A MITEL
PRODUCT
GUIDE

Unify OpenScape 4000

OpenScape 4000 Assistant V11, Realtime Diagnosis System

Administrator Documentation
07/2024

P31003H34B0M1000276A9

Mitel

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Contents

1 Introduction

1.1 About Realtime Diagnosis System (RDS)

Realtime Diagnosis System (hereafter referred to as RDS) provides telephony fault localization for station and data lines and limited trunk fault reporting capabilities for trunk facility problems. It provides tools and features to help reduce the time of solving trunk problems, as well as enabling you to solve the problems more efficiently.

The function shall be accessible entirely by internet browsers. Using internet browser allows remote control. Therefore the user interface is created using HTML, JAVASCRIPT and other webbased technologies.

RDS provides the following features:

- Monitoring
  - Monitor trunk/line/data line - This feature allows you to view the call processing events as they occur.
  - ISDN trace - This feature applies to ISDN trunk interfaces and ISDN devices and allows you to capture and display the decoded layer 3 messages.
- On-demand facility tests - These tests facilitate testing between the OpenScape 4000 and the facility provider by providing standard transmission tests, such as sending and receiving test tones. The tests are:
  - Bit Error Rate (BER) Test and Network-wide BER Test
  - Echo Return Loss/Singing Return Loss (ERL/SRL) Test
  - Send Signal Test
  - Receive Signal Test
  - Loopback Test
- Trunk Rolling - This feature is only available for specific boards. It enables you to exchange or roll trunk facilities on TMC16 and TMANI boards. Once a trunk is rolled, you can observe the trunk tests to isolate the suspected trunk.

These features significantly enhance remote diagnostic efficiency of telephony problems, and reduce the need for test equipment.

The RDS Help system displays the general information about RDS and its features. Help pop-up windows display auxiliary text. To access the help facility from any RDS control page, click the Help Icon in the header bar. The Help System appears in an applett which is independent from the browser.

Error messages display for test failures, application errors, or user input errors.

1.2 Using RDS Help System

Context Sensitive Help

By clicking the Help Icon on the header bar you can get context sensitive help about the active control page (e.g. calling help from the BER Test Control page the context sensitive help refers the user to BER Test Help in the RDS Help System).

Table of contents help system organization

The RDS help system is organized similar to the RDS application. The Help table of contents menu also contain the selections Introduction, Monitoring and Testing and additionally a glossary. The chapter Examples gives you a brief graphical overview about test schemes.

Hyperlinks

Blue and underlined text marks hyperlinks which refer to a corresponding site in the help system. This site will be opened in the main help applett window.

SeeAlso Windows

SeeAlso windows contain additional information regarding a selected topic and appear in a supplementary window. Access the SeeAlso windows by clicking the blue boldfaced text. Please note that helptext is not printable from a SeeAlso window.

Pop-up Windows

Pop-up windows contain short definitions or assistance regarding data entry fields. Access these Pop-ups by clicking the blue italicized text. Exit the Pop-up window by clicking anywhere on the screen.

Step-by-Step

This chapter provides instructions for your . The guide will accompanie you along monitoring, tracing, and a sample for testing.

Index and Search

The RDS Help Applet provides a search function and an Index where keywords are listed in alphabetical order. The search results are listed in order of pages with most frequently occurring keywords. These functions are reachable from the card index system of the RDS Help Applett.

Glossary

A glossary of keyword definitions is located in the help glossary. To access the glossary, use the Help table of contents menu.

Printing out of the RDS Help System

Printing is enabled for the main applett window. Clicking the Printer Icon starts printing. Printing is not possible from SeeAlso or Popup windows.

1.3 RDS Session Management Page

1.3.1 Starting RDS

For recommendations and requirements for using RDS see OpenScape 4000 Administration Server System Requirements. Please note that you must enable and accept cookies in your browser.

RDS is located at the following URL:
`https://<servername>/rds/cgi-bin/rds_index.cgi`

Thereby, replace <servername> by the name of the server on that RDS runs (e.g. RDS runs on the server called "switch343" then the url is `https://switch343/rds/rds-bin/rds_index.cgi`).

RDS expects *Username* and *Password*. Apply to the system administrator.

1.3.2 RDS Header Bar

The top of the window contains the RDS Header. It will be constant for each function of RDS. The RDS Header contains the Realtime Diagnosis System Headline, the RDS Logo and three navigation icons.

	**Home Icon** Returning to the RDS Session Management Page by clicking the Home Icon.
	**Help Icon** The Help icon is used to activate context sensitive help. To obtain a help message regarding any topic of RDS, click the help icon at the right end of the RDS header bar.
	**Restart Icon** The Restart Icon is used to start the Unity A&S Launchpad inside of the RDS Page.
	**Logoff Icon** Logs you off, closing the current session for all associated browser windows, and brings you back to the Logon screen.

1.3.3 RDS Navigation Bar

The RDS Navigation Bar on the left handed side offers the hyperlinks to the RDS features.

Monitor Trunk Line Data Line ISDN Trace

The selection of this link will invoke a new browser window loading the 'Monitoring Control' page.

Bit Error Rate Test (BER)

The selection of this link will invoke a new browser window loading the 'BER Test Control' page - contains even the function Network-wide BER Test for more than two switches.

Echo Return Loss Singing Return Loss Test

The selection of this link will invoke a new browser window loading the 'ERL/ SRL Test Control' page.

Send Signal Test

The selection of this link will invoke a new browser window loading the 'Send Signal Test Control' page.

Receive Signal Test

The selection of this link will invoke a new browser window loading the 'Receive Signal Test Control' page.

Loopback Test

The selection of this link will invoke a new browser window loading the 'Loopback Test Control' page.

Trunk Rolling

The selection of this link will invoke a new browser window loading the 'Trunk Rolling Control' page.

View Protocol Data of last RDS session

The link only appears on the main RDS screen in the left-hand menu bar under certain conditions. It appears only when any test / trace results remain from the previous RDS session, i.e. test has been run without clearing the results, and RDS has been shut down.

The selection of this link will invoke a new browser window showing the logged protocol data of the last RDS session.

Online Message Viewer

This section in the navigation bar contains all the RDS features regarding Online Trace Message viewing. The section title is a link that has the same functionality as the 'List Available Traces' link.

List Available Traces

The selection of this link will load the list of available traces in the right side of the RDS window.

Create Predefined Trace

The selection of this link will invoke a new browser window loading the 'Predefined Trace Creator' page.

Start Predefined Trace

The selection of this link will invoke a new browser window loading the 'Predefined Trace Starter' page.

Home

This is a hyperlink to the RDS session management page it self. Selecting this hyperlink will reload the whole page for refreshing needs.

Shutdown RDS

The selection of this link will shutdown the RDS server. The connection will be lost.

1.3.4 Creating a session

To start a job you have to create a new session. RDS is usable by one client.

RDS Session Management shows the RDS session which is still running on the switch. The user gets information about user name, session start time, state of session (vacant/busy) and a description.

If a session is still running on the switch the user cannot install a further session.

Creating a session needs to fill in the entry field "Username". The session should be annotated with short words in the entry field "Description".

By clicking the button **Logon** the form is sent to the system. RDS reloads the status page in the browser. The created session is displayed in the table. You can start monitoring and testing.

Double-clicking on the session leads to the RDS Job Overview Page.

1.3.5 Closing RDS

Closing the internet browser will not finish RDS. RDS is running on the server, the internet browser only enables remote control. To exit RDS you must shut down the server. A server shutdown will terminate the session and all ongoing jobs.

Closing the internet browser has no effect on the functionality of RDS. Reopening the internet browser leads back to the session and all jobs which are still running.

Clicking **Home** on the navigation bar or the **Restart** Button on the header bar will restart the server. The session will be recovered.

Clicking **Shutdown RDS** in the navigation bar will shutdown the server. Pay attention that all jobs are finished. The user obtains a message that RDS is finished and all RDS servers are shutted down. All protocol data files are deleted and RDS is closed.

1.4 View Protocol Data of last RDS Session

After a restart or an abnormal termination of a RDS session your test, monitor or trace test result data will not be lost. RDS will place the protocol data to your proposal at the next RDS session. The hyperlink View Protocol Data of last RDS session is not applicable after a shutdown of RDS.

The Protocol Data of last RDS session menu enables you to view all protocol data collected during a RDS session remaining on the switch after a restart or an abnormal termination of the server or RDS client. For each function started during a RDS session a protocol data file will be created.

In the next RDS session after a restart or an abnormal abort of the server or the RDS client an additional hyperlink will be visible on the navigation bar.

For displaying the data contents double-click the View Protocol Data of last RDS session hyperlink. This will spawn a new browser window displaying the content in HTML format. For printing to printer or saving the data to your client PC just use the capabilities of your current browser.

The protocol data files will be deleted after terminating the RDS application via the navigation bar hyperlink 'Shutdown RDS'.

1.5 RDS Job Overview Page

Getting more information about a session

On the RDS session management page the registered session is displayed. Clicking marks the session. Another click opens the session in the RDS Job Overview Page to get detailed information about the jobs still running on the switch.

The jobs are listed in the table with feature name, Station/PEN, start time and short description.

Following jobs can occur: Monitor, ISDN Trace, BER Test, ERL SRL Test, Send Signal Test, Receive Signal Test, Loopback Test, and Trunk Roll Test.

Double-clicking on a row leads to the corresponding RDS feature control page. The double-click has the same effect as selecting the feature from the navigation bar.

2 Monitoring/ISDN Tracing

Monitor trunk/line/data line

This feature allows viewing the call processing and device handler events as they occur. Watch what dialing and how the switch is reacting, which numbers are outpulsed etc. This feature allows you to understand complex call scenarios online. So you get a better view, how the problem is caused (operating error or switch faults).

ISDN trace

This feature applies to ISDN trunk interfaces and ISDN devices and allows you to capture and display the decoded layer 3 messages as they occur. So you are able to identify protocol mismatches very fast, because of easy accessibility of the interpreted layer 3 ISDN Messages.

2.1 Monitor Trunk/Line/Data Line Control Page

Before working with the Monitor/ISDN Trace Tool you have to create a new session. To create a new session see Creating a session. To activate the Monitor/ISDN Trace Control click Monitor Trunk Line Data Line ISDN Trace on the Navigation bar.

Monitoring

The Call processing monitoring provides information about call setup and disconnect, simultaneous monitoring of multiple stations (analog and digital), trunks (analog and digital), data lines and attendant console. For monitoring of the attendant console, the private number of the corresponding attendant device has to be entered. It is *NOT* possible to monitor the attendant by its public number. This will be rejected by RDS.

ISDN Trace

ISDN Trace displays ISDN Layer 3 messages (ISDN L3 Message Types) on ISDN devices. It allows you to capture and display the decoded layer 3 messages as they occur. So you are able to identify protocol mismatches very fast, because of easy accessibility of the interpreted layer 3 ISDN Messages.

An ISDN Trace on functional devices does not deliver the protocol type but on trunks. To this specific topic, you can trace CorNet-TS Layer 3 protocol data of Optiset phones or other functional devices. The Optiset phone is only selectable by its PEN. For this device type the columns 'B-Channel' and 'Call Reference' are not applicable. Double-click the message row on the ISDN Trace Display Page to get the complete decoded CorNet-TS message. Please note that the Cornet-TS is not an ISDN protocol.

ISDN Boards for ISDN Tracing

Starting Monitoring/ISDN Trace:

You have to fill in the entry fields and to select from the list boxes. The state of the job is displayed as Idle, Pending or Active.

1) Enter the PEN or station number in the Station/PEN field
2) Enter the desired TSI or BCH (B-Channel) number, if to apply.
3) In the Type field, select Station Monitor, ISDN Tracer or Trunk Monitor from the list box.
4) In the Service field, select Voice, DEE or FAX from the list box. This field is not applicable when selected Trunk Monitor or ISDN Tracer as Monitor type.
5) Select the corresponding Start button.
6) When you want to end trunk or line monitoring, select the Stop button. Alternatively you can stop all active jobs at the same time by clicking the Stop All button.
7) Click the Display Monitor button or the Display ISDN Trace button to view the results.

   RDS allows up to four simultaneous jobs. For example see Matrix displaying monitor function combinations. You can use any of the combinations of monitoring and ISDN traces.

Station/PEN	PEN resp. station number of the object being monitored or traced.
TSI/BCH	Terminal Selection Index, in case that bus devices have to be monitored. BCH to identify the ISDN B-Channel to be monitored. This field is only valid for monitoring and L3 ISDN trace of stations, if the PEN is given.
Type	Single selection list box of types. The list has the following items: Station Monitor, ISDN Tracer, Trunk Monitor. The selection of trunk will invoke a trunk monitoring. If the user is selecting 'ISDN-Trace', a L3 ISDN trace will be started for the corresponding addressed object, which may be a trunk or a station.
Service	Single selection list box of service types. The box is only activated for station monitoring, else it is shown 'undefined'. The list has following items: undefined, Voice, DTE, FAX.
State	Display field, showing the status of the corresponding monitor and the L3 ISDN trace. The status can have the following values: Active (green), Pending (blue), or Idle (in red color).
Start	The start button for activating the L3 ISDN trace or the monitor of the corresponding row.
Stop	The stop button for deactivating the corresponding function, which may be a L3 ISDN trace or a monitor.
ISDN Trace Display	invoke a new window loading the L3 ISDN trace messages
Monitor Display	invoke a new window loading the monitoring data

Stop All	stop all active monitors and L3 ISDN traces at once
Cancel	terminates all active monitor functions and closes the monitor control page

2.2 Monitor Display Page

RDS monitoring displays the current state of the station, trunk, or data line, and all subsequent call processing status changes of the devices being monitored.

If you monitor an ISDN trunk you will receive call processing state information but you need to run an ISDN trace to get ISDN layer 3 information.

Monitoring sessions are not maintained across switch restarts.

The Display Monitor table scrolls automatically by default as new events are displayed. You can stop the auto-scrolling by unchecking the checkbox auto scroll. You are also able to scroll the table by using the arrow keys.

Monitor results

Due to the different CP-handling of ACWinMQ in contrast to ACWin3 (ACWin4) and AC3 (AC4), there is no inheritance in the case where a device calls an ACWinMQ when both are prime-monitors. The first CP-event of ACWinMQ, which is displayed on the screen, is the "ATND SOURCE KEY". At this time there is no information about the partner-device and so it will not be displayed in the trace results. Therefore the ACWinMQ is not inherited from the partner-device.

The Monitor Display output page contains two frames to display the real-time monitor events and the static information about the device(s) being monitored. The real-time monitor events will be displayed in the upper frame showing the Monitor Station/PEN or BCH, the Partner Station/PEN or BCH, the current state, the user activities and the timestamp when the event occures. A sort of the monitoring data is not possible. The protocol data can be printed or downloaded to the PC as described in the following section. The dynamic data display area can be set in auto scroll mode. Therefore you have to mark the corresponding auto scroll checkbox.

The dynamic data display area contains the following fields for a station:

Monitor Station/PEN	Line or PEN of the trunk under test
BCH	Corresponding to Monitor Station/PEN. BCH to identify the ISDN B-Channel to be monitored. This field is only valid for monitoring and L3 ISDN trace of stations, if the PEN is given.
Partner Station/PEN	line or trunk associated with the activity being reported
BCH	Corresponding to Partner Station/PEN. BCH to identify the ISDN B-Channel to be monitored. This field is only valid for monitoring and L3 ISDN trace of stations, if the PEN is given.
State	Calling state of the line or trunk being monitored

Activity	Information about the call in progress
Time	Time stamp of test (hh:mm:ss:msmsms 24 hour clock)

The static data display area contains the following fields:

PEN	Port equipment number of the line being monitored
STNO	Station number
DEVFUNC	Type of device function (for example, SLMA or Optiset)
ITR	Internal traffic relations group number
TRKID	Trunk ID number
BOARD	Board type (for example, SLMA or TMDN)
DEV	Device type of the trunk (for example, DID or PRIB)
TGRP	Trunk group number
TCCID	Telephone company circuit ID
TRTBL	Translation table number
DEDSVC	Type of dedicated service on the trunk (for example, MEG8, INW, or PRIV)
PROTOCOL	ISDN protocol variant - Protocol ID of trunks

Printing the monitor results

For printing the monitoring and test data and test results a special print page will be used. Clicking the **Print** Button on the Monitor Display Page activates a new instance browser window. The monitor results will be displayed in formatted Hypertext Markup Language (HTML) in the browser window. At the top of this screen there is a link "Click here to download the file:" which enables you to download the displayed file from the server. A standard dialog is displayed which gives you the option to "Save" or "Open" the file in Excel (or whatever is installed on your PC).

