

Group switch, GS

OPERATIONAL DIRECTIONS



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1 GENERAL

The operational directions for the group switch include description for the handling of the group switch hardware.

The group switch establishes the media connection between autonomous LIMs into a larger system. The group switch is built up by Group Switch Modules (GSM). Each GSM can have 31 PCM lines connected to it. A group switch can have 8 GSMs and it can be duplicated.

Each GSM has a clock unit, GCU2, which can be locked in phase and frequency. The clock in the master GSM is controlled from the master LIM via the master PCM-line. The master GSM clock controls all the other GSM clocks via the clock bus. Each media gateway can also be connected directly to another media gateway using a GJUL board or a ISDN PRI board.

2 PREREQUISITES

3 AIDS

I/O terminal.

4 REFERENCES

5 PROCEDURE

6

EXECUTION

6.1

CONFIGURING A GROUP SWITCH

General

Make sure that there are three clock controlling LIMs, with external synchronization trunks, placed near the group switch.

Prerequisites

The group switch should have been installed as described in the installation instruction for the *Group switches to telephone exchange 07/ASB 501 04*.

Execution

	Measure/Question	Observation/ Comment
1	Has the group switch been installed as shown in the installation instruction? YES, go to step 2. NO, install the group switch as shown in the installation instruction.	To install the group switch, see the installation instruction for <i>Group switches to telephone exchange 07/ASB 501 04</i> .
2	Key command <i>pcm_config</i> , to find new group switch lines.	
3	Key command <i>pcm_synchronization</i> , to set the master function to a GSM.	
4	Is it a duplicated group switch?	
5	See section, 6.18 Duplication of Group Switch on page 31duplication of group switch.	
6	Key command <i>trsp_synchronization</i> , to set the master function to a LIM.	
7	Key command <i>alarm</i> to print (list) alarms in the alarm log.	

6.2

BLOCKING OF GSM

General

The function blocking is used at repair, replacement of circuit boards etc. Command *pcm_order* results in a blocking of all PCM-lines connected to the GSM.

If any of the PCM-lines being blocked is assigned as sync receiving, then these functions should be moved to a LIM connected to another GSM. These functions are not supervised in a blocked GSM.

Blocking must be made with care, since many extensions are affected if congestion occurs due to the reduced capacity.

Prerequisites

Execution

Key command pcm_order to block the GSM .

Key command pcm_status, to check if the blocking has been executed. For more information, see the command description for *Group Switch*.

Move the sync reception by keying command pcm_synchronization. For more information, see the command description for *Group Switch*.

6.3

DEBLOCKING OF GSM

General

Command pcm_order deblocks the PCM-lines which are manually blocked and connected to the GSM.

Prerequisites

Execution

Key command pcm_order to deblock the GSM .

Key command pcm_status to check if the deblocking has been executed for the PCM lines which are connected to the deblocked GSM. For more information, see the command description for *Group Switch*.

If the sync reception was moved before the GSM was blocked, it will automatically be moved back to the original place. Key command pcm_status to confirm the move of the sync reception.

6.4

STATUS PRINTOUT OF GSM

General

Command pcm_status is used to obtain a printout of the group switch module status.

Prerequisites

Execution

Key command pcm_status .

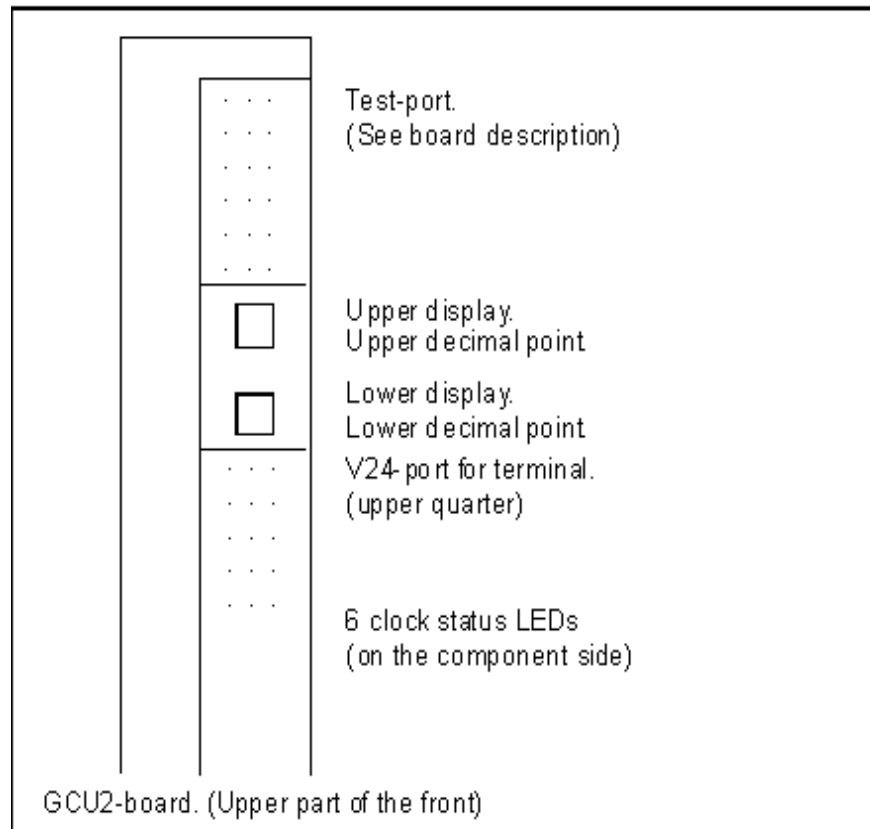
6.5

STATUS READ-OUT OF GCU2 BOARD.

