprehensive test of each plug-in unit handling individual traffic channels. If a persistent fault is present in the individual channels, the respective plug-in unit should be replaced.

Remote diagnostics from the BSC

You can also run the diagnostics test from the BSC using the command: ZUDU: TCSM,index.

Testing the alarm system ofthe TCSM2

This test can be done when the BSC and its connection(s) are already presumed to be working, to verify that the basic alarm mechanism is functional up to the BSC (see the figure below).

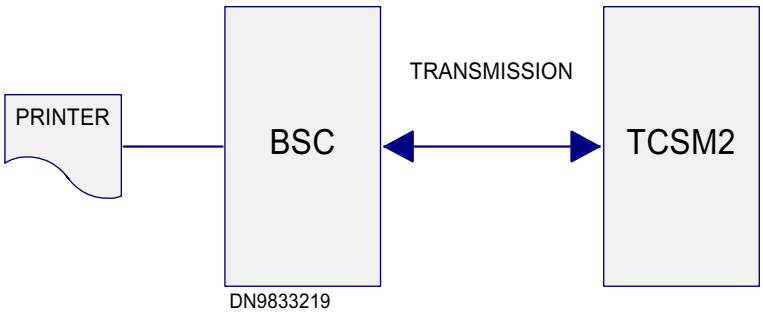

Figure 4. Alarm test

1. Check that the TCSM2 is in a normal working state (WO-EX) with no alarms active (ZAI;).
2. Cause an alarm by disconnecting an MSC-side trunk cable.
3. Check that the BSC produces an alarm (from the BSC) relative to the MSC trunk (AHO;).
4. Replace the cable to the MSC trunk.
5. Check that the alarm (from the BSC) is cancelled at the BSC (AHO;).

Testing the TCSM2 unit configuration

5.2 Testing the power supply alarms of the TCSM2

This optional test is carried out only if the power supply alarms are connected to an external collecting equipment, for example, the MSC. When cabling is complete the alarm can be activated by grounding the test pin.

Testing the TCSM2 unit configuration

5.3 Testing power break recovery in the TCSM2

With this test you can test the recovery of the TCSM2 from power breaks. When the LAPD connection to the BSC is established and working, the TCSM2 units should automatically restart after the power is on again.

1. Check that the TCSM2 is in a normal state with no alarms active and the power supplies on (ZAI;).
2. Disconnect the power from the TCSM2 rack by flicking the two power switches to the OFF position on the PSA-0 or PSA-1 front panel. The even or odd numbered TCSM2 units should go off.
3. The BSC should produce the alarms (AHO;) indicating the loss of connection (2M signal missing).
4. Connect the power to the TCSM2 units back on by flicking the power switches to the ON position.
5. The TCSM2 units should recover automatically.
6. The BSC should cancel the current alarms (AHO;).

Testing the TCSM2 unit configuration