2.3 ISDN Trace Display Page

The ISDN Trace Display Page shows the interpreted Layer 3 ISDN Messages of the selected digital trunk(s) S0, S1 and S2. The RDS ISDN tracer offers two levels of ISDN Layer 3 message information. The table in the Display Page shows the header information of a Layer 3 ISDN message only.

The Display ISDN Trace table scrolls automatically by default as new events are displayed. You can stop the auto-scrolling by unchecking the check control auto scroll. Alternatively it is scrollable by using the arrow keys.

ISDN Trace Results

When an ISDN span is traced, scores (hundreds) of messages come through for a 30 (23) channels of the span. To see all the messages related to a specific phone call, click on the CR header box. This will sort the messages by Call Reference (CR) number. To return to the sort by time, click on the Time header.

To get more detailed information:

To get detailed information (e.g. about information elements and bit information), double-click the specific row. In this case a new browser window will be opened with detail information about the ISDN Trace results. This may take a second or two depending on the interpretation process on the switch and the transmission speed of your PC to switch network connection.

Special Handling for getting information out of segmented messages:

In some cases the size of a Layer 3 ISDN message frame is too small for the information being transmitted with the Layer 3 message. These messages will be transmitted in segments. `SEGMENT` messages always belong to a group of messages. The real type of the message (e.g. `SETUP` or `ALERTING`) is indicated by the first message type which follows the preceding `SEGMENT` messages. Double-clicking on the real type offers details of the complete message.

Example:

The message is a `SETUP` message which consists of 3 segments.

`Outgoing 1-1-79-0`	`SEGMENT`	`20:26:13:280 3 (3H)`
`Outgoing 1-1-79-0`	`SEGMENT`	`20:26:13:280 3 (3H)`
`Outgoing 1-1-79-0`	`SETUP`	`20:26:13:280 3 (3H)`

To view details of the complete message double-click the first message type different from a `SEGMENT` message type, in this sample double-click the segment `SETUP`.

See ISDN Cause Codes

The ISDN trace test result table contains the following fields:

Direction	Direction of the traced call (Incoming / Outgoing)
Station/PEN	Port equipment number of the line being monitored
BCH	BCH to identify the ISDN B-Channel to be monitored. This field is only valid for monitoring and L3 ISDN trace of stations, if the PEN is given.
Call Reference Value	provides a tag for messages related to the same call
Message Type	L3 message itself, sent on the line. (ISDN L3 Message Types)
Time	Time stamp of the entry

The second display area contains the following fields for a trunk:

PEN	Port equipment number of the line being monitored
TRKID	Trunk ID number
BOARD	Board type (for example, PER or TMDN)
DEV	Device type of the trunk (for example, DID or PRIB)
TGRP	Trunk group number
TCCID	Telephone company circuit ID
TRTBL	Translation table number
DEDSVC	Type of dedicated service on the trunk (for example MEG8, INW, or PRIV)
PROTOCOL	ISDN protocol variant - Protocol ID of trunks

Printing the ISDN trace results

For printing the ISDN Trace test data and test results a special print page will be used. Clicking the **Print** Button on the ISDN Trace Display Page activates a new instance browser window. The ISDN Trace results will be displayed in formatted Hypertext Markup Language (HTML) in the browser window. At the top of this screen there is a link "Click here to download the file:" which enables you to download the displayed file from the server. A standard dialog is displayed which gives you the option to "Save" or "Open" the file in Excel (or whatever is installed on your PC).

ISDN Boards for ISDN Tracing

IM boards	DIUN2	Q2196-X	PRI S2
	DIUN4	Q2195-X	PRI S2
	STMD	Q2174-X	BRI S0

US specific board	TMDNH	Q2192-X	PRI T1

ISDN protocol variant

Following values can apply as protocol variant. These values are selected with Parameter PROTVAR (AMO PRODE) or subscriber.

Protocol	**PROTVAR or subscriber**	**IM/US/UK marke**
AT&T 4ESS PRI - US specific	ATT4ESS	US
CorNet-N	CORNV33	IM
CorNet-NQ 2.0a ECMA1 V1	ECMA1	IM/US
CorNet-NQ 2.1 Basis ETSI QSIG	ECMAV2	IM/US

CorNet-NQ 2.1 Basis ISO/IEC PSS1	PSS1V2	IM/US
CorNet-N - US specific	CORNUS	US
CorNet-TS	Optiset	IM
DPNSS1 for CDG in UK		UK
Euro-ISDN	ETSI	IM
MCI DEX600 PRI - US specific	MCI600	US
MCI DMS-250 PRI - US specific	MCI250	US
NI2 PRI - US specific	NI2	US
Sprint DMS-250 PRI (using AT&T 4ESS emulation at layer 3) - US specific	SPRINT	US
Standard-QSIG	ECMAV2	IM

ISDN L3 Message Types

ALERTING	CALL PROCEEDING	CONGESTION CONTROL
CONNECT	CONNECT ACKNOWLEDGE	DISCONNECT
FACILITY	HOLD	HOLD ACKNOWLEDGE
HOLD REJECT	INFORMATION	NOTIFY
PROGRESS	REGISTER	RELEASE
RELEASE COMPLETE	RESTART	RESTART ACKNOWLEDGE
RESUME	RESUME ACKNOWLEDGE	RESUME REJECT
RETRIEVE	RETRIEVE ACKNOWLEDGE	RETRIEVE REJECT
SEGMENT	SETUP	SETUP ACKNOWLEGDE
STATUS	STATUS ENQUIRY	SUSPEND
SUSPEND ACKNOWLEDGE	SUSPEND REJECT	USER INFORMATION

SEGMENT

This message is sent when the transferred message is longer than 260 octets and therefore divided into several segments.

SETUP

This message is sent by the calling user to the network and by the network to the called user to initiate call establishment.

SETUP ACKNOWLEGDE

This message is sent by the network to the calling user or by the called user to the network to indicate that call establishment has been initiated, but additional information may be required.

ALERTING

This message is sent by the called user to the network and by the network to the calling user to indicate that called user alerting has been initiated.

CONNECT

This message is sent by the called user to the network and by the network to the calling user to indicate call acceptance by the called user.

CONNECT ACKNOWLEDGE

This message is sent by the network to the called user to indicate the user has been awarded the call. It may also be sent by the calling user to the network to allow the symmetrical protocol procedures.

CONGESTION CONTROL

This message is sent by the user or the network to indicate the establishment or termination of flow control on the transmission of USER INFORMATION messages.

HOLD

This message requests the center office to hold the connection.

HOLD ACKNOWLEDGE

This message is sent by the central office to indicate holding the connection in the office.

HOLD REJECT

This message is sent by the central office to refuse holding the connection in the office.

NOTIFY

This message is sent by the user or the network to indicate information pertaining to a call, such as user suspended.

REGISTER

The terminal requests an entering or an activating of the feature specified in the message in the central office.

PROGRESS

This message is sent by the user or the network to indicate the progress of a call in the event of interworking or in relation to in-band information/patterns.

RESTART

This message is sent by the user or the network to request the recipient to restart (i.e., return to null state) the indicated channel(s) or interface.

RESTART ACKNOWLEDGE

This message is sent to acknowledge the receipt of a RESTART message and to indicate that the requested restart is complete.

RESUME

This message is sent by the user to request the network to resume a suspended call.

RESUME ACKNOWLEDGE

This message is sent by the network to the user to indicate completion of a request to resume a suspended call.

RESUME REJECT

This message is sent by the network to the user to indicate failure of a request to resume a suspended call.

RETRIEVE

This message is sent by the terminal to resume the held connection.

RETRIEVE ACKNOWLEDGE

This message was sent by the central office to indicate completion of a request to retrieve a suspended call.

RETRIEVE REJECT

This message is sent by the network to the user to indicate failure of a request to retrieve a suspended call.

STATUS

This message is sent by the user or the network in response to a STATUS ENQUIRY message or at any time during a call report certain error conditions.

STATUS ENQUIRY

This message is sent by the user or the network at any time to solicit a STATUS message from the peer layer 3 entity. Sending a STATUS message in response to a STATUS ENQUIRY message is mandatory.

FACILITY

This message is used by central office and terminal for extended features.

DISCONNECT

This message is sent by the user to request the network to clear an end-to-end connection or is sent by the network to indicate that the end-to-end connection is cleared.

RELEASE

This message is sent by the user or the network to indicate that the sending equipment has disconnected the channel (if any) and intends to release the channel and call reference, and that receiving equipment should also prepare to do so after sending RELEASE COMPLETE.

RELEASE COMPLETE

This message is sent by the user or the network to indicate that the equipment sending the message has released the channel (if any) and call reference, the

channel is available for refuse, and the receiving equipment releases the call reference.

INFORMATION

This message is sent by the user or the network to provide additional information. It may be used to provide information for call establishment or miscellaneous call-related information.

CALL PROCEEDING

This message is sent by the called user to the network or by the network to the calling user to indicate that the requested call establishment has been initiated and no more call establishment information will be accepted.

SUSPEND

This message is sent by the user to request the network to suspend a call.

SUSPEND ACKNOWLEDGE

This message is sent by the network to the user to indicate completion of a request to suspend a call.

SUSPEND REJECT

This message is sent by the network to the user to indicate failure of a request to suspend a call.

USER INFORMATION

This message is sent by the user to the network to transfer information to remote user. This message is also sent by the network to the user to deliver information from the other user.

ISDN Cause Codes

Cause No. 1	Cause No. 2	Cause No. 3	Cause No. 4	Cause No. 5	Cause No. 6
Cause No. 7	Cause No. 8	Cause No. 9	Cause No. 16	Cause No. 17	Cause No. 18
Cause No. 19	Cause No. 20	Cause No. 21	Cause No. 22	Cause No. 26	Cause No. 27
Cause No. 28	Cause No. 29	Cause No. 30	Cause No. 31	Cause No. 34	Cause No. 35
Cause No. 38	Cause No. 39	Cause No. 40	Cause No. 41	Cause No. 42	Cause No. 43
Cause No. 44	Cause No. 46	Cause No. 47	Cause No. 49	Cause No. 50	Cause No. 52
Cause No. 53	Cause No. 54	Cause No. 55	Cause No. 57	Cause No. 58	Cause No. 62
Cause No. 63	Cause No. 65	Cause No. 66	Cause No. 69	Cause No. 70	Cause No. 79

Cause No. 81	Cause No. 82	Cause No. 83	Cause No. 84	Cause No. 85	Cause No. 86
Cause No. 87	Cause No. 88	Cause No. 90	Cause No. 91	Cause No. 95	Cause No. 96
Cause No. 97	Cause No. 98	Cause No. 99	Cause No. 100	Cause No. 101	Cause No. 102
Cause No. 103	Cause No. 110	Cause No. 111	Cause No. 127	Cause Codes over 128	

Cause No. 1

Unallocated (unassigned) number [Q.850]

This cause indicates that the called party cannot be reached because, although the called party number is in a valid format, it is not currently allocated (assigned).

Cause No. 2

No route to specified transit network (national use) [Q.850]

This cause indicates that the equipment sending this cause has received a request to route the call through a particular transit network which it does not recognize.

The equipment sending this cause does not recognize the transit network either because the transit network does not exist or because that particular transit network, while it does exist, does not serve the equipment which is sending this cause.

Cause No. 3

No route to destination [Q.850]

This cause indicates that the called party cannot be reached because the network through which the call has been routed does not serve the destination desired. This cause is supported on a network dependent basis.

Cause No. 4

send special information tone [Q.850]

This cause indicates that the called party cannot be reached for reasons that are of a long term nature and that the special information tone should be returned to the calling party.

Cause No. 5

misdialed trunk prefix (national use) [Q.850]

This cause indicates the erroneous inclusion of a trunk prefix in the called party number. This number is to striped from the dialed number being sent to the network by the customer premises equipment.

Cause No. 6

channel unacceptable [Q.850]

This cause indicates that the channel most recently identified is not acceptable to the sending entity for use in this call.

Cause No. 7

call awarded, being delivered in an established channel [Q.850]

This cause indicates that the user has been awarded the incoming call, and that the incoming call is being connected to a channel already established to that user for similar calls (e.g. packet-mode x.25 virtual calls).

Cause No. 8

preemption [Q.850]

This cause indicates the call is being preempted.

Cause No. 9

preemption - circuit reserved for reuse [Q.850]

This cause indicates that the call is being preempted and the circuit is reserved for reuse by the preempting exchange.

Cause No. 16

normal call clearing [Q.850]

This cause indicates that the call is being cleared because one of the users involved in the call has requested that the call be cleared. Under normal situations, the source of this cause is not the network.

Cause No. 17

user busy [Q.850]

This cause is used to indicate that the called party is unable to accept another call because the user busy condition has been encountered.

This cause value may be generated by the called user or by the network. In the case of user determined user busy it is noted that the user equipment is compatible with the call.

Cause No. 18

no user responding [Q.850]

This cause is used when a called party does not respond to a call establishment message with either an alerting or connect indication within the prescribed period of time allocated.

Cause No. 19

no answer from user (user alerted) [Q.850]

This cause is used when the called party has been alerted but does not respond with a connect indication within a prescribed period of time.

Note - This cause is not necessarily generated by Q.931 procedures but may be generated by internal network timers.

Cause No. 20

subscriber absent [Q.850]

This cause value is used when a mobile station has logged off, radio contact is not obtained with a mobile station or if a personal telecommunication user is temporarily not addressable at any user-network interface.

Cause No. 21

call rejected [Q.850]

This cause indicates that the equipment sending this cause does not wish to accept this call, although it could have accepted the call because the equipment sending this cause is neither busy nor incompatible.

This cause may also be generated by the network, indicating that the call was cleared due to a supplementary service constraint.

The diagnostic field may contain additional information about the supplementary service and reason for rejection.

Cause No. 22

number changed [Q.850]

This cause is returned to a calling party when the called party number indicated by the calling party is no longer assigned.

The new called party number may optionally be included in the diagnostic field.

If a network does not support this cause, cause no: 1, unallocated (unassigned) number shall be used.

Cause No. 26

non-selected user clearing [Q.850]

This cause indicates that the user has not been awarded the incoming call.

Cause No. 27

destination out of order [Q.850]

This cause indicates that the destination indicated by the user cannot be reached because the interface to the destination is not functioning correctly.

The term "not functioning correctly" indicates that a signal message was unable to be delivered to the remote party; e.g. a physical layer or data link layer failure at the remote party, or user equipment off line.

Cause No. 28

invalid number format (address incomplete) [Q.850]

This cause indicates that the called party cannot be reached because the called party number is not in a valid format or is not complete.

Cause No. 29

facilities rejected [Q.850]

This cause is returned when a supplementary service requested by the user cannot be provide by the network.

Cause No. 30

response to STATUS INQUIRY [Q.850]

This cause is included in the STATUS message when the reason for generating the STATUS message was the prior receipt of a STATUS INQUIRY.

Cause No. 31

normal, unspecified [Q.850]

This cause is used to report a normal event only when no other cause in the normal class applies.

Cause No. 34

no circuit/channel available [Q.850]

This cause indicates that there is no appropriate circuit/channel presently available to handle the call.

Cause No. 35

Call Queued [Q.850]

Cause No. 38

network out of order [Q.850]

This cause indicates that the network is not functioning correctly and that the condition is likely to last a relatively long period of time e.g. immediately re-attempting the call is not likely to be successful.

Cause No. 39

permanent frame mode connection out-of-service [Q.850]

This cause is included in a STATUS message to indicate that a permanently established frame mode connection is out-of-service (e.g. due to equipment or section failure) [see Q.933]

Cause No. 40

permanent frame mode connection operational [Q.850]

This cause is included in a STATUS message to indicate that a permanently established frame mode connection is operational and capable of carrying user information. [see Annex A/Q.933]

Cause No. 41

temporary failure [Q.850]

This cause indicates that the network is not functioning correctly and that the condition is no likely to last a long period of time; e.g. the user may wish to try another call attempt almost immediately.

Cause No. 42

switching equipment congestion [Q.850]

This cause indicates that the switching equipment generating this cause is experiencing a period of high traffic.

Cause No. 43

access information discarded [Q.850]

This cause indicates that the network could not deliver access information to the remote user as requested, i.e. user-to-user information, low layer compatibility, high layer compatibility or sub-address as indicated in the diagnostic.

It is noted that the particular type of access information discarded is optionally included in the diagnostic.

Cause No. 44

requested circuit/channel not available [Q.850]

This cause is returned when the circuit or channel indicated by the requesting entity cannot be provided by the other side of the interface.

Cause No. 46

precedence call blocked [Q.850]

This cause indicates that there are no pre-emptable circuits or that the called user is busy with a call of equal or higher pre-emptable level.

Cause No. 47

resource unavailable, unspecified [Q.850]

This cause is used to report a resource unavailable event only when no other cause in the resource unavailable class applies.

Cause No. 49

Quality of Service not available [Q.850]

This cause is used to report that the requested Quality of Service, as defined in Recommendation X.213, cannot be provided (e.g. throughput of transit delay cannot be supported).