General

There are two ways of reading the status of a GCU2 board:

- a) by looking at the display at the front of the GCU2 board.
- b) by connecting a terminal to a V24-interface at the front of the GCU2 board.

**Prerequisites**

PC IBM compatible terminal with a communication program, for example, Hyper Terminal and use of an I/O terminal cable.

Execution

		Measure/Question	Observation/ Comment
Flow <pre> graph TD START([START]) --> 1[1] 1 --> 2[2] 2 --> 3[3] 3 --> STOP([STOP]) </pre>	1	Check the status on all GCU2 boards in the group switch by looking at the display on the front of the GCU2 board.	See below for description of the codes.
	2	Connect a terminal to the front of any GCU2 board if a more detailed information is needed.	See below for description of the printout and how to obtain it.
	3	If there is a fault, check all the GCU2 boards in the group switch.	A fault can give different status depending on where it is read.

STATUS FROM THE DISPLAY

If the GCU2 board has not detected any faults, the internal group switch number (IGS-number) is shown on the display. The IGS number (0~7) is dependent of the clock bus configuration and is not necessarily the same as the GSM number. The GCU2 boards at the end of the clock cable (if any), will have number 0 at the left end and number 7 at the right end. The rest of the boards will start the numbering from the left side.

If the GCU2 board has detected a fault, an error code is shown alternately with the IGS number.

Fault codes:

- E1** More than one GCU2 board is ordered as master by the clock controlling LIMs.
- E2** Faulty communication between GCU2 boards. (IGLD)
- E3** Faulty communication between GCU2 boards. (IGMC)
- E4** Faulty 8 kHz between GCU2 boards. (IGCC)
- E5** Faulty clock unit function on GCU2 board.
- E6** Faulty incoming clock source
- E7, E8** Not used
- E9** Faulty board. (RAM memory)

The **upper decimal point** shows the synchronization function of the board:

Point off

Slave.

Point on

Ordered master by the clock controlling LIMs

Point flashing

Interim master. (A master chosen by the GCU2s)

The **lower decimal point** shows the synchronization receiving status:

Point off

Clock is not synchronized.

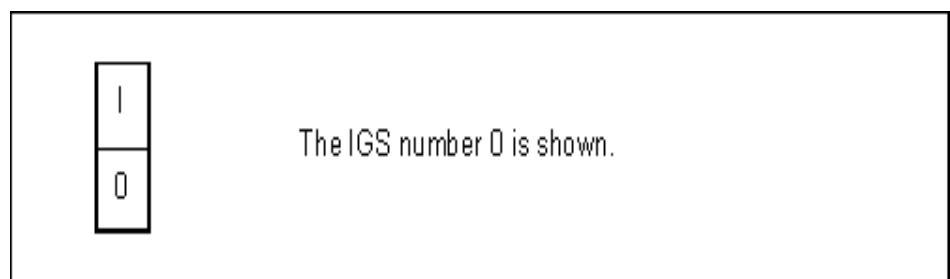
Point on

Clock is synchronized.

Point flashing

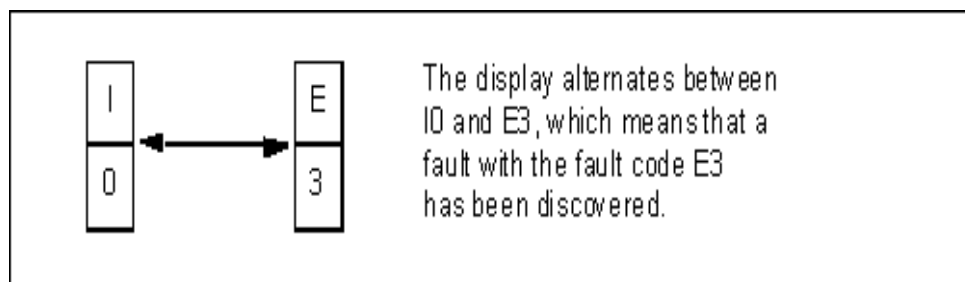
Synchronization function deactivated.

Example 1: Display reading at **no fault**:



Example 2:

Display reading at **fault**:

**Figure 1:****STATUS FROM THE LEDs**

The information LEDs are placed on the component side, close to the front connector.

LEDs indicates:

MCCL (Green LED)

CCB0 Clock Control Bit 0 set by Master Clock Controlling Line.

RCCL (Green LED)

CCB1 Clock Control Bit 1 set by Reserve Clock Controlling Line.

ACCL (Green LED)

CCB2 Clock Control Bit 2 set by Additional Clock Controlling Line.