Cause No. 50

requested facility not subscribed [Q.850

This cause indicates that the user has requested a supplementary service which is implemented by the equipment which generated this cause, but the user us not authorized to use.

Cause No. 52

outgoing calls barred

Cause No. 53

outgoing calls barred within CUG [Q.850]

This cause indicates that although the calling party is a member of the CUG for the outgoing CUG call, outgoing calls are not allowed for this member of the CUG.

Cause No. 54

incoming calls barred

Cause No. 55

incoming calls barred within CUG [Q.850]

This cause indicates that although the calling party is a member of the CUG for the incoming CUG call, incoming calls are not allowed for this member of the CUG.

Cause No. 57

bearer capability not authorized [Q.850]

This cause indicates that the user has requested a bearer capability which is implemented by the equipment which generated this cause but the user is not authorized to use.

Cause No. 58

bearer capability not presently available [Q.850]

This cause indicates that the user has requested a bearer capability which is implemented by the equipment which generated this cause but which is not available at this time.

Cause No. 62

inconsistency in outgoing information element. [Q.850]

This cause indicates an inconsistency in the designated outgoing access information and subscriber class.

Cause No. 63

service or option not available, unspecified [Q.850]

This cause is used to report a service or option not available event only when no other cause in the service or option not available class applies.

Cause No. 65

bearer capability not implemented [Q.850]

This cause indicates that the equipment sending this cause does not support the bearer capability requested.

Cause No. 66

channel type not implemented [Q.850]

This cause indicates that the equipment sending this cause does not support the channel type requested.

Cause No. 69

requested facility not implemented [Q.850]

This cause indicates that the equipment sending this cause does not support the requested supplementary services.

Cause No. 70

only restricted digital information bearer capability is available (national use) [Q.850]

This cause indicates that the calling party has requested an unrestricted bearer service but the equipment sending this cause only supports the restricted version of the requested bearer capability.

Cause No. 79

service or option not implemented, unspecified [Q.850]

This cause is used to report a service or option not implemented event only when no other cause in the service or option not implemented class applies.

Cause No. 81

invalid call reference value [Q.850]

This cause indicates that the equipment sending this cause has received a message with a call reference which is not currently in use on the user-network interface.

Cause No. 82

identified channel does not exist [Q.850]

This cause indicates that the equipment sending this cause has received a request to use a channel not activated on the interface for a call.

For example, if a user has subscribed to those channels on a primary rate interface numbered from 1 to 12 and the user equipment or the network attempts to use channels 13 through 23, this cause is generated.

Cause No. 83

a suspended call exists, but this call identify does not [Q.850]

This cause indicates that a call resume has been attempted with a call identity which differs from that in use for any presently suspended call(s).

Cause No. 84

call identity in use [Q.850]

This cause indicates that the network has received a call suspended request containing a call identity (including the null call identity).

The call identity is already in use for a suspended call within the domain of interfaces over which the call might be resumed.

Cause No. 85

no call suspended [Q.850]

This cause indicates that the network has received a call resume request containing a Call identity information element which presently does not indicate any suspended call within the domain of interfaces over which calls may be resumed.

Cause No. 86

call having the requested call identity has been cleared [Q.850]

This cause indicates that the network has received a call resume request containing a Call identity information element indicating a suspended call that has in the meantime been cleared while suspended (either by network time-out or by the remote user).

Cause No. 87

user not a member of CUG [Q.850]

This cause indicates that the called user for the incoming CUG call is not a member of the specified CUG or that the calling user is an ordinary subscriber calling a CUG subscriber.

Cause No. 88

incompatible destination [Q.850]

This cause indicates that the equipment sending this cause has received a request to establish a call which has low layer compatibility, high layer compatibility or other compatibility attributes (e.g. data rate) which cannot be accommodated.

Cause No. 90

non-existent CUG [Q.850]

This cause indicates that the specified CUG does not exist.

Cause No. 91

invalid transit network selection (national use) [Q.850]

This cause indicates that a transit network identification was received which is of an incorrect format as defined in Annex C/Q.931

Cause No. 95

invalid message, unspecified [Q.850]

This cause is used to report an invalid message event only when no other cause in the invalid message class applies.

Cause No. 96

mandatory information element is missing [Q.850]

This cause indicates that the equipment sending this cause has received a message which is missing an information element which must be present in the message before that message can be processed.

Cause No. 97

message type non-existent or not implemented [Q.850]

This cause indicates that the equipment sending this cause has received a message with a message type it does not recognize either because this is a message not defined of defined but not implemented by the equipment sending this cause.

Cause No. 98

message not compatible with call state or message type non-existent or not implemented. [Q.850]

This cause indicates that the equipment sending this cause has received a message such that the procedures do not indicate that this is a permissible message to receive while in the call state, or a STATUS message was received indicating an incompatible call state.

Cause No. 99

Information element / parameter non-existent or not implemented [Q.850]

This cause indicates that the equipment sending this cause has received a message which includes information element(s)/parameter(s) not recognized because the information element(s)/parameter name(s) are not defined or are defined but not implemented by the equipment sending the cause.

This cause indicates that the information element(s)/parameter(s) were discarded.

However, the information element is not required to be present in the message in order for the equipment sending the cause to process the message.

Cause No. 100

Invalid information element contents [Q.850]

This cause indicates that the equipment sending this cause has received and information element which it has implemented; however, one or more fields in the I.E. are coded in such a way which has not been implemented by the equipment sending this cause.

Cause No. 101

message not compatible with call state [Q.850]

This cause indicates that a message has been received which is incompatible with the call state.

Cause No. 102

recovery on timer expiry [Q.850]

This cause indicates that a procedure has been initiated by the expiration of a timer in association with error handling procedures.

Cause No. 103

parameter non-existent or not implemented - passed on (national use) [Q.850]

This cause indicates that the equipment sending this cause has received a message which includes parameters not recognized because the parameters are not defined or are defined but not implemented by the equipment sending this cause.

The cause indicates that the parameter(s) were ignored. In addition, if the equipment sending this cause is an intermediate point, then this cause indicates that the parameter(s) were passed unchanged.

Cause No. 110

message with unrecognized parameter discarded [Q.850]

This cause indicates that the equipment sending this cause has discarded a received message which includes a parameter that is not recognized.

Cause No. 111

protocol error, unspecified [Q.850]

This cause is used to report a protocol error event only when no other cause in the protocol error class applies.

Cause No. 127

Interworking, unspecified [Q.850]

This cause indicates that an interworking call (usually a call to SW56 service) has ended.

Cause Codes over 128

Cause code values of 128 and higher aren't sent over the network, and aren't defined in Rec. Q.850. A terminal displaying a value 128 or higher and claiming it is a cause code arguably has a bug or is implementing some proprietary diagnostic code (not necessarily bad).

Some documentation has cause codes listed with numbers higher than 128, but at this time they are proprietary in nature.

The PRI equipment vendors are the most likely to use these codes as they have been using proprietary messages in the facilities data link for some time now (there is an as yet undefined area in the FDL which is big enough to carry small datagrams or messages.

It is typically used to pass proprietary control or maintenance messages between multiplexers.

Matrix displaying monitor function combinations

RDS allows up to four simultaneous jobs. The following table displays possible combinations.

Station/PEN	TSI/BCH	Type	Service	Sample for Device Types
PEN	BCH	ISDN Trace	na[1]	Digital Trunks
PEN/Station number	na	Station Monitor	Voice	Anate and pure Optiset

[1] na = not applicable (the entry field is automatically locked)

Station/PEN	TSI/BCH	Type	Service	Sample for Device Types
PEN	TSI=1	Station Monitor	Voice	Optiset as master device on the PEN
PEN	TSI=2	Station Monitor	Voice	Optiset as slave device on the PEN
PEN	TSI of device	Station Monitor		Optiset with adapter (eg: ISDN Adapter)
Station Number	na	Station Monitor	Voice, Data, FAX	functional device
PEN	TSI=1 (Master)	Station Monitor		Keyset (Optiset as keyset) Bus device on SLMO
Station Number	na	Station Monitor	Voice, Data	
Station Number	na	Station Monitor		CMI (S0 point-to-point)
PEN	TSI of device	Station Monitor	Voice	Anate on symphony bus via TA (functional device)
Station Number	na	Station Monitor	Voice	Anate on symphony bus via TA (functional device)
PEN	BCH	Trunk Monitor	na	S1 trunk (NW_S1) as S2 trunks (30 B-Channels)
PEN	BCH	Trunk Monitor	na	S0 trunk (board)
PEN	BCH	Trunk Monitor	na	S2 trunk
PEN	na	Trunk Monitor	na	analog trunk

CMI (S0 point-to-point)

For CMI devices just CP (Call Processing) messages will be displayed.

3 Trunk Testing

3.1 General Information

On-demand facility tests - these tests facilitate testing between the OpenScape 4000 and the facility provider by providing standard transmission tests, such as sending and receiving test tones. The tests are:

- Bit Error Rate (BER) Test and Network-wide BER Test
- Echo Return Loss/Singing Return Loss (ERL/SRL) Test
- Send Signal Test
- Receive Signal Test
- Loopback Test

Further information about Boards for Transmission Test of Digital and Analog Trunks.

- Trunk Rolling - This feature is only available with US-specific boards. It enables you to exchange or roll trunk facilities on COT and DID trunk type boards (US specific boards for Rolling of Trunks). Once a trunk is rolled, you can observe the trunk tests to isolate the suspected trunk.

These tests provide information that supports diagnosis of analog and digital trunk problems. They provide local and remote service personnel integrated test tools that provide quantitative transmission measurements and reduce the need for external test equipment and on-site personnel. These tests do not provide PASS/FAIL criteria and are only run on demand.

- Trunk Tests are not simultaneously but only successively possible. Simultaneously testing a trunk and monitoring/ISDN tracing is possible.The connection establishment can last, dependent on test and board up to 12 seconds.Performing a RDS test with another OpenScape 4000 needs to insert an access code. The code the user inserts is *only valid for the remote PBX* - it has not any local effect. You can select any code *but the remote system must be adjusted to this code with ADD-WABE*.

When the BER test is in progress, clicking the Close button will NOT terminate the test. All other tests are terminated by clicking the Cancel button. The BER test continues running even if you log off your session. The BER Test, respectively the BER Test results are available in the next Session.

On-demand test messages:

The on-demand test may generate test message. The On-demand test messages Help Page provides definitions or suggested actions for each message.

On-demand test internal error messages:

Internal errors may terminate the on-demand test because of irregularities outside of known faults, or perhaps because of unusual timing conditions. Retest, or follow the advisory steps relative to the specific errors as listed in the On-demand RDS test internal error messages dialog box. If the test continues to fail, contact your next level of support.

US specific boards for Rolling of Trunks

US specific	TMC16	Q2485-X	tie trunk
	TMDID	Q2452-X	DID trunk
	TMANI	Q2327-X100	tie trunk

Boards for Transmission Test of Digital and Analog Trunks

US specific boards for transmission tests		TMDNH-MOS (ISDN) Q2192-X	TMDNH-BOS (CAS) Q2192-X	TMC16 analog Q2485-X	TMDID analog Q2452-X	TMEMUS analog Q2469-X	TMANI Q2327-X100
Send Signal Test	Interactive	YES	YES	YES	no	YES	YES
	Forced	no	YES	YES	YES	no	YES
Receive Signal Test	Interactive	YES	YES	YES	no	YES	YES
	Forced	no	YES	YES	YES	no	YES
Loopback Test	Interactive	YES	YES	no	no	YES	no
	Forced	no	no	no	no	no	no
ERL/SRL Test	Interactive	YES	YES	YES	no	YES	YES
	Forced	no	no	no	YES	no	no
BER Test	Interactive	YES	YES	no	no	no	no
	Forced	no	no	no	no	no	no
CTS Test		YES	no	no	no	no	no

IM boards for transmission tests		DIUN4 ISDN Q2195-X	DIUN2 CAS Q2196-X	DIUN2 ISDN Q2196-X	STMD ISDN Q2174-X	DIUC64 CAS Q2185-X	TM2LP analog Q2159-X130	TMEW2 analog Q2292-X100	TMANI-BRA Q2327-X182	TMANI-IM Q2327-X101

Send Signal Test	Inter-active	YES	YES	YES	YES	YES	YES	YES	YES	YES
	Forced	no	no	no	no	no	no	no	no	no
Receive Signal Test	Inter-active	YES	YES	YES	YES	YES	YES	YES	YES	YES
	Forced	no	no	no	no	no	no	no	no	no
Loopback Test	Inter-active	YES	YES	YES	YES	YES	no	YES	no	no
	Forced	no	no	no	no	no	no	no	no	no
ERL/SRL Test	Inter-active	YES	YES	YES	YES	YES	YES	YES	YES	YES
	Forced	no	no	no	no	no	no	no	no	no
BER Test	Inter-active	YES	YES	YES	YES	YES	no	no	no	no
	Forced	no	no	no	no	no	no	no	no	no
CTS Test		YES	no	YES	YES	no	no	no	no	no

On-demand test messages

Click test message for definition/suggested actions

Test completed.
SIUX RDS port not available, check SIUX.
Test termination busy.
Another test in progress, retry later.
SIUX out of service while test in progress.
Unsupported access code digits or PEN.
BER Test: Error rate exceeded test limit.
BER Test: Test signal cannot synchronize.
ERL/SRL Forced test: Aborted by user.
Trunk released by network.
Trunk specified by user is busy.
Trunk not available, check trunk status.
ERL/SRL Forced test: Input time expired.
Timeslot not available, retry later.

No start supervision.
No answer supervision.
BER Test: Aborted by Switch Restart.
Dynamic Overload.

Test completed.

The test is completed.

SIUX RDS port not available, check SIUX.

Check the status of the SIUX board for any abnormal state. May require resetting the SIUX board if it is stuck in an abnormal state. Retry test.

Contact the next level of support to check the function id value in the SIUX board configuration.

Test termination busy.

The test termination at the far end is unavailable due to a busy state. Retry test.

Another test in progress, retry later.

Another test is in progress so this test stopped. Retry later.

SIUX out of service while test in progress.

The SIUX board went out of service during testing. Retry later. May require resetting the SIUX board if it is stuck in an out of service state.

Unsupported access code digits or PEN.

The access code digits or PEN entered is not supported. Re-enter the correct number.

BER Test: Error rate exceeded test limit.

The error rate exceeded the test limit.

BER Test: Test signal cannot synchronize.

The test signal cannot synchronize during the test set up times so the BER test has been stopped.

ERL/SRL Forced test: Aborted by user.

The test stopped because the user discontinued the ERL/SRL test.

Trunk released by network.

The trunk was released at the far end.

Trunk specified by user is busy.

The near end trunk is busy. Retry test. May require monitor trunk for perm state indication.

Trunk not available, check trunk status.

Near end trunk is unavailable. Check the trunk status using EMML.

ERL/SRL Forced test: Input time expired.

The test stopped because the timer expired due to lack of input from user.

Timeslot not available, retry later.

The OpenScape 4000 is experiencing heavy traffic and there are not enough timeslots to process the test. The test has been stopped. Retry the test at a later time when the OpenScape 4000 is not experiencing heavy traffic.

No start supervision.

No start dial supervision is detected. Check for valid trunk configuration on the near end. Check for tip and ring or E&M leads open at the demarcation point.

No answer supervision.

No answer supervision detected. Check for valid trunk configuration on both near and far ends. Check for tip and ring and E&M leads open at the demarcation point. This message can also occur on specified analog trunks, because a wrong dial code has been sent to partner or the PEN of the outgoing trunk was incorrect. Some types of analog trunks just can not recognize the reason why a dial code does not lead to dial end (DAR). A digital trunk delivers more information trough its protocol, so the reason of an error is more detailed.

BER Test: Aborted by Switch Restart.

The Bit Error Rate test was stopped due to a switch restart. Any test results displayed are valid.

Dynamic Overload.

Dynamic overload occurred in the switch.

On-demand RDS test internal error messages

Click test error message for definition/suggested actions

Internal error: Unable to outpulse.
Internal error: Internal time expired.
Internal error: CP resource not available.
Internal error: SIUX got wrong parameters.
Internal error: SIUX got wrong command.
Internal error: SIUX RDS port busy.
Internal error: SIUX returns unknown error.
Internal error: SIUX LW not responding.

Internal error: Unable to outpulse.

Internal error reported by software. Retry the test. If the same test continues to generate the error, contact your next level of support.

Internal error: Internal time expired.

Internal error reported by software. Retry the test. If the same test continues to generate the error, contact your next level of support.

Internal error: CP resource not available.

Internal error reported by software. Retry the test. If the same test continues to generate the error, contact your next level of support.

Internal error: SIUX got wrong parameters.

Internal error reported by the SIUX board. Retry the test. If the same test continues to generate this error, check the SIUX board loadware status using EMML and reset the SIUX board if necessary. If the problem continues, contact your next level of support.

Internal error: SIUX got wrong command.

Internal error reported by the SIUX board. Retry the test. If the same test continues to generate this error, check the SIUX board loadware status using EMML and reset the SIUX board if necessary. If the problem continues, contact your next level of support.

Internal error: SIUX RDS port busy.

Internal error reported by the SIUX board. Retry the test. If the same test continues to generate this error, check the SIUX board loadware status using EMML and reset the SIUX board if necessary. If the problem continues, contact your next level of support.

Internal error: SIUX returns unknown error.

Internal error reported by the SIUX board. Retry the test. If the same test continues to generate this error, check the SIUX board loadware status using EMML and reset the SIUX board if necessary. If the problem continues, contact your next level of support.

Internal error: SIUX LW not responding.

Internal error reported by the SIUX board. Retry the test. If the same test continues to generate this error, check the SIUX board loadware status using EMML and reset the SIUX board if necessary. If the problem continues, contact your next level of support.

3.2 Bit Error Rate (BER) Test

- Before working with the feature you have to create a new session. To create a new session see RDS Session Management Page. To activate the BER Test click Bit Error Rate Test on the Navigation frame.
- The RTO Port Loopback test must be stopped before thr RDS trunk test is started, and then restarted when RDS is finished.

The BER Test performs a bit error rate test on a channel basis. It runs in interactive mode only.

In the upper third of the Control Page are text entry fields, single selection list boxes, check boxes, a combo box, and the 'Add CTS Route' Control Button. A table to display the network connection is located on the left handed side in the middle third. On the right handed side BER test results will be displayed. In the lower third a output window will display test messages. The test messages show the PEN of the tested digital trunk, the Bit Error Rate after the test, the echo delay time in milliseconds and the timestamp when the test has been stopped.

Only one BER Test can be active at each time. If no BER Test is in progress, the Stop button is disabled. If you run a BER Test, but log off from the system before the test is completed, you can retrieve the BER Test results by selecting BER Test from the navigation bar.

A inactivated Start button is to indicate that a BER Test is in progress. The test message box will also have information regarding the test. The BER Test can be stopped without entering the PEN.

When the BER test is in progress, clicking the Close button will NOT terminate the test. All other tests are terminated by clicking the Cancel button. The BER Test continues running even if you log off your session. The BER Test, respectively the BER Test results are available in the next session. If a user starts a new RDS session while a BER test is in progress, the RDS Job Overview Page displays to the user that a BER Test is running. The user can open the BER Test Control Page and allow the test to continue or can stop the test.

see Network-wide BER Test

see BER Test Reference

The BER Test performs a bit error rate test on a channel basis. This test is a problem isolation tool, not an initial span qualification measuring device and always runs at 64 Kbps (respectively at 56 Kbps in the US). These tests provide special functions that support the diagnosis of digital transmission problems.

Starting BER Test

1) Select BER Test from the navigation bar.

2) In the BER Test control page, enter the following:

- PEN number
- Mode (BER Test runs in interactive mode only: Interactive mode reference)
- Access Code (insert the DAR which represents the *loopback access code*)
- Duration (select 10 minutes, 30 minutes, 2 hours or 8 hours from the choice list)
- CBM Echo Cancelers (select None, 32 ms, 64 ms, 128 ms from the choice list)
- CBM A/M-Law Conversion (mark the checkbox for using CBM A/M-Law Conversion.)
- Echo Cancelers (mark the checkbox for using echo cancelers.)

3) Click the Start Button or press Enter.

The Message Output Display informs you about the state of the test.

NOTICE: You can run the BER test in the background, i.e. log off and the test will continue to run

At the end of the duration time the testing ends. To stop the testing before the end of the duration time, select the Stop button.

If you run a BER Test but log off from the system before the test is completed, you can retrieve the BER Test results by selecting BER Test from the Job Overview Page or from the navigation bar.

BER Test Control Page Buttons

Start	activates the test
Stop	stops or aborts the test
Close	When the BER test is in progress, clicking the Close button will NOT terminate the test.
Print	prints the test results
Clear	wipes out the test results, applicable for Network-wide BER Test
Add CTS Route	see Network-wide BER Test

Printing the BER Test results

For printing the BER Test data and test results a special print page will be used. Clicking the Print Button on the BER Test Control Page activates a new instance browser window. The results will be displayed in formatted Hypertext Markup Language (HTML) in the browser window.

With the Browser facilities (e.g. using the Printer icon or selecting from the menubar) you can send the HTML-File to the printer or alternatively save the file on the harddisk.

BER Test Reference

Test Operation:

When the test is started, the signal is outpulsed (up to 11 digits), answer supervision is checked (if applicable), busy detection is checked, echo canceler disabler tone is transmitted, and the test is run.

If you run a BER test result but log off from the system before the test is completed, you can retrieve the BER Test results by selecting BER under the Test menu item.

BER Test Example: Test Example for the BER Test in interactive mode

After a specified test period is ended, or if the Close button is pressed, the connection is released and the test measurement is reported in terms of bit error rate. The test is also canceled if the network releases the connection (e.g. shutdown).

NOTICE: If the test does not synchronize after 5 seconds, the SIUX board cancels the test and sends the message BER `Test: Test signal cannot synchronize`.

Once started, if the test encounters an excessive number of errors, the SIUX board stops the test and sends the message `BER Test: Error rate exceeded test limit`.

BER Test results:

The Test Result field displays the following test results:

BER	if errors occur, they will be expressed in exponential notation
Delay	Travel time (ms) for the Echo Path Delay
Time Stamp	Time stamp of test (hh:mm:ss 24 hour clock)

3.3 Network-wide BER Test

- The Network-wide BER Test will be used for establishing a network wide connection through a HiPath 4000/OpenScape 4000 Network with more than 2 switches. The feature works only with specific protocols. The connection must be established switch by switch.
- The RTO Port Loopback test must be stopped before thr RDS trunk test is started, and then restarted when RDS is finished.

Enter the PEN of the outgoing trunk from the source switch in the text entry field and than click the 'Add CTS Route' button. The connection to the specified switch will be established. The connections are listed in the middle frame. The table contains the node number of current switch (partner A), the PEN of the trunk leading to the next switch in the network and the node number of partner B. In case of failed connection setup, the reason will be displayed in the CTS Message frame at the bottom of the BER Test Control Page.

NOTICE: You have to connect two nodes within 10 seconds otherwise the complete connection *will be canceled!*

3.4 Echo Return Loss/Singing Return Loss (ERL/SRL) Test

Definition ERL/SRL

- Before working with the feature you have to create a new session. To create a new session see RDS Session Management Page. To activate the ERL/SRL Test click Echo Return Loss/Singing Return Loss Test on the Navigation frame.
- The RTO Port Loopback test must be stopped before thr RDS trunk test is started, and then restarted when RDS is finished.

The ERL/SRL Test measures the echo return loss and singing return loss of 4-wire to 2-wire transmission points. It runs in Forced or Interactive mode depending on the type of trunk.

- Forced mode reference
- Interactive mode reference

In the upper third of the Control Page a text entry field, a single selection list box, a combo box, and a checkbox are located. The middle third is an output frame displaying test input and test output data in tabular form. The test messages will be displayed in the table showing the PEN of the tested trunk, the ERL, SRL-lo,SRL-Hi, Echo Delay and the timestamp when the test message occures. In the lower third a output window will display test messages.

The ERL/SRL test runs differently for the following types of interfaces:

- ERL/SRL DID Trunk Test Reference
- ERL/SRL CO Trunk Test Reference
- ERL/SRL TIE Trunk Test Reference
- ERL/SRL OPS Trunk Test Reference

Starting the ERL/SRL Test:

1) From the RDS navigation bar, select Echo Return Loss/Singing Return Loss Test.

2) In the ERL/SRL Test control page, enter the following:

- PEN number
- Mode (interactive is set for CO, TIE and OPS; forced is set for DID)
- Access Code (insert the DAR which represents the *silence access code*)
- Echo Cancelers (checkbox marked or unmarked for DID trunks, unmarked for CO, TIE, and OPS trunks)

3) Click the Start button or press Enter.

At the end of the duration time the test stops automatically.

To end the testing before the end of the duration time, select the Stop or Cancel button, which are only activated when the test is running.

ERL/SRL Test Control Page Buttons

Start	activates the test
Stop	stops or aborts the test
Cancel	terminates the test
Print	prints the test results
Clear	wipes out the test results.

Printing the ERL/SRL Test results

For printing the ERL/SRL Test data and test results a special print page will be used. Clicking the Print Button on the ERL/SRL Test Control Page activates a new instance browser window. The results will be displayed in formatted Hypertext Markup Language (HTML) in the browser window.

With the Browser facilities (e.g. using the Printer icon or selecting from the menubar) you can send the HTML-File to the printer or alternatively save the file on the harddisk.

Interactive mode reference

Interactive mode generates a trunk test call to a test termination in the network from which the test signal is transmitted or looped back.

The interactive mode is generally used when the trunk is completely operable.

Running an interactive mode test provides the following:

- Trunk is seized
- Network signaling is performed and checked
- Digits are outpulsed to the network
- Test signals are sent (if applicable to the test)
- Test signals are measured and reported (if applicable to the test)
- Trunk is disconnected when the test is completed

Forced mode reference

The Forced mode is only available for the US version. Forced mode does not cause a trunk test call to be made.

It puts the trunk out of service, forces a connection between the trunk channel to be tested and the SIUX board.

The forced mode is generally used when the trunk is inoperable, or a dialable test termination is not available.

Running a forced mode test provides the following:

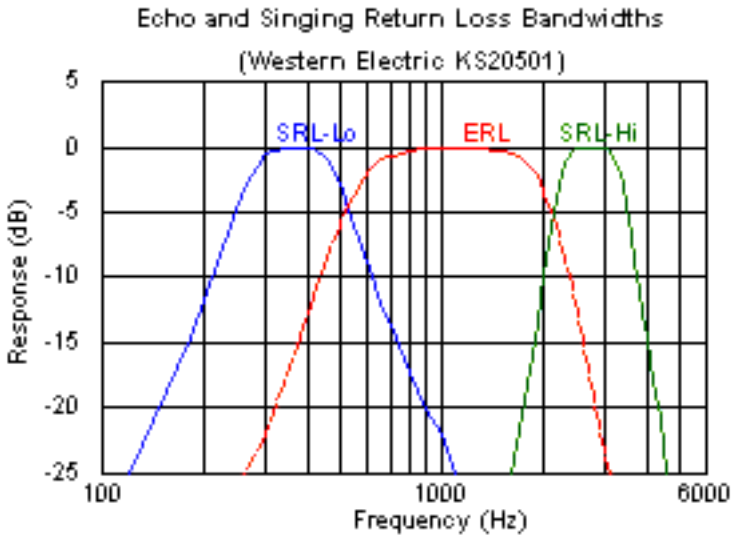
1) Trunk is taken out of service

- Trunk is seized
- Test signals are sent (if applicable to the test)
- Tone signals are measured and reported (if applicable to the test)
- Trunk is disconnected when the timer expires or when you stop the test

Definition ERL/SRL

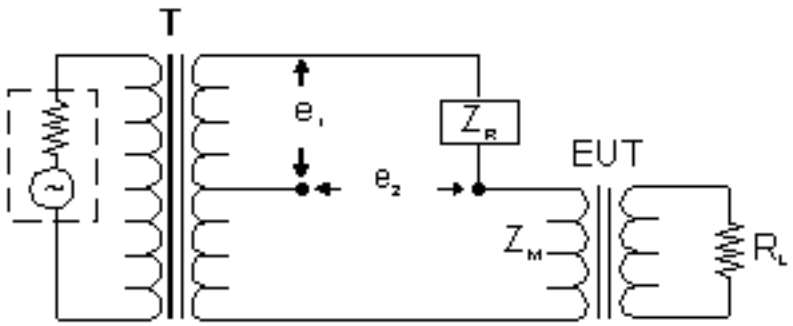
Echo Return Loss

Since return loss figures may be highly dependent on frequency another method for specifying voice band return loss performance is often used. For audible echoes, the frequencies between about 560 to 2000 hertz are considered in one (multi-frequency) return loss measurement. Echo return loss, or ERL as it is known, is measured by passing a white noise source through a passband shaping filter and them through a comparison bridge circuit with the circuit under test in one of its arms. The residual signal remaining after the bridge is nulled is indicated on a meter (see Figure) as echo return loss.



Singing Return Loss

Singing return loss is the return loss in the bands of frequencies both below and above the ERL (echo return loss) band. The bands Lo and Hi, measured separately, give an indication of the system's tendency to oscillate or "sing". SRL-Lo is measured like ERL, except the energy resides mainly in the band from 260 to 500 hertz. SRL-Hi is a counterpart to SRL-Lo in the 2200 to 2400 hertz band.Test sets for measuring ERL, SRL-Lo and SRL-Hi are more complex than single frequency bridges due to the noise shaping circuits employed, but they provide with a single number a more comprehensive return loss measurement. See Figure.



ERL/SRL DID Trunk Test Reference

Description

The ERL/SRL test measures the ERL, SRL-Lo, and SRL-Hi of 4-wire to 2-wire transmission points. Since outgoing calls are not possible on DID trunks, only forced mode is supported.

When invoked, it:

- Checks to see that the channel is idle
- Sets up a connection between the SIUX board and the DID trunk
- Prompts the user to provide a silent termination from the central office
- Runs return loss tests

The return loss guidelines for DID trunks are:

ERL	18dB
SRL-Lo	10dB
SRL-Hi	10dB

If test results do not meet or exceed these guidelines, modify the trunk balance network and retest.

Signaling Test Example for the ERL/SRL test in forced (DID) mode

Test Operation:

The ERL/SRL test run in the forced mode is for DID trunks only.

A connection is made between the SIUX board and the specified trunk channel, and a message appears on the test screen asking that the connection be properly terminated from the central office.

The remote (CO) side provides silent termination.

You have 10 minutes to confirm whether the test measurements should be made by clicking the OK button.

If you do not confirm within 10 minutes, the system releases the connection and cancels the test. A message is received stating that the test was canceled due to a time-out.

If a response is entered by clicking the OK button the test measurements are made, the connection is released, and the results are reported in decibels (dB).

ERL/SRL Test Results:

The Test Results scrollable field displays the following test results:

PEN Number	PEN of the trunk under test
ERL	Echo Return Loss (db)
SRL-Lo	Singing Return Loss - low (db)
SRL-Hi	Singing Return Loss - high (db)
Echo Delay Time	Travel time (ms) for the Echo Path Delay
Time	Time stamp of test (hh:mm:ss 24 hour clock)

ERL/SRL CO Trunk Test Reference

Description

The ERL/SRL test measures the ERL, SRL-Lo, and SRL-Hi of 4-wire to 2-wire transmission points.

When invoked, it:

- Checks to see that the trunk is idle
- Seizes the trunk
- Checks start supervision (if applicable to the test)
- Outpulses a test termination access number at the CO
- Sets up a connection between the SIUX board and the CO trunk
- Runs return loss tests

The return loss values for CO trunks are:

ERL	18dB
SRL-Lo	10dB
SRL-Hi	10dB

If test results do not meet or exceed these guidelines, modify the trunk balance network and retest.

Signaling Test Example for the ERL/SRL Test in interactive (CO) mode

Test Operation:

When the test is started, the specified trunk is seized, start dial supervision is checked (if applicable), the specified digit string is outpulsed (up to 11 digits), and busy detection is checked, test signals are transmitted, test measurements are made, and the connection is released.

The test results are reported in decibels. If the network releases the connection before the test completes, the test is canceled.

CO Test results:

The Test Results scrollable field displays the following test results:

PEN Number	PEN of the trunk under test
ERL	Echo Return Loss (db)
SRL-Lo	Singing Return Loss - low (db)
SRL-Hi	Singing Return Loss - high (db)
Echo Delay Time	Travel time (ms) for the Echo Path Delay
Time	Time stamp of test (hh:mm:ss 24 hour clock)

ERL/SRL TIE Trunk Test Reference

Description

The ERL/SRL test measures the ERL, SRL-Lo, and SRL-Hi of 4-wire to 2-wire transmission points.

The purpose of running the test over a tie trunk is to measure the return loss of a four-wire to two-wire hybrid in a distant switch, e.g., a CO Trunk or a Station.

When invoked, it:

- Checks to see that the channel is idle
- Seizes the trunk
- Checks start supervision (if applicable to the test)
- Outpulses a test termination access number at the distant switch (extension number, CO Trunk access + CO Silent Termination)
- Checks answer supervision
- Sets up a connection between the SIUX board and the trunk channel
- Runs return loss tests

The return loss guidelines for Stations are:

ERL	12dB
SRL-Lo	8dB
SRL-Hi	8dB

If test results do not meet or exceed these guidelines, check the station cable impedance and retest.