CCA (Red LED)

Clock Control Alarm.

ICA (Red LED)

Internal Clock Alarm.

FRSY (Yellow LED)

Receiving External Clock Synchronization

STATUS FROM THE TERMINAL

The status will be printed at a change of status on any GCU2 board or if <RETURN> is given from the keyboard.

Example 1:

Group switch with one GSM.

IGS	state	CCB	C C A	IGLD	left	right	C U	ctrl	sync	source	Err	Nr	Time
*0	MASTER	111	-		7	7		203 4	YES	ECS	-	1A	0123

Example 2:

Group switch with two GSMs.

IGS	state	CCB	C C A	IGLD	left	right	C U	ctrl	sync	source	Err	Nr	Time
*0	MASTER	111	-		7	0		2183	YES	ECS	-	1A	3456
7	SLAVE	000	-		0	7		1F8E	YES	IGCC0	-	02	5566

Example 3:

Group switch with four GSMs.

IGS	state	CCB	C C A	IGLD	left	right	C U	ctrl	sync	source	Err	Nr	Time
0	MASTER	111	-		7	2		201F	YES	ECS	-	44	4567
*1	SLAVE	000	-		0	1		1D78	YES	IGCC0	-	2C	4567
2	SLAVE	000	-		1	0		1E45	YES	IGCC0	-	11	2347
7	STANDBY	000	-		2	7		2233	YES	IGCC0	-	5F	2223

Example 4:

Group switch with four GSMs with a parity fault on IGLD between IGS 1 and 2 and a faulty master GJUG.

IGS	state	CCB	C C A	IGL D	left	right	C U	ctrl	sync	source	Err	Nr	Time
0	MASTER	110	N O K		7	6p		201F	NO	ECS	#	44	4567
#	16 73												
*1	SLAVE	000	-		0	5p		1D78	YES	IGCC0	16	2 C	4567
2	SLAVE	000	-		1	0		1E45	YES	IGCC0	-	11	2347
7	STANDBY	000	-		2	7		2233	YES	IGCC0	-	5F	2223

IGS

IGS-number for all connected GCU2s

[*]N

* = The GCU2 where the terminal is connected.

N = Number (0~7).

state

Synchronization function status

MASTER

ordered master by the clock controlling LIMs.

INTERIM

ordered master by the GCU2 boards. Exists only when no ordering is available from the clock controlling LIMs or when the ordered GCU2 board is faulty.

SLAVE

slaves on the MASTER or the INTERIM MASTER.

STANDBY

an interim master in stand-by mode, slaving on the master.

CCB

Clock Controlling Bits set by the clock controlling LIMs.

abc

(a =ACCL, b= RCCL, c=MCCL, 0=no ordering, 1-ordering)

Example:**000**

slave GCU2

111	master GCU2
CCA	Clock Control Alarm
NOK	Alarm, incomplete clock ordering. CCB = 001, 010, 100, 011, 110, 101
-	Clock controlling/ordering OK. CCB = 000 or 111.
IGLD left	Inter GS Line Detection. Position number on the bus from left to right.
N[p]	N= IGS number (0~7) P = Parity fault detected on the clock bus (IGLD lines)
right	Position indication right. Position number on the bus from right to left.
N[p]	N= IGS number (0~7) P= Parity fault detected on the clock bus (IGLD lines)
CU ctrl	The control value of the clock unit (D/A converter value)
(0000-3FFF)	normal value approximately 2000.
sync	Synchronization receiving status.
YES	Clock is synchronized. The status is entered a few minutes after normal operation.
NO	Clock is not synchronized to the external source.
OFF	Synchronization function deactivated. Only entered when a serious error has been detected.
source	clock source
IGCC0	clock source from IGS-0 GCU2
IGCC1	clock source from IGS-1 GCU2
IGCC2	clock source from IGS-2 GCU2
IGCC3	clock source from IGS-3 GCU2

IGCC4

clock source from IGS-4 GCU2

IGCC5

clock source from IGS-5 GCU2

IGCC6

clock source from IGS-6 GCU2

IGCC7

clock source from IGS-7 GCU2

ECS

External Clock Synchronization (from master LIM)

INTERN

Internal Reference (free running)

Err

Error code.

-

No fault.

nn

A fault with the fault code nn discovered.

#

More than one fault detected. All faults are printed on the following line.

CCB (Clock Controlling Bit)

0A - Ordering fault

IGLD (Inter GS Line Detection)

15 - Parity fault (IGLD-L).16 - Parity fault (IGLD-R).17 - Change of IGS-number.18 - Change of IGSS-configuration.19 - Size of IGSS wrong.1A - Not used.1B - Not used.1C - Not used.1D - More than one IGLD-fault.

IGMC (Inter GS Message Channel)

44 - Slave has no contact with master.45 - More than one fault.46 - Master has not contact with all slaves.47 - Fault at loop test of IGMC-0.48 - Fault at loop test of IGMC-1.