The return loss guidelines CO trunks are:

ERL	18dB
SRL-Lo	10dB
SRL-Hi	10dB

If test results do not meet or exceed these guidelines, modify the trunk balance network and retest.

Test Example for ERL/SRL Test - TIE to Distant Station

TIE Test results:

The Test Results scrollable field displays the following test results:

PEN Number	PEN of the trunk under test
ERL	Echo Return Loss (db)
SRL-Lo	Singing Return Loss - low (db)
SRL-Hi	Singing Return Loss - high (db)
Echo Delay Time	Travel time (ms) for the Echo Path Delay
Time	Time stamp of test (hh:mm:ss 24 hour clock)

ERL/SRL OPS Trunk Test Reference

Description

The ERL/SRL test OPS is used on off-premises stations.

When the test is started, the specified extension is seized, ringing is sent to the station, and a connection is made between the SIUX board and the specified OPS channel.

The off-premises extension must be answered in order to obtain a valid test result.

When answered (off-hook), test measurements are made and the connection is released.

The return loss values for OPS trunks are:

ERL	12dB
SRL-Lo	8dB
SRL-Hi	8dB

If test results do not meet or exceed these guidelines, modify the trunk balance network and retest.

Test Example for ERL/SRL Test - analog OPS

Test Example for ERL/SRL Test - digital OPS

OPS Test results:

The Test Results scrollable field displays the following test results:

PEN Number	PEN of the trunk under test
ERL	Echo Return Loss (db)
SRL-Lo	Singing Return Loss - low (db)
SRL-Hi	Singing Return Loss - high (db)
Echo Delay Time	Travel time (ms) for the Echo Path Delay
Time	Time stamp of test (hh:mm:ss 24 hour clock)

3.5 Send Signal Test

- Before working with the feature you have to create a new session. To create a new session see RDS Session Management Page. To activate the Send Signal Test click Send Signal Test on the Navigation Bar.
- The RTO Port Loopback test must be stopped before thr RDS trunk test is started, and then restarted when RDS is finished.

The Send Signal Test transmits test tones to other switches or remote service personnel. It runs in either forced or interactive mode.

For further information change to Forced mode reference or Interactive mode reference

The Test Control Page contains two frames. The upper frame contains the text entry and control fields and buttons. The Send Signal Test Control page uses a text entry field, single selection list boxes, and a combo box. In the lower half the test message (test sent) is displayed in the Test Message frame.

see Send Signal Test Reference

Starting the Send Signal Test

Start the Send Signal Test in interactive mode as follows: From the RDS navigation bar, select Send Signal Test. The Send Signal Test Control Page appears.

1) In the PEN number field, enter the PEN number of the trunk to be tested.
2) Mode (select Forced or Interactive from the list box)
3) Access Code (when interactive mode is selected, insert the DAR which represents the *silence access code*).
4) In the Duration field, select the desired test duration from the listbox (10 minutes, 30 minutes, 2 hours or 8 hours).
5) In the Frequency field the system default is 1004Hz.
6) In the Power field, select the desired transmit level from the list box (-3dBm0, -16dBm0).
7) Click the Start Button or press Enter.

Send Signal Test Control Page Buttons

Start	Activates the test
Stop	Stops or aborts the test
Cancel	When the Send Signal Test is in progress, clicking the Car terminate the test.

The Test Results scrollable field displays the following Send Signal Test Results:

PEN Number	PEN of the trunk under test
Time (24 hr. clock)	time stamp of when the test ran in the format hh:mm:ss

Power - Send Signal Test

The power of the test tone received. Choose -3dBm0 or -13dBm0. See also decibels relative to one milliwatt (dBm), dBm0.

Send Signal Test Reference

Description

The Send Signal Test transmits test tones to other switches or remote service personnel. It runs in either forced or interactive mode.

When forced mode is invoked, the test:

- Seizes the trunk
- Sends the test tone (frequency 1004Hz)

When interactive mode is invoked, the test:

- Seizes the trunk
- Checks start supervision (if applicable to the test)
- Outpulses a test termination access number
- Checks answer supervision (if applicable to the test)
- Sends the frequency and level of the tone

Test Operation - Forced Mode

When the test is started, the trunk is put in the testing state and the trunk is seized. After the trunk is successfully seized, network signaling is ignored.

A connection is made between the SIUX board and the specified trunk channel.

The SIUX board transmits the specified signal. The test continues until you enter the Cancel command or the test duration is exceeded.

Test Operation - Interactive Mode

When the test is started, the specified trunk is seized, start dial supervision is checked (if applicable), the specified digit string is outpulsed, answer supervision is checked (if applicable), and busy detection is checked. The SIUX board transmits the specified signal. The test stops if the network releases the connection.

Further Information:

Test Example for Transmit Level for Send Signal Test on Trunks

Send Signal Test Example

3.6 Receive Signal Test

- Before working with the feature the user has to create a new session. To create a new session see RDS Session Management Page. To activate the Receive Signal Test click Receive Signal Test on the Navigation bar.
- The RTO Port Loopback test must be stopped before thr RDS trunk test is started, and then restarted when RDS is finished.

The Receive Signal Test measures incoming test tones from other switches or remote service personnel. It runs in Forced or Interactive mode depending on the type of trunk.

See further information: Forced mode reference or Interactive mode reference

In the upper third of the Test Control Page a text entry field, single selection list boxes, a combo box, and a checkbox are located. The middle third is an output frame displaying test input and test output data in tabular form. The test messages will be displayed in the table of the middle frame showing the PEN of the tested trunk, the Frequency in Hz which has been received, the Power in dBm0, and the timestamp for the time the test message occures. In the lower third Control Buttons are located and a output window will display test messages during the test.

see Receive Signal Test Reference

Starting the Receive Signal Test

1) From the RDS navigation bar, select Receive Signal Test

2) In the Receive Signal Test Control Page, enter the following:

- PEN number
- Mode (Select Forced or Interactive from the list box)
- Access Code (when interactive mode is selected, insert the DAR which represents the *milliwatt access code*)
- Duration (select 10 minutes, 30 minutes, 2 hours, or 8 hours from the list box)
- Measuring Rate (select 1 Second or 5 Second from the list box)Busy Tone Detection (as default the checkbox is marked, that means busy tone detection is switched on)

3) Click the Start button or press Enter.

To end the testing before the end of the duration time, select the Stop or Cancel button, which are only activated when the test is running.

Test Control Page Buttons

Start	Activates the test
Stop	Stops or aborts the test
Cancel	The test is terminated by clicking the Cancel button
Print	prints the test results
Clear	wipes out the test results.

Printing the Receive Signal Test results

For printing the Receive Signal Test data and test results a special print page will be used. Clicking the Print Button on the Receive Signal Test Control Page activates a new instance browser window. The results will be displayed in formatted Hypertext Markup Language (HTML) in the browser window.

With the Browser facilities (e.g. using the Printer icon or selecting from the menubar) you can send the HTML-File to the printer or alternatively save the file on the harddisk.

Receive Signal Test Reference

Description

The Receive Signal Test is capable of measuring test tones from another OpenScape 4000. The test is done by the receiving SIUX board but reflects the value at the DMARC point.

It runs in either forced or interactive mode.

When forced mode is invoked, the test:

- Seizes the trunk
- Attaches the trunk to the SIUX board
- Measures incoming tone signal frequency and power

When interactive mode is invoked, the test:

- Seizes the trunk
- Checks start supervision (if applicable to the test)
- Outpulses a test termination access number
- Checks answer supervision (if applicable to the test)
- Checks busy tone
- Measures the frequency and level of the test tone

Test Example for Receive Signal Test

Test Operation - Forced Mode

When the test is invoked, the trunk is put in the testing state and is seized. After the trunk is successfully seized, subsequent network signaling is ignored.

A connection is made between the SIUX board and the specified trunk channel. The SIUX board measures the signal frequency in hertz (Hz), and the power in decibels relative to one milliwatt (dBm).

This is the same measurement that standard transmission test sets provide. The measurement is updated to the screen by the user-defined measuring rate, or when power levels change from the previous measurement by more than 1 dBm.

The test continues until you click the Stop or Cancel button or the test duration is exceeded. The Cancel button stops any active test functions of this dialog box, exits the current dialog box and returns to the previous dialog box

Test Operation - Interactive Mode

When the test is started, the specified trunk is seized, start dial supervision is checked (if applicable), the specified digit string is outpulsed, answer supervision is checked (if applicable). If no answer supervision is received, RDS checks for a busy signal (CO trunks only). With a connection made between the SIUX board and the specified trunk channel, the SIUX board measures the signal frequency in hertz and the power in dBm.

The test continues until you enter the Cancel command or the test duration is exceeded. The Cancel button stops any active test functions of this dialog box, exits the current dialog box and returns to the previous dialog box

Receive Signal Test Results:

The test messages will be displayed in the table of the middle frame showing the PEN of the tested trunk, the Frequency in Hz which has been received, the Power in dBm and the timestamp when the test message occurs.

The Test Results scrollable field displays the following test results:

PEN Number	PEN of the trunk under test
Frequency	Test tone frequency (Hz) usually within the voice range
Power	Power (dBm0) of the test tone received
Time	Time stamp of test (hh:mm:ss 24 hour clock)

The bottom frame displays output messages during the test.

3.7 Loopback Test

- Before working with the feature the user has to create a new session. To create a new session see RDS Session Management Page. To activate the RDS Loopback Test click Loopback Test on the Navigation bar.
- The RTO Port Loopback test must be stopped before thr RDS trunk test is started, and then restarted when RDS is finished.

The Loopback Test measures round-trip transmission loss over anyone trunk circuit. It runs only in interactive mode.

In the upper third of the Control Page a text entry field, a single selection list box, a combo box, and a checkbox are located. The middle third is an output frame displaying test input and test output data in tabular form. The test messages will be displayed in the table of the middle frame showing the PEN of the tested trunk, the sent and received Frequency in Hz which has been received, the sent and received Power in dB, the Noise Level in dB, and the timestamp for the time the test message occures. In the lower third Control Buttons are located and the output window will display test messages during the test.

Loopback Test Reference

Starting the Loopback Test:

1) From the RDS navigation bar, select Loopback Test
2) From the Loopback Test Control Window, enter the following:

- PEN number
- Mode (Select Interactive from the drop-down menu)
- Access Code (for interactive mode insert the DAR which represents the *loopback access code*)
- Echo Cancelers (mark the checkbox for using echo cancelers.)

3) Click the Start button or press Enter.

At the end of the duration time the testing automatically stops.

To end the testing before the end of the duration time, select the Stop or Cancel button, which are only activated when the test is running.

Test Control Page Buttons

Start	Activates the test.
Stop	Stops or aborts the test.
Cancel	Terminates the test - the Loopback Test Control Window will be closed.
Print	Opens a new browser instance window, allows to print the test results.
Clear	Wipes out the test results.

Printing the Loopback Test results

For printing the Loopback Test data and test results a special print page will be used. Clicking the Print Button on the Loopback Test Control Page activates

a new instance browser window. The results will be displayed in formatted Hypertext Markup Language (HTML) in the browser window.

With the Browser facilities (e.g. using the Printer icon or selecting from the menubar) you can send the HTML-File to the printer or alternatively save the file on the harddisk.

Loopback Test Reference

Description

The Loopback Test measures round-trip transmission loss over anyone trunk circuit. It runs in interactive mode only.

Test Operation

When the test is started, the specified trunk is seized, start dial supervision is checked (if applicable), the specified digit string is outpulsed (up to 11 digits), answer supervision is checked (if applicable), and busy detection is checked.

The tone is sent out and then measured for frequency and power level when it is received back from the far end. This test allows 1 second of round-trip delay to accommodate a long distance trunk.

Test Example for Loopback Test

Loopback Test Results:

The Test Results scrollable field displays the following test results:

PEN Number	PEN of the trunk under test
Send Frequency	Test tone frequency (Hz) used for the send signal
Send Power	Power (dBm0) of the transmitted test tone
Receive Frequency	Test tone frequency (Hz) used for the received signal
Receive Power	Power (dBm0) of the received test tone
Noise Level	Idle channel noise (dBRN)
Time	Time stamp of test (hh:mm:ss 24 hour clock)

3.8 Trunk Rolling

- The feature Trunk Rolling is only available in the US version. Before working with the feature you have to create a new session. To create a new session see RDS Session Management Page. To activate Trunk Rolling click Trunk Rolling on the Navigation frame.
- The RTO Port Loopback test must be stopped before thr RDS trunk test is started, and then restarted when RDS is finished.

This feature enables you to exchange trunk facilities on the TMCOT, TMC16, TMDID and TMANI boards.

How to activate a Trunk Roll (Rolling a pair of trunks)

How to deactivate a Trunk Roll (Unrolling a pair of trunks)

Once a roll is performed, RDS trunk tests can be run to determine if a fault follows the trunk facility. Trunks can be left in a rolled state to observe live trunk traffic. Multiple diagnostic commands are required to start this feature. Trunks must be in the idle state in order to initiate the trunk roll. RDS prompts you to hard block a trunk if it is in use when you request the roll.

The following features are accessible using the trunk rolling function:

- Roll - activates rolling of selected trunk pairs (see Rolling a pair of trunks)
- Unroll - activates unrolling of selected rolled trunk pairs (see Unrolling a pair of trunks)
- List roll - displays a rolled trunks listing

Rolling is maintained across soft and hard restarts.

Test Control Page Buttons

Roll	invoke rolling of trunks
Unroll	invoke unrolling of selected rolled trunks
Cancel	All rolled trunks, displayed in the list will be unrolled.
Proceed	If the trunks specified are busy, a message informs the user to either proceed (the call in progress is cut-off, the user has to wait) or cancel.
Print	Opens a new browser instance window, allows to print the test results.

Printing the Trunk Rolling results

For printing the Trunk Rolling test data and test results a special print page will be used. Clicking the Print Button on the Trunk Rolling Control Page activates a new instance browser window. The results will be displayed in formatted Hypertext Markup Language (HTML) in the browser window.

With the Browser facilities (e.g. using the Printer icon or selecting from the menubar) you can send the HTML-File to the printer or alternatively save the file on the harddisk.

3.8.1 Rolling a pair of trunks

The user inputs the paired trunks and click on Roll to start the roll function. Completion of rolled trunks are displayed in the result table in the middle frame and the message of completion in the test message page. To unroll, the user simply click the 'Unroll' button on the paired trunks listed in the table in the middle frame or types in the PEN of a rolled trunk and clicks the 'Unroll' button in the Control frame. Upon completion of unroll, the paired trunks is removed from the result table and message of unrolled completed is displayed in the test message frame. The rolled trunks will be displayed in the table of the middle frame showing the PEN of the rolled trunk, the paired PEN, the timestamp when the trunk rolling was performed and the 'Action' column to unroll the corresponding pair of trunks.

Roll a pair of trunks as follows:

1) From the RDS navigation bar, select Trunk Rolling.
2) In the Trunk Rolling control page, enter the PEN number of a trunk to be rolled in the text entry field.
3) Select the Roll button or press Enter to start trunk rolling.
4) If the trunks specified are busy, a dialog box displays asking you to either proceed (the call in progress is cut-off) or cancel.
5) If the trunks specified are not of an appropriate trunk type a box displays stating that the board type is unrollable. Press the OK button to continue.

NOTICE: When the trunk rolling is completed, the dialog box is updated to reflect the PEN numbers of the trunk pair rolled and the message field is reflected that the roll of the trunks is complete

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6) Select Test from the RDS navigation bar to perform any of the RDS trunk tests or select Monitoring to monitor trunk activity.
7) When the test or monitor session finishes, deactivate the trunk roll.

At the end of the duration time the testing ends. To terminate the testing before the end of the duration time, select the Stop button, which is only activated when the test is running

3.8.2 Unrolling a pair of trunks

Unroll a pair of trunks as follows:

1) From the RDS navigation bar, select Trunk Rolling.
2) From the Trunk Rolling Control Window, double-click a pair of trunks from the list or input a PEN number and press Enter.

NOTICE: The PEN number of the trunk pairs to be unrolled is displayed in the text box. When trunk unrolling is completed the dialog box is updated to reflect only the trunk pairs still rolled

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3) To exit the Trunk Rolling Control page click the Close window button.