IGCC (Inter GS Clock Channel)

51 - More than one IGCC-fault.52 - Expected clock missing on IGCC0.53 - Expected clock missing on IGCC1.54 - Expected clock missing on IGCC2.55 - Expected clock missing on IGCC3.56 - Expected clock missing on IGCC4.57 - Expected clock missing on IGCC5.58 - Expected clock missing on IGCC6.59 - Expected clock missing on IGCC7.5A - Not expected clock detected on IGCC0.5B - Not expected clock detected on IGCC1.5C - Not expected clock detected on IGCC2.5D - Not expected clock detected on IGCC3.5E - Not expected clock detected on IGCC4.5F - Not expected clock detected on IGCC5.60 - Not expected clock detected on IGCC6.61 - Not expected clock detected on IGCC7.

CU (Clock Unit)

64 - PROM error.65 - RAM error.66 - EE-PROM error.67 - not used.68 - not used.69 - TPOS not OK. (Positive voltage for the clock unit).6A - TNEG not OK. (Negative voltage for the clock unit).6B - TREF not OK. (Reference voltage for the clock unit).6C - Phase register not OK.6D - Phase measurement circuitry not OK.6E - Phase multiplexer not OK.6F - A/D converter not OK.70 - D/A converter not OK.71 - Delay line not OK.72 - No pulse received on chosen source.73 - Too many or too few pulses received on chosen source.74 - Clock is beyond limits.75

- Synchronization function in search mode. (can take 10 min.)
76 - Control value close to limit.
77 - The clock processor (CUP) does not answer.

Nr

Sequence number on the status information.

(00~FF)

Time

Internal "time" counter.

(0000~FFFF) 1 unit is 10 msec.

6.6

REPLACEMENT OF GCU2 BOARD

General

The GCU2 clock bus cable has a specific direction.

When the clock bus cable is removed from the GCU2-board, the GSM will be out of synchronization, thus leading to lost signals and parity errors. Some part of the traffic will be disrupted.

A GJUG placed in the actual GSM will stop working as the GCU2 is removed and this will also affect the PCM lines connected to it.

If the group switch is duplicated the replacement should be made on the passive group switch side. If the actual side is active it can be made passive by command `pcm_order`, this will automatically make the other side active. The replacement can then be made without having to block or move anything, and will not affect the traffic.

Prerequisites

The GSM in question must be free from traffic.

Execution

	Measure/Question	Observation/ Comment
1	Is the Group switch duplicated? YES, go to step 2 in table 8. NO, go to step 2.	
2	Key command <code>pcm_order</code> to block GSM .	Wait until all traffic has ended.
3	Is it the master GSM? YES, go to step 4. NO, go to step 5.	
4	Key command <code>pcm_synchronization</code> to move synchronization reception to spare master GSM.	
5	Power OFF the GSM.	
6	Detach the front cables from the board.	If two cables are connected to the board, both shall be detached from the board without separating the cables.
7	Replace the GCU2 board.	
8	Connect the front cables to the board.	
9	Power ON the GSM.	
10	Reset alarm LEDs on the GSU boards. resetting the GSU alarm. Test is ready when the display stops counting.	Wait for the GCU2 board test to finish before
11	Key command <code>pcm_order</code> to clear the control memory.	

	Measure/Question	Observation/ Comment
12	Key command <i>pcm_order</i> to deblock the GSM .	Check that the traffic is working and that the synchronization has been moved back to the master GSM.
13	Key command <i>alarm</i> to erase (reset) alarms in the alarm log.	

	Measure/Question	Observation/ Comment
	DUPLICATED GROUP SWITCH	
2	Key command <i>pcm_order</i> to block the group switch side where a board should be replaced. This will lead to an automatic side change.	Check with command <i>pcm_order</i> .
3	Power OFF the entire passive side.	
4	Detach the front cables from the board.	If two cables are connected to the board, both shall be detached from the board without separating the cables.
5	Replace the GCU2 board.	
6	Connect the front cables to the board.	
7	Power ON the entire passive side.	Wait for the GCU2 board test to finish before resetting the GSU alarm (see section 6.7 Reset the GSU alarm on page 166.7 Reset the GSU alarm). Test is done when the display stops counting
8	Reset alarm LEDs on the GSU boards.	
9	Wait until the PCM lines are OK.	Check with command <i>pcm_status</i> .
10	Key command <i>alarm</i> to erase (reset) alarms in the alarm log.	

6.7 RESET THE GSU ALARM

Press the button on the GSU board, to reset the GSU alarm.

6.8

REPLACEMENT OF GSU BOARD

General

If the group switch is duplicated the replacement should be made on the passive group switch side. If the actual side is not already passive it can be made so by command pcm_order. The replacement can then be made without having to block or move anything, and will not affect the traffic.