RTO Port Loopback test

The RDS port loopback test is started from RTO routinely every hour from 5 a.m. to midnight. The RDS port is seized by RTO and some frequencies are looped back by the TDS part of the SIU. Then the result is sent to RTO. If a RDS trunk facility test would be started at the same time when the RDS port is seized for the RTO port loopback test, the RDS trunk test would be rejected. This case is seldom. If you plan to carry out RDS Trunk tests for a few hours, it would be recommendable to stop the routine RDS port loopback test for that time. This can be done using the following commands of the AMO FUNSU (which is used for the control of the RTO routine tests):

1) To stop the RTO RDS port loopback test:

```
SET-FUNSU:UNIT=SWU,COMPLEX=RJ,RJ=SIUTDSA,RJFREQ=0;
SET-FUNSU:UNIT=SWU,COMPLEX=RJ,RJ=SIUPTDSA,RJFREQ=0;
EXEC-FUNSU:SWU;
```

2) To start the RTO RDS port loopback test, when it was stopped:

```
SET-FUNSU:UNIT=SWU,COMPLEX=RJ,RJ=SIUTDSA,RJFREQ=1;
SET-FUNSU:UNIT=SWU,COMPLEX=RJ,RJ=SIUPTDSA,RJFREQ=1;
EXEC-FUNSU:SWU;
```

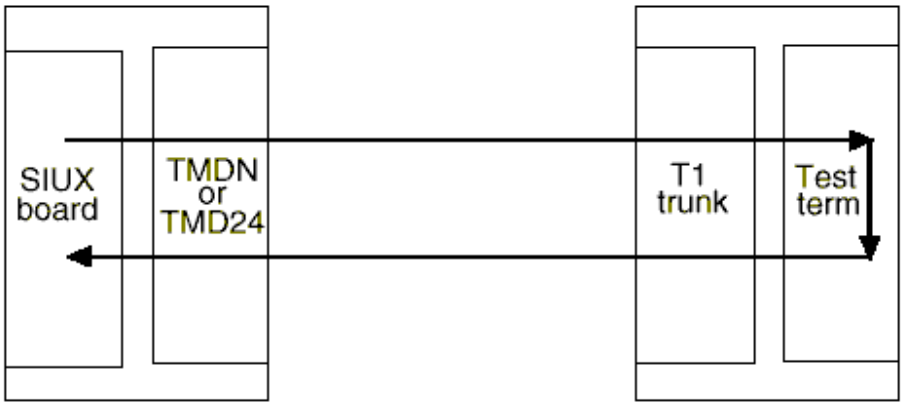
On the other hand, when the RDS port is seized for a trunk facility test the RDS port cannot be used by RTO for the port loopback test. Therefore this RTO test cannot be carried out. This is not considered as an error. An hour later there is a new attempt to start this RTO test.

4 Examples

This section shows some test arrangements.

- BER Test Example
- ERL/SRL Test Example:
  - Signaling Test Example for the ERL/SRL Test in interactive (CO) mode
  - Test Example for ERL/SRL Test - TIE to Distant Station
  - Test Example for ERL/SRL Test - analog OPS
  - Test Example for ERL/SRL Test - digital OPS
- Send Signal Test Example
- Test Example for Transmit Level for Send Signal Test on Trunks
- Test Example for Receive Signal Test
- Test Example for Loopback Test

4.1 BER Test Example



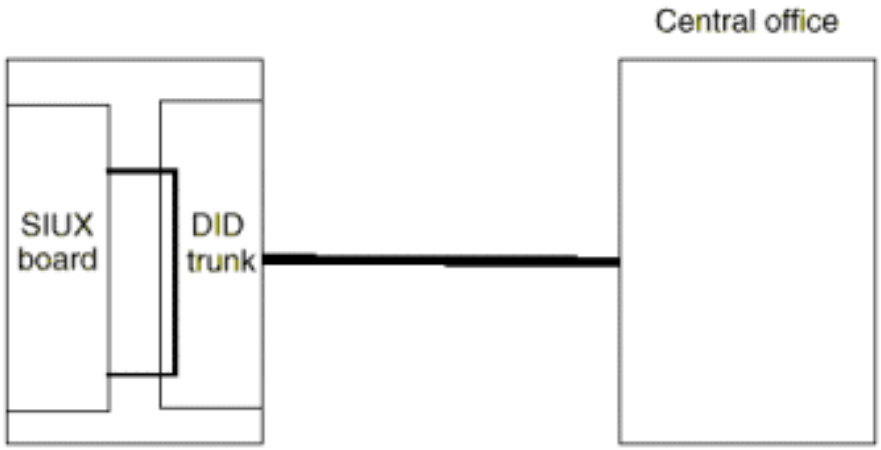
Test Example for the BER Test in interactive mode

BER Test Reference

4.2 ERL/SRL Test Example

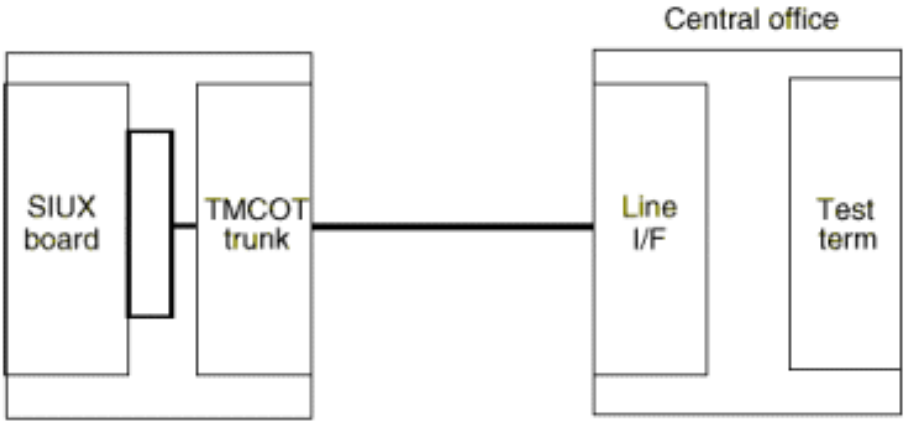
- Signaling Test Example for the ERL/SRL Test in interactive (CO) mode
- Test Example for ERL/SRL Test - TIE to Distant Station
- Test Example for ERL/SRL Test - analog OPS
- Test Example for ERL/SRL Test - digital OPS

4.2.1 Signaling Test Example for the ERL/SRL test in forced (DID) mode



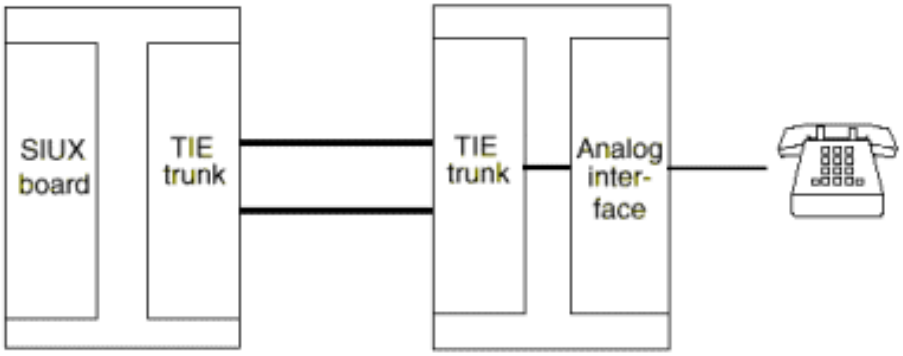
ERL/SRL DID Trunk Test Reference

4.2.2 Signaling Test Example for the ERL/SRL Test in interactive (CO) mode



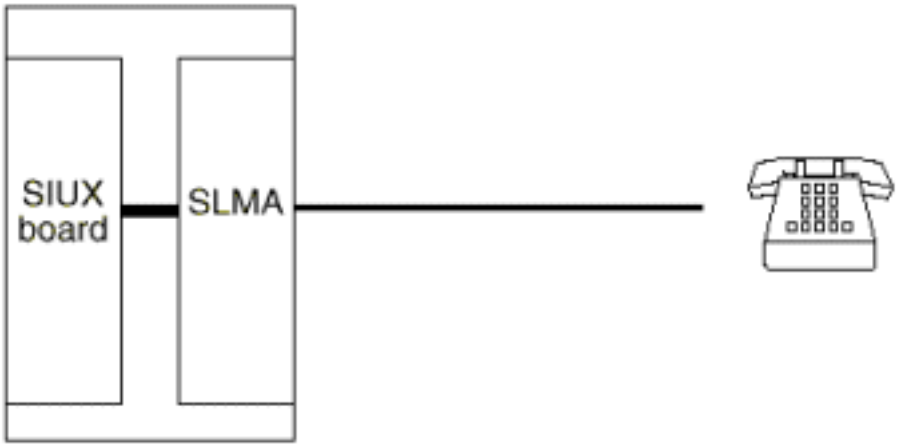
ERL/SRL CO Trunk Test Reference

4.2.3 Test Example for ERL/SRL Test - TIE to Distant Station



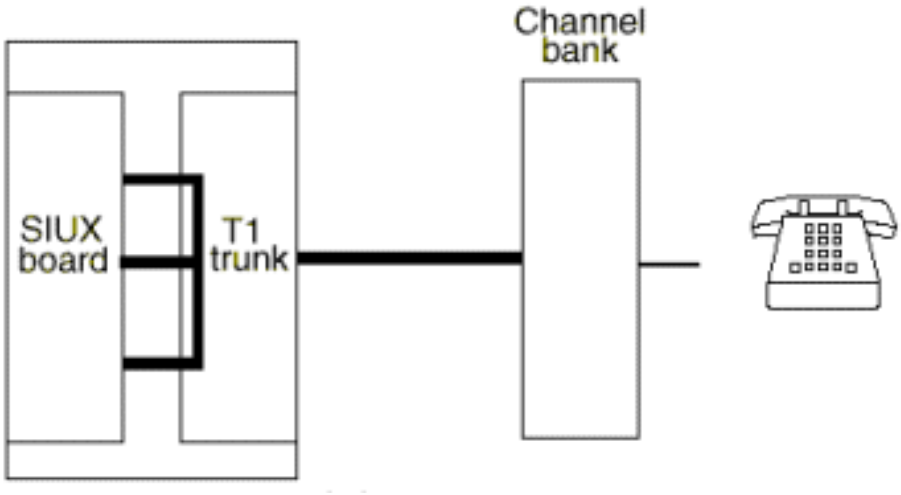
ERL/SRL TIE Trunk Test Reference

4.2.4 Test Example for ERL/SRL Test - analog OPS



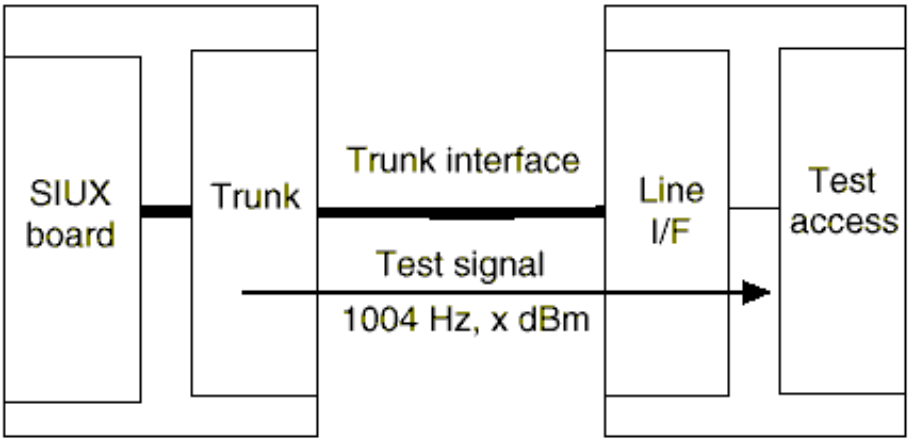
ERL/SRL OPS Trunk Test Reference

4.2.5 Test Example for ERL/SRL Test - digital OPS



ERL/SRL OPS Trunk Test Reference

4.3 Send Signal Test Example



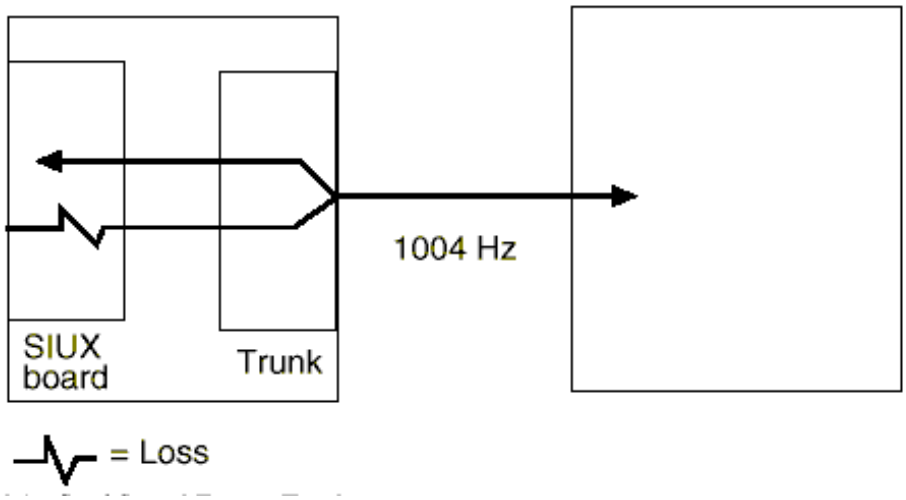
Test Example for Send Signal Test - Forced and Interactive Modes

Note: x is either -3dBm or -16 dBm depending on what was sent by the SIUX board.

Send Signal Test Reference

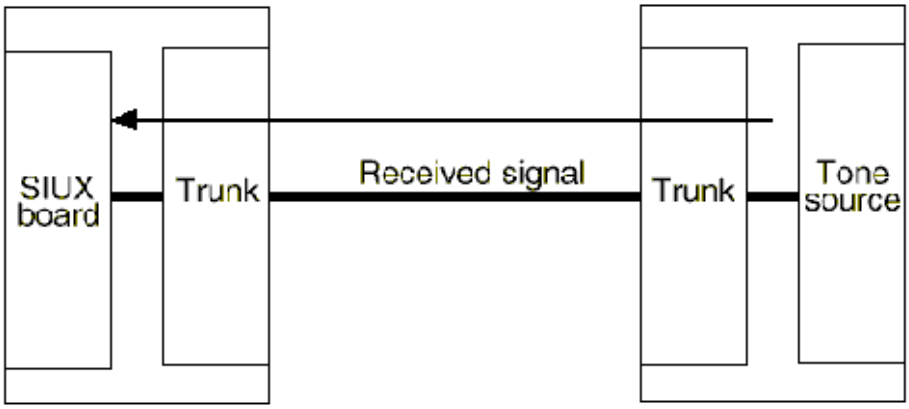
4.4 Test Example for Transmit Level for Send Signal Test on Trunks

The figure shows the transmission loss allocation for the Send Signal test on analog or digital ties and the level at which the test signal is transmitted out of the OpenScape 4000.



Send Signal Test Reference

4.5 Test Example for Receive Signal Test

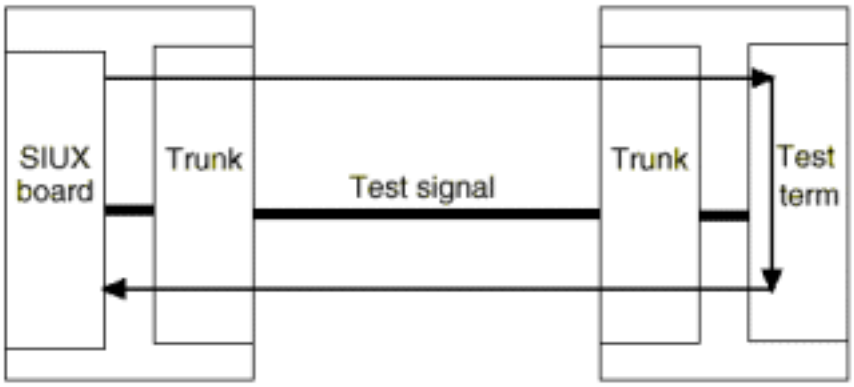


Test Example for Receive Signal Test - Forced and Interactive Modes

Receive Signal Test Reference

4.6 Test Example for Loopback Test

Examples



Loopback Test Reference

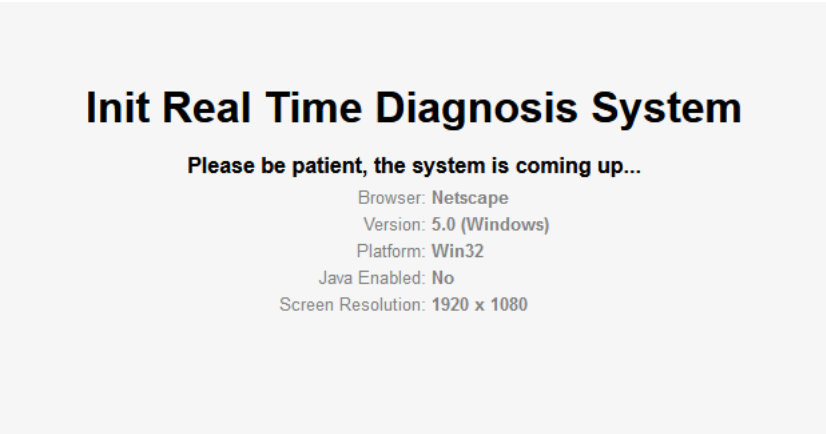
5 Step-by-Step

This chapter will show you step-by-step the handling with the RDS system. Monitoring and ISDN Tracing is shown detailed. The Testing is exemplary described by the easy-to-use Receive Signal Test, the BER Test and the Network-wide BER Test.