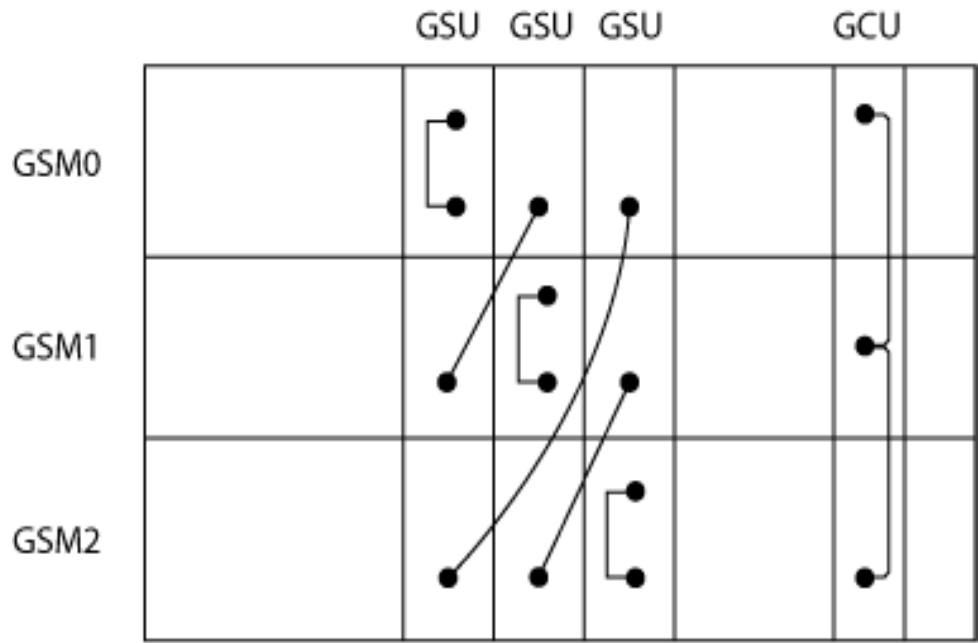


Figure 2: Cabling in a group switch with 3 GSM, GSU boards and GCU boards.

Prerequisites

The affected GSMs are to be free from traffic.

Execution

In a duplicated group switch the change is made on the passive side. If the actual side is active, key command pcm_order to make the other side active, this will automatically make the actual side passive.

Power OFF the entire passive side before replacing the GSU board. After the GSU board is replaced, power ON the entire passive side, then key command alarm to erase (reset) alarms in the alarm log.

Only valid for single group switch.

	Measure/Question	Observation/ Comment
1	Key command pcm_order to block affected GSM .	The affected GSM(s) must be free from traffic.
3	Replace the GSU board.	
4	Deblock the GSM. Key command pcm_order .	

	Measure/Question	Observation/ Comment
5	Key command <i>alarm</i> to erase (reset) alarms in the alarm log .	

6.9

ADDITION OF PCM LINE USING GJUL BOARD

General

A PCM line consists of two boards and an applicable cable. The cable can either be a coaxial cable or a pair cable.

The boards can either be a GJUG board in the group switch connected to a GJUL board in the LIM, or two GJUL boards, if it is a direct PCM line between two LIMs.

If the group switch is duplicated, each GJUL board must be connected to the same gsmult position on a GJUG board, on both sides of the group switch.

Prerequisites

-

Execution

		Measure/Question	Observation/ Comment
<pre> graph TD Start([Start]) --> 1[1] 1 --> 2[2] 2 --> 3{3} 3 -- Y --> 4[4] 3 -- N --> 5[5] 4 --> 5 5 --> 6[6] 6 --> Stop([Stop]) </pre>	1	Insert the boards.	
	2	Connect an applicable cable to the boards.	
	3	Is the GJUL board(s) used?	
	4	Run <i>board_config</i> to update the LIM's board configuration.	
	5	Run <i>pcm_config</i> to scan for new hardware and to start supervision of PCM lines.	
	6	Key command <i>pcm_config</i> to print the group switch configuration.	For more information see the command description for Group Switch.

6.10

ADDITION OF PCM LINE USING ISDN PRI BOARD

General

A PCM line consists of two boards and an applicable cable. The boards can either be TLU76/1,

TLU76/11 or an MGU PRI interface.

A TLU76 board or a PRI interface is not primarily used for this purpose. Therefore it is not automatically owned by the transport function. Therefore the boards needs to be registered before a scan is possible.

1. Insert the boards.
2. Connect an applicable cable to the boards.
3. Run `board_config` to update the LIM's board configuration.
4. Run `pcm_config -reg` on both boards to register them for this function.
5. Run `pcm_config -scan` to scan for new hardware. During the scan a client – network negotiation takes place. This may take up to 60 seconds.
6. Key command `pcm_config -pcm` several times to print the result. When the printout states PCM up, Data link up the connection is ready.

6.11

REMOVAL OF PCM LINE

General

If the group switch is duplicated, a PCM line must be removed on both sides. (side1 must be an exact copy of side0)

Note: Removal of a PCM line leads to reduced media capacity to that LIM or between LIMs with a direct line. The IPLU board can take over the media.

Prerequisites

-

Execution

	Measure/Question	Observation/ Comment
1	Block applicable parts. Use command <i>pcm_order</i> to block gsmult and use command <i>block</i> to block the GJUL board.	
2	Has the system a group switch? YES, go to step 3. NO, go to step 5.	
3	Key command <i>pcm_status</i> . Is the PCM line, that is going to be replaced, synchronization receiving for the group switch? YES, go to step 4. NO, go to step 5:	For more information see the command description for <i>Blocking</i> .
4	If applicable, make changes so that the group switch has a valid synchronization receiving PCM line.	
5	Key command <i>trsp_synchronization</i> to move the synchronization. Is the PCM line synchronization source for a LIM?	For more information see the command description for <i>Transport</i> .
6	If applicable, make changes so that the LIM has a valid synchronization source.	