With descriptions and screenshots of the GUI, examples and comprehensive explanations for the essential settings you will learn how to use RDS efficiently.

5.1 Starting RDS

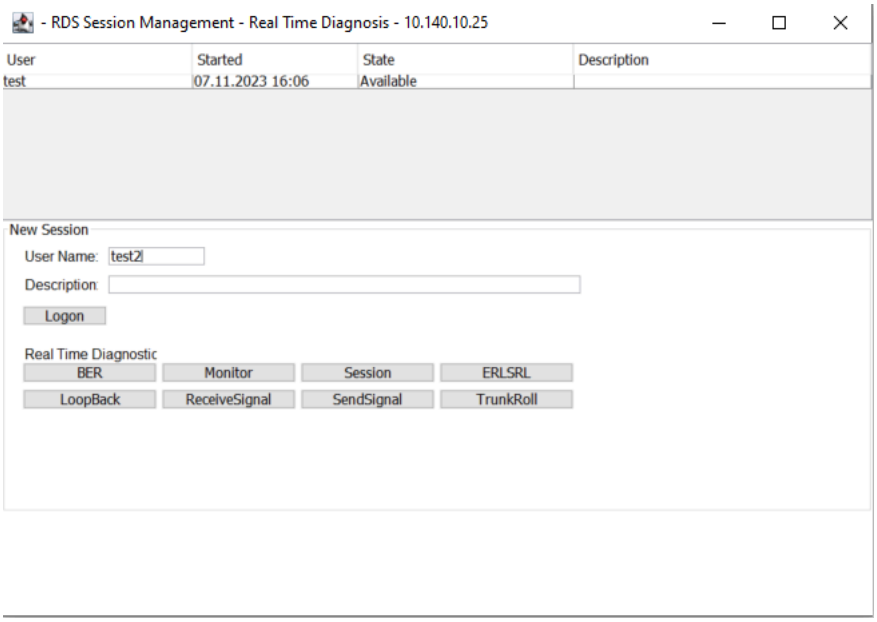
After calling up the Real Time Diagnosis System the Startup-screen appears.



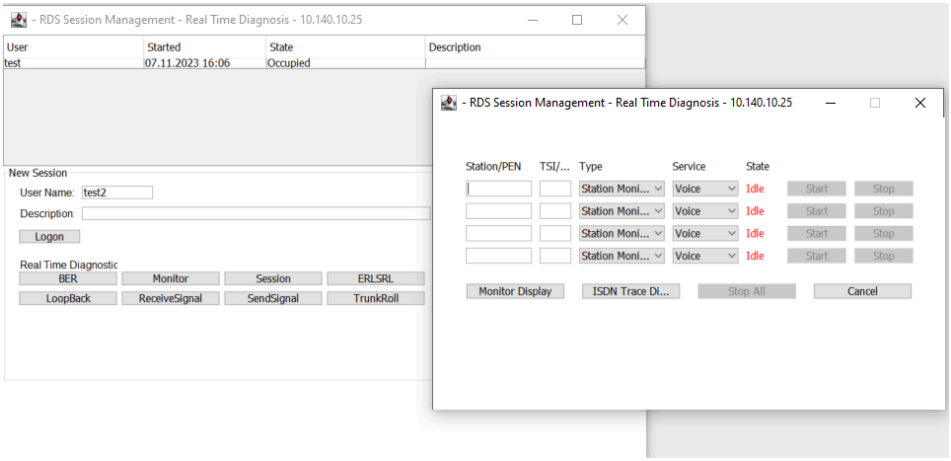
Before working with RDS you have to create a new session. Insert user name and a short description to give information to other users.

Currently the system allows only one user a time.

By clicking the button **Logon** the form is sent to the system.

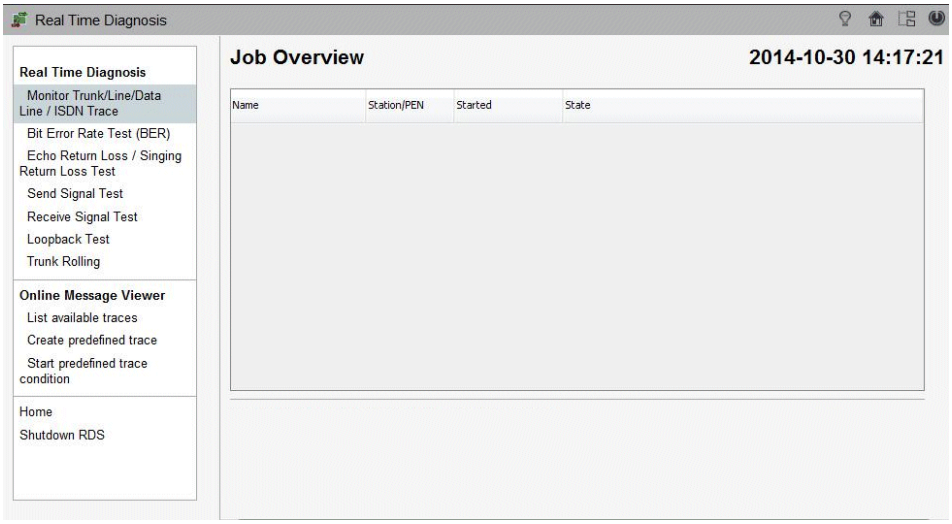


RDS reloads the status page in the browser. The created session is displayed in the table. You can start monitoring and testing.



Double-clicking the user session leads you to the Job Overview page.

Currently activated tests and traces will be displayed in the overview. In this example not any test is activated.



The RDS Navigation Bar, the left-hand menu bar, offers the hyperlinks to the RDS features.

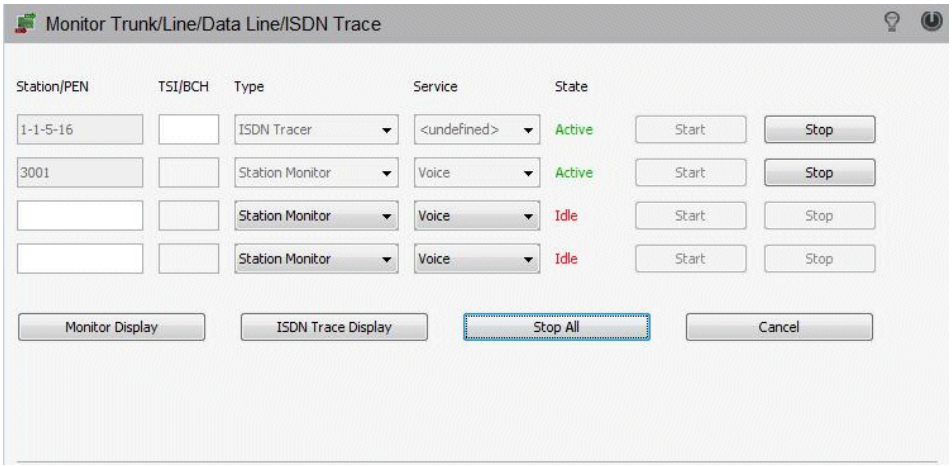
5.2 Monitor Trunk/Line/Data Line and ISDN Trace

Monitor Trunk Line Data Line allows viewing the call processing and device handler events as they occur. Watch what dialing and how the switch is reacting, which numbers are outpulsed etc. This feature allows you to understand complex call scenarios online.

ISDN Trace allows you to capture and display the decoded layer 3 messages as they occur. So you are able to identify protocol mismatches very fast, because of easy accessibility of the interpreted layer 3 ISDN Messages.

From the RDS Session Management page you can choose Monitor Trunk Line/ Data Line/ISDN Trace from the navigation bar. Click on the hyperlink.

The Monitor Trunk/Line/Data Line Control Page will appear:



5.2.1 Starting Monitoring/ISDN Trace:

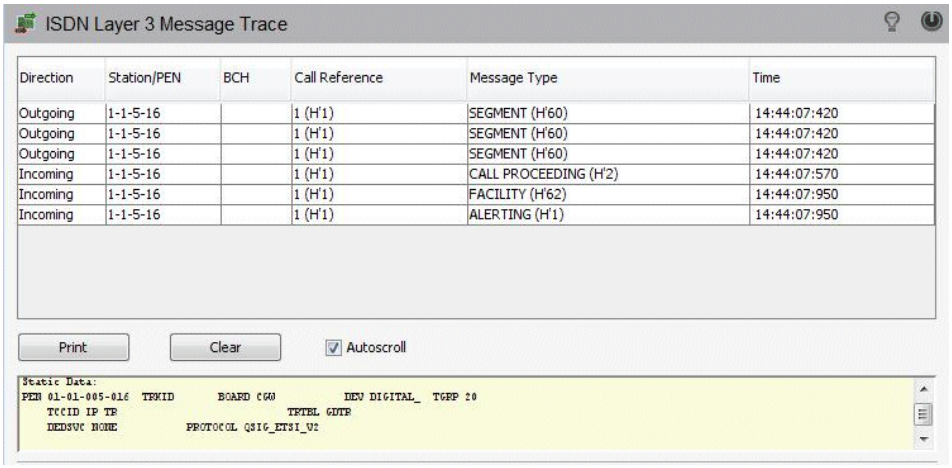
You have to fill in the entry fields and to select from the list boxes. The state of the job is displayed as Idle, Pending or Active.

1) Enter the PEN or station number in the Station/PEN field
2) Enter the desired TSI or BCH (B-Channel) number, if to apply.
3) In the Type field, select Station Monitor, ISDN Tracer or Trunk Monitor from the list box.
4) In the Service field, select Voice, DEE or FAX from the list box. This field is not applicable when selected Trunk Monitor or ISDN Tracer as Monitor type.
5) Select the corresponding **Start** button.
6) When you want to end trunk or line monitoring, select the **Stop** button. Alternatively you can stop all active jobs at the same time by clicking the **Stop All** button.
7) Click the Monitor Display button or the ISDN Trace Display button to view the results.

This example shows in the first line a ISDN Trace, in the second line a data line monitoring. The state is indicated. In this example there are two more traces or Monitors possible.

5.2.2 ISDN Trace Display

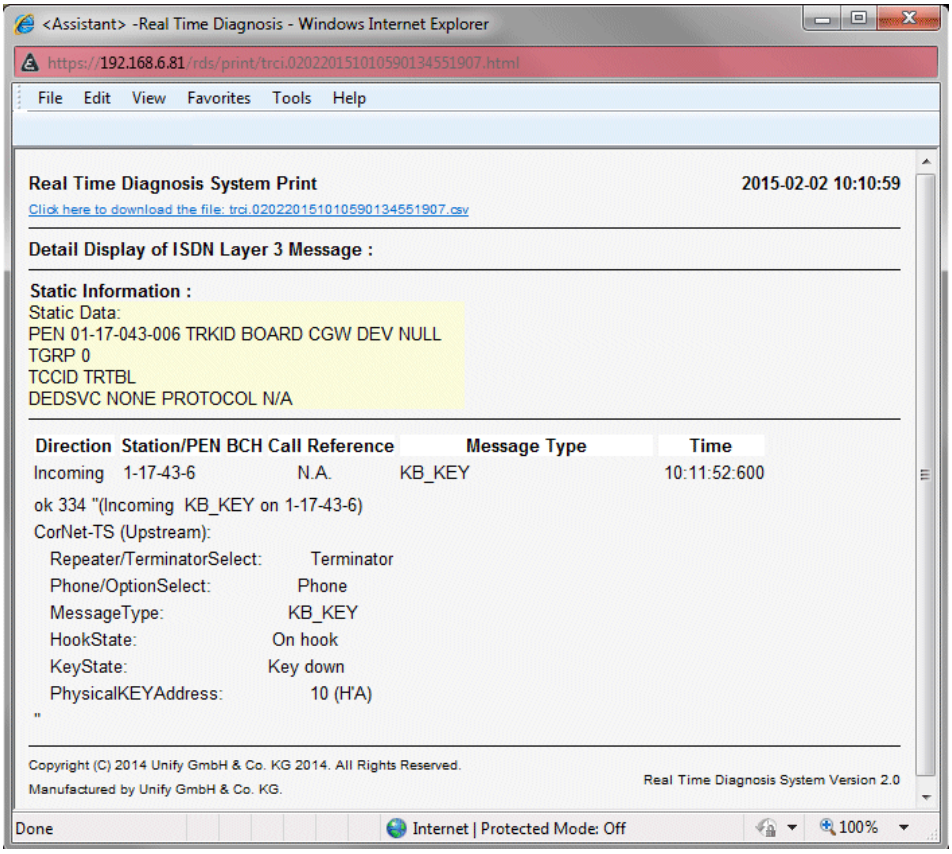
Click **ISDN Trace Display** gives you the ISDN Layer 3 Message Trace in a new browser instance.



When an ISDN span is traced, scores (hundreds) of messages come through for a 30 (23) channels of the span. You can stop the auto-scrolling by unchecking the check control auto scroll. To see all the messages related to a specific phone call, click on the CR header box. This will sort the messages by Call Reference (CR) number. To return to the sort by time, click on the Time header.

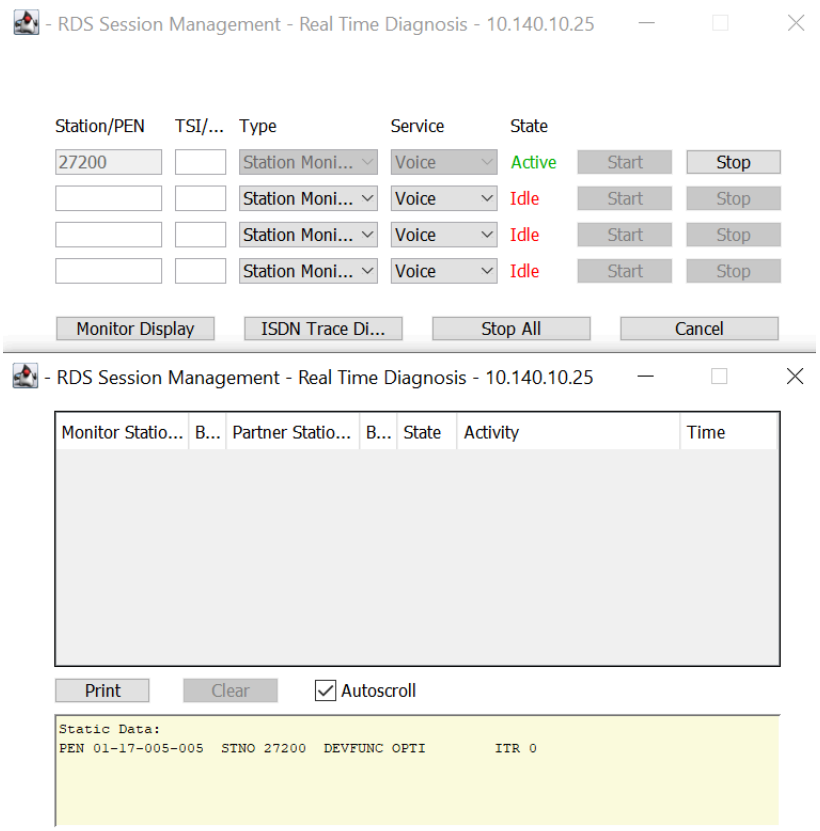
In some cases the size of a Layer 3 ISDN message frame is too small for the information being transmitted with the Layer 3 message. These messages will be transmitted in segments. `SEGMENT` messages always belong to a group of messages. The real type of the message (e.g. `SETUP` or `ALERTING`) is indicated by the first message type which follows the preceding `SEGMENT` messages. Double-clicking on the real type offers details of the complete message.