	Measure/Question	Observation/ Comment
7	Check that there is no traffic on the PCM line.	
8	Remove the PCM line.	
9	Key command <i>alarm</i> to erase (reset) alarms in the alarm log.	

6.12

REPLACEMENT OF PCM LINE

General

When a PCM line is going to be replaced, do the following:

1. Make sure that the group switch will still have a synchronization receiving PCM line.
2. Make sure that each LIM still have a synchronization source.
3. Replace the PCM line when there is no traffic on it.

Note: During the time that the pygmy line is blocked, the media capacity of the concerned LIM(s) will be reduced. Other pygmy lines or IPLU boards can take over the media.

Prerequisites

The PCM line shall be free from traffic.

Execution

	Measure/Question	Observation/ Comment
1	Block applicable parts. Use command <i>pcm_order</i> to block gsmult and use command <i>block</i> to block the GJUL board.	
2	Has the system a group switch? YES, go to step 3. NO, go to step 5.	
3	Key command <i>pcm_status</i> . Is the PCM line, that is going to be replaced, synchronization receiving for the group switch? YES, go to step 4. NO, go to step 5:	For more information see the command description for <i>Blocking</i> .
4	If applicable, make changes so that the group switch has a valid synchronization receiving PCM line.	

	Measure/Question	Observation/ Comment
5	Key command <i>trsp_synchronization</i> to move the synchronization. Is the PCM line synchronization source for a LIM?	For more information see the command description for <i>Transport</i> .
6	If applicable, make changes so that the LIM has a valid synchronization source.	
7	Check that there is no traffic on the PCM line.	
8	Replace the part of the PCM line which is to be replaced.	
9	Deblock the PCM line with command <i>pcm_order</i> or <i>deblock</i> .	
10	Was the synchronization source configuration changed? YES, go to step 11. NO, go to step 12.	
11	Restore any changes made in step 6, to change the synchronization source.	
12	Was the PCM line synchronization receiving? YES, go to step 13. NO, go to step 14.	
13	Restore any changes made in step 4, to enable synchronization of the group switch.	
14	Key command <i>alarm</i> to erase (reset) alarms in the alarm log	

6.13

REPLACEMENT OF GSM IN A SINGLE GROUP SWITCH

General

A replacement of a GSM does not comprise PCM-lines and GJUL-boards.

Prerequisites

There has to be a group switch (GS) with one or more GSMs. The GSM which is to be replaced must be free from traffic.

Execution

		Measure/Question	Observation/ Comment
<pre>graph TD; Start([Start]) --> D1{1}; D1 -- N --> A((A)); D1 -- Y --> P2[2]; P2 --> D3{3}; D3 -- Y --> P4[4]; P4 --> B((B)); D3 -- N --> B;</pre>	1	Does the group switch have more than one GSM?	
	2	Key command <i>pcm_synchronization</i> to see the synchronization configuration .	
	3	Is the GSM synchronization master GSM?	
	4	Key command <i>pcm_synchronization</i> to change the synchronization order.	

		Measure/Question	Observation/ Comment
<pre> graph TD A((A)) --- B1[6] B1 --- B2[9] B2 --> C((C)) D((B)) --- E1[5] E1 --- E2[6] E2 --- E3[7] E3 --- E4[8] E4 --- E5[9] E5 --- E6[10] B2 --> E6 </pre>	5	Key command pcm_order to block the GSM which is to be replaced .	
	6	Remove all PCM lines connected to the GSM.	
	7	Disconnect all cables connected to the time switch boards in the GSM which is to be replaced.	In group switch, the time switch board is GSU.
	8	Disconnect the cable of the board front on the GCU2.	Disturbances in the synchronization in GS will occur, if two cables are connected to the board and these are parted from each other.
	9	Replace GSM.	
	10	Connect the cable for the clock synchronization to the new GSM/GCU2-board.	

		Measure/Question	Observation/ Comment
Flow <pre> graph TD C((C)) --> 9[9] 9 --> 10[10] 10 --> 11[11] 11 --> STOP([STOP]) </pre>	9	Connect all cables to the time switch boards.	
	10	Connect PCM lines to the GJUG boards in the new GSM.	
	11	Is it the synchronization master GSM?	
	12	Key command <i>pcm_synchronization</i> to change back the synchronization order.	
	13	Key command <i>alarm</i> to erase (reset) alarms in the alarm log.	

6.14

REPLACEMENT OF GSM IN A DUPLICATED GROUP SWITCH

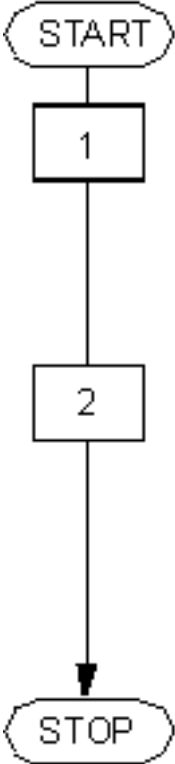
General

A replacement of GSM does not comprise PCM-lines and GJUL-boards.

Prerequisites

There has to be a duplicated group switch with one or more GSMs on each side (side1 must be an exact copy of side0).

Execution

		Measure/Question	Observation/ Comment
Flow  <pre> graph TD START([START]) --> 1[1] 1 --> 2[2] 2 --> STOP([STOP]) </pre>	1	Key command <i>pcm_order</i> to set the active group switch side to the side in which the replacement is not to be made .	
	2	Replace relevant GSM(s).	See section Replacement of GSM in single group switch regarding HW handling.

6.15

REMOVAL OF GSM

General

PCM lines and GJUL are to be removed as well, when a GSM is taken out of operation. The relevant GSM ought to be blocked, and the traffic ought to have time to settle down. Make sure that the clock bus cable between GCU2 boards is as short as possible and not spliced for instance.

If the group switch is duplicated, a GSM must be removed on both sides. (side1 must be an exact copy of side0)

Prerequisites

-

Execution

		Measure/Question	Observation/ Comment
<p>Flow</p> <pre> graph TD START([START]) --> D1{1} D1 -- Y --> P2[2] D1 -- N --> P3[3] P2 --> P3 P3 --> P4[4] P4 --> D5{5} D5 -- Y --> P6[6] D5 -- N --> A([A]) P6 --> A </pre>	1	Is this the last GSM?	
	2	Key command <i>pcm_synchronization</i> to remove synchronization.	
	3	Key command <i>pcm_synchronization</i> to see if the affected GSM is master or spare master.	
	4	Key command <i>pcm_order</i> to block the PCM lines towards the GSM which are to be removed. If the GS is duplicated, block the PCM lines on both GS sides.	
	5	Is the master- or the spare master GSM to be removed?	
	6	Key command <i>pcm_synchronization</i> to redirect the clock control to another GSM .	

		Measure/Question	Observation/ Comment
<pre> graph TD A((A)) --> 7[7] 7 --> 8{8} 8 --> 9{9} 9 -- Y --> 10[10] 10 --> 9 9 -- N --> B((B)) </pre>	7	Key command <i>pcm_config</i> to remove all PCM lines.	
	8	Remove all PCM-lines connected to the GSM. If the group switch is duplicated, remove all PCM-lines on both sides.	
	9	Is there still any GSMs in the group switch?	
	10	Remove all cables between GSU boards in the GSM which is to be removed and the GSU boards in the other GSMs.	

	Measure/Question	Observation/ Comment
11	Disconnect the cable of the board front on the GCU2.	Disturbances in the synchronization in GS will occur, if two cables are connected to the board and these are parted from each other.
12	Remove the hardware.	
13	Clear the control memory with command <i>pcm_order</i> .	
14	Key command <i>alarm</i> to print (list) alarms in the alarm log and examine if there are any relevant alarm .	
15	Key command <i>alarm</i> to erase (reset) alarms in the alarm lo.	

6.16

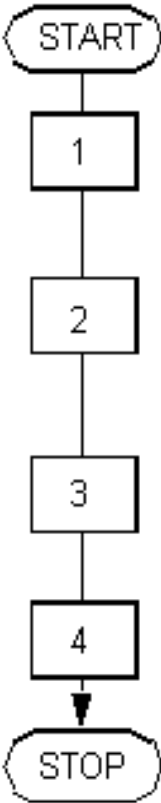
REMOVAL OF DUPLICATION OF THE GROUP SWITCH

General

Only side 1 can be removed.

Prerequisites

Execution

		Measure/Question	Observation/ Comment
Flow 	1	Key command <i>pcm_order</i> to terminate side 1 in the group switch .	
	2	Key command <i>pcm_status</i> to check the result.	
	3	Remove the hardware.	
	4	Key command <i>alarm</i> to erase (reset) alarms in the alarm log.	

6.17

ADDITION OF GSM

General

Addition of GSM comprises also addition of the boards GJU-L, GJU-G and PCM cables.

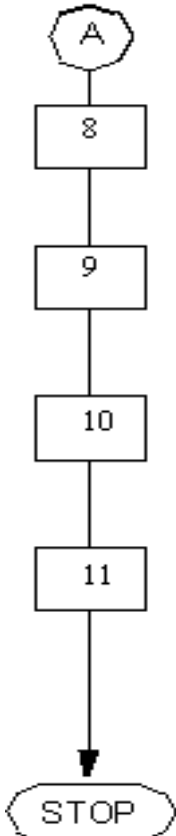
If the group switch is duplicated, a GSM must be added on both sides. (side1 must be an exact copy of side0)

Prerequisites

-

Execution

		Measure/Question	Observation/ Comment
<p>Flow</p> <pre> graph TD START([START]) --> D1{1} D1 -- Y --> S6[6] D1 -- N --> S2[2] S6 --> S7[7] S7 --> A1((A)) S2 --> S3[3] S3 --> S4[4] S4 --> S5[5] S5 --> S6 S5 --> S7 S7 --> A2((A)) </pre>	1	Is this the first GSM?	
	2	Equip existing GSMs with a new time switch.	In group switch, the time switch board is a GSU.
	3	Connect the cable for the clock synchronization from the new GSM's GCU2 board to one of the existing GSM's GCU2 boards.	
	4	Connect all cables between the time switch boards in the new GSM and the existing GSMs.	
	5	Connect all cables between the time switch boards in the existing GSMs and the new GSM.	
	6	Equip the GSM with a GSU board and a GCU2 board.	
	7	Connect the time switch cable to the GSU board.	

		Measure/Question	Observation/ Comment
Flow  <pre> graph TD A((A)) --> 8[8] 8 --> 9[9] 9 --> 10[10] 10 --> 11[11] 11 --> STOP([STOP]) </pre>	8	Connect all new PCM-lines to the GJUG-boards in the new GSM.	
	9	Equip the LIM with GJUL boards.	
	10	Key command <i>board_config</i> to initiate the new GJUL boards.	
	11	Key command <i>pcm_config</i> to initiate the new GSM .	

6.18

DUPLICATION OF GROUP SWITCH

General

The active side of the group switch is defined with command *pcm_order*.

Active group switch side, is the side from where all GJULs are to receive speech, signaling and synchronization. The group switch side is decided by the connection of the PCM line to the GJUL board, port 0 or port 1.

Prerequisites

All necessary hardware for duplication of the group switch side shall exist.

Side1 must be an exact copy of side0, which means that all GSU boards must be placed in the same positions on both sides. All GJUG boards must be placed in the same positions on both sides and have contact to the same GJUL board.

The GCU2 board must be connected in the same order on both sides.

Execution

		Measure/Question	Observation/ Comment
Flow <pre> graph TD START([START]) --> 1[1] 1 --> 2[2] 2 --> 3[3] 3 --> 4[4] 4 --> STOP([STOP]) </pre>	1	Connect the necessary hardware for duplication.	
	2	Key command <i>pcm_config</i> to scan the new hardware.	
	3	Key command <i>pcm_order</i> to activate duplicated group switch.	
	4	Key command <i>pcm_order</i> to change the active side in the group switch if that is desired .	
	5	Key command <i>pcm_status</i> to check the result.	See command description for the Group Switch.

6.19

BLOCKING OF PCM LINE

General

When there is a direct PCM line between two LIMs, both sides will be blocked at the same time. When one side is blocked, the other side will automatically be blocked.

A device can be blocked automatically, if:

- the device becomes faulty
- the device is connected to another device that is blocked (manually or automatically)
- the connection/cable to another device has been broken

When a device has been blocked automatically, it will also be deblocked automatically (with some time delay) when the fault has been solved.

Prerequisites

If the line is synchronization receiving or clock controlling, its functions shall be moved to another PCM line keying the commands pcm_synchronization (if clock controlling) or trsp_synchronization (other).

When blocking a group switch module, a LIM or a PCM line, some extensions will be affected. Therefore blocking shall be done carefully, for example at severe traffic disturbance or fault corrections.

Execution

Key command block, if it is a direct PCM line, otherwise key command pcm_order, to block all the time slots in the PCM line.

Key command block or pcm_status to verify that the PCM line has been blocked.

6.20

DEBLOCKING OF PCM LINE

General

The PCM line to be deblocked will not be made operational until system blocking (if any) has been cancelled by the system itself.

Prerequisites

Execution

Key command deblock, if it is a direct PCM line, otherwise key command pcm_order, to deblock all the time slots in the PCM line.

Key command pcm_status to verify the result.

6.21

PRINTOUT THE PCM LINE STATUS

General

-

Prerequisites

-

Execution

Key command `pcm_status` to get a printout status of the PCM lines. A group switch module is blocked if all its PCM lines are blocked. If there is a system blocked PCM line when command `pcm_status` was keyed, check if a restart is executing. If there is a restart executing, wait until the restart is finished and key command `pcm_status` again.

6.22

ADDITION OF LIM

General

-

Prerequisites

-

Execution

When a new LIM(s) has been added (see *Adding LIM*) connect the relevant hardware.

Key command `board_config` to find all new device boards, including GJUL board(s).

Key command `pcm_config` to find the GJUG board, the group switch, the PCM lines, and the GSM.

6.23

CHANGE CONNECTION MEDIA

General

Media data, specifications on pygmy lines, is always set when a line is added. If no value is given, it will be set to default.

Prerequisites

-

Execution

Key command `pcm_config`, to set the number of timeslots.

6.24

SELECTION OF MEDIA CONNECTION

General

To set up a media connection to a LIM, the media with the best class on the logical line is chosen first. If two logical lines has the same class, the logical line with the best priority is chosen

Prerequisites

-

Execution

Key command `trsp_connection`, to set class and prio.

7

TERMINATION

When the system's configuration is changed (removal, duplication, addition, synchronization), a **data backup** has to be made immediately afterwards. A disturbance causing a data reload of previous data is otherwise fatal. If a data reload has occurred before the backup, the hardware has to be put back according to the previous data, and the re-configuration has to be done again.