Double clicking an ISDN header gives the expanded Layer 3 details of that message. This page is printable via the browser print button:

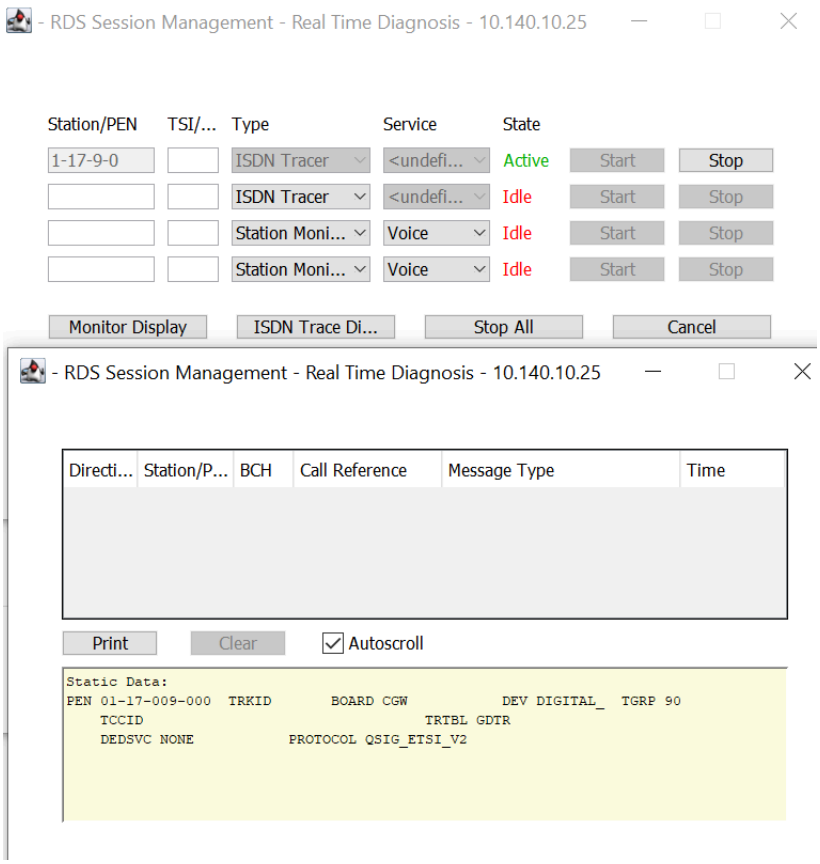


5.2.3 Monitor Display

Clicking on **Monitor Display** will show you the occuring states and activities on the line in a new browser instance.



For printing the monitoring and test data and test results a special print page will be used. Clicking the **Print** Button on the Monitor Display Page activates a new instance browser window. The monitor results will be displayed in formatted Hypertext Markup Language (HTML) in the browser window.

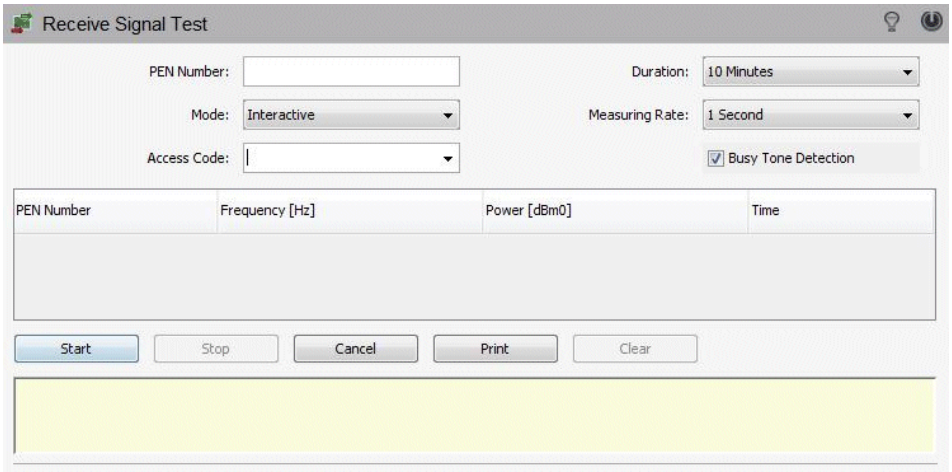


With the Browser facilities (e.g. using the Printer icon from the browser toolbar or selecting from the menubar) you can send the HTML-File to the printer or alternatively save the file on the harddisk.

5.3 Receive Signal Test

The Receive Signal Test measures incoming test tones from other switches or remote service personnel. It runs in Forced or Interactive mode depending on the type of trunk.

Receive Signal Control Page:



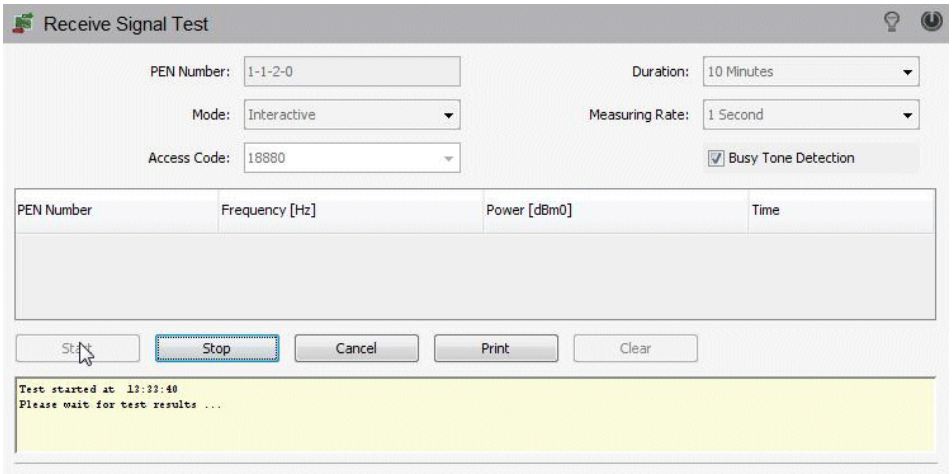
Starting the Receive Signal Test

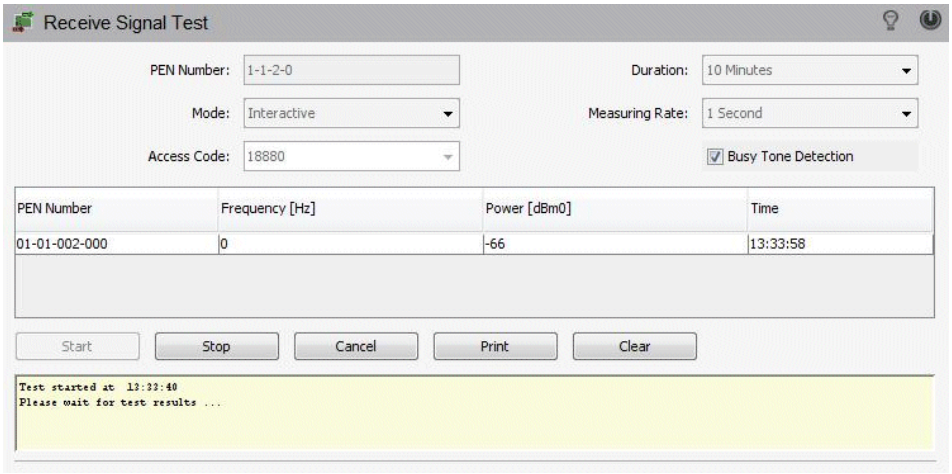
1) From the RDS navigation bar, select Receive Signal Test

2) In the Receive Signal Test Control Page, enter the following:

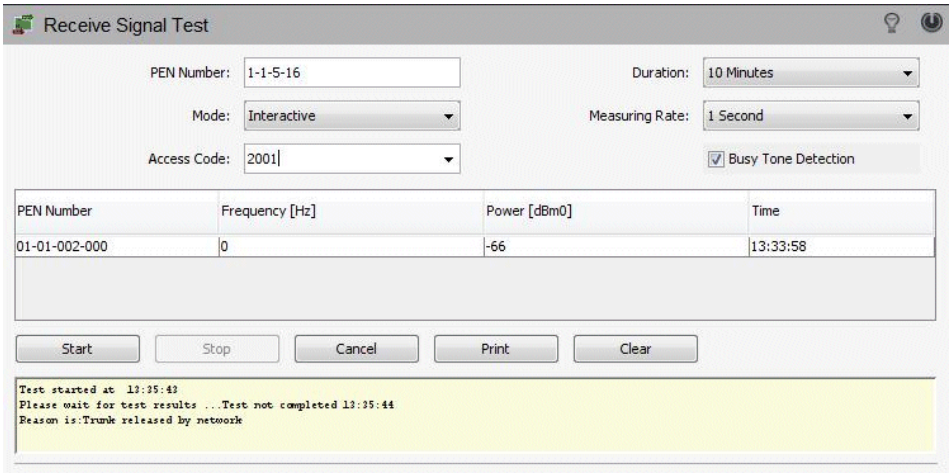
- PEN number
- Mode (Select Forced or Interactive from the list box)
- Access Code (when interactive mode is selected, insert the DAR which represents the *milliwatt access code*)
- Duration (select 10 minutes, 30 minutes, 2 hours, or 8 hours from the list box)
- Measuring Rate (select 1 Second or 5 Second from the list box)Busy Tone Detection (as default the checkbox is marked, that means busy tone detection is switched on)

3) Click the **Start** button or press Enter.





To end the testing before the end of the duration time, select the **Stop** or **Cancel** button, or replace the handset on the remote station to complete the test early:



For printing the Receive Signal Test data and test results a special print page will be used. Clicking the **Print** Button on the Receive Signal Test Control Page activates a new browser instance window. The results will be displayed in formatted Hypertext Markup Language (HTML) in the browser.

With the Browser facilities (e.g. using the Printer icon or selecting from the menubar) you can send the HTML-File to the printer or alternatively save the file on the harddisk.

5.4 BER Test

On the Job Overview Page clicking on the hyperlink BER Test gives you the BER Test control page.

Starting the BER Test:

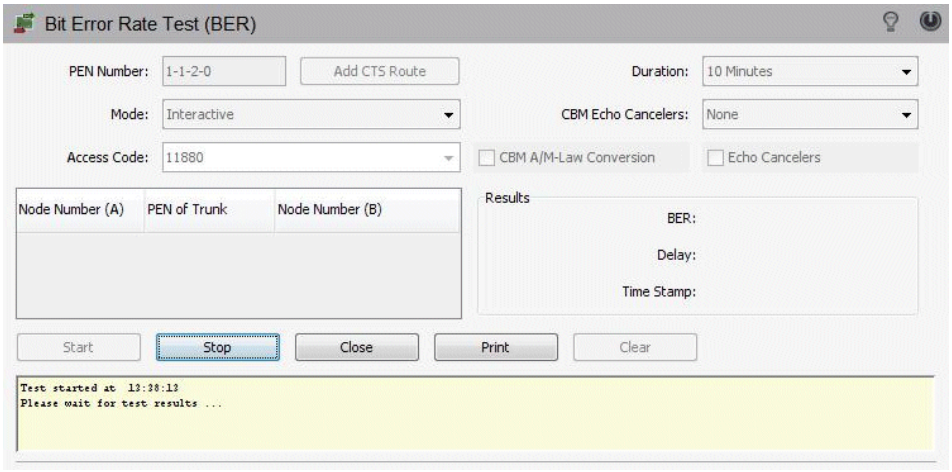
1) Select BER Test from the navigation bar.
2) In the BER Test control page, enter the following:

- PEN number
- Mode (BER Test runs in interactive mode only: Interactive mode reference)
- Access Code (insert the DAR which represents the *loopback access code*)
- Duration (select 10 minutes, 30 minutes, 2 hours or 8 hours from the choice list)
- CBM Echo Cancelers (select None, 32 ms, 64 ms, 128 ms from the choice list)
- CBM A/M-Law Conversion (mark the checkbox for using CBM A/M-Law Conversion.)
- Echo Cancelers (mark the checkbox for using echo cancelers.)

3) Click the **Start** Button or press Enter.

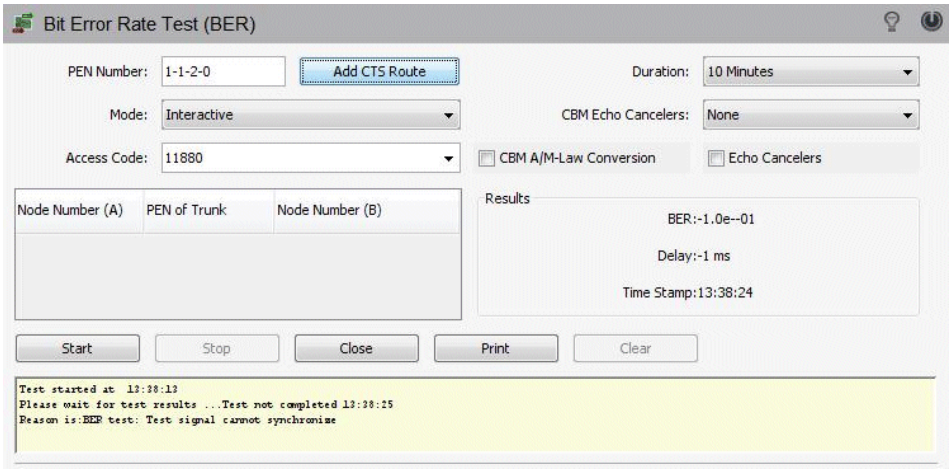
Shown is the data necessary to run the BER test with no CTS route. The access pen is the PEN Number of the trunk, and the Access Code is the code for LOOPBACK which is configured using the add-wabe AMO.

Clicking **Start**:



When the BER test is in progress, clicking the Cancel button will NOT terminate the test. All other tests are terminated by clicking the **Cancel** button. The BER Test continues running even if you log off your session. To stop the testing before the end of the duration time, select the **Stop** button.

BER Test result:

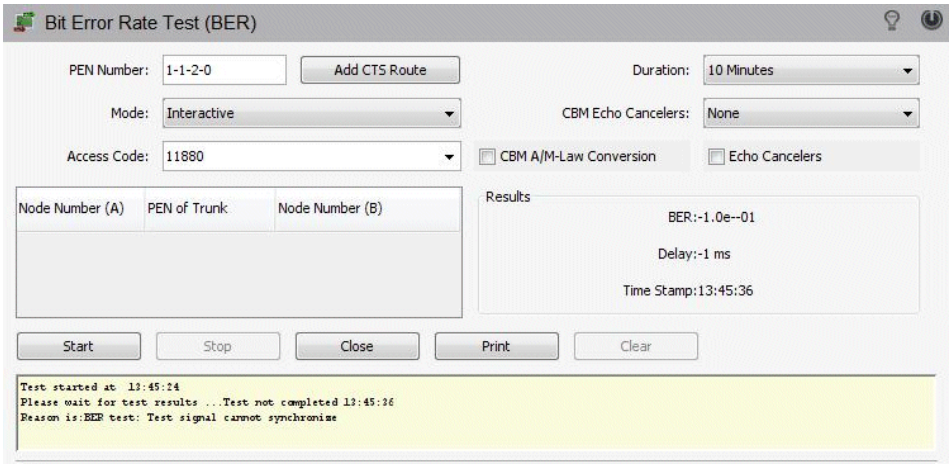


For printing the BER Test data and test results a special print page will be used. Clicking the **Print** Button on the BER Test Control Page activates a new instance browser window. The results will be displayed in formatted Hypertext Markup Language (HTML) in the browser window. With the Browser facilities (e.g. using the Printer icon or selecting from the menubar) you can send the HTML-File to the printer or alternatively save the file on the harddisk.

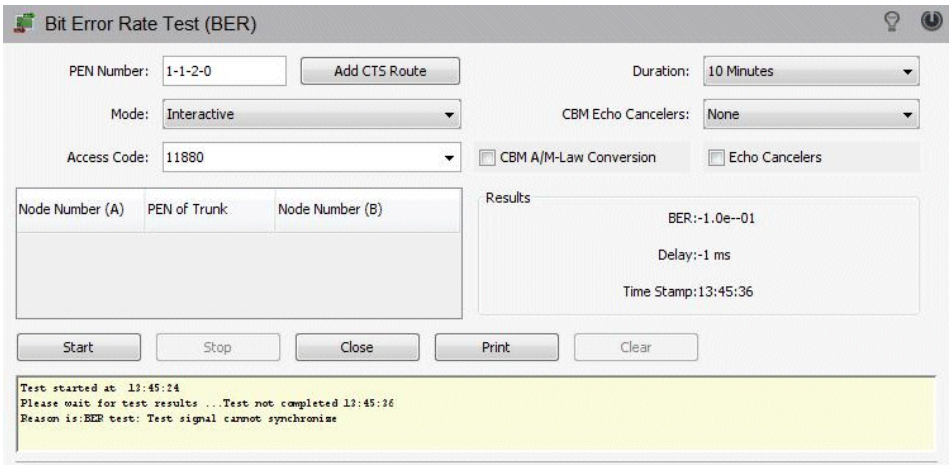
5.5 Network-wide BER Test

Enter the PEN of the outgoing trunk from the source switch in the text entry field and than click the **Add CTS Route** button. The connection to the specified switch will be established. The connections are listed in the middle frame. The table contains the node number of current switch (partner A), the PEN of the trunk leading to the next switch in the network and the node number of partner B. In case of failed connection setup, the reason will be displayed in the CTS Message frame at the bottom of the BER Test Control Page.

Adding the first node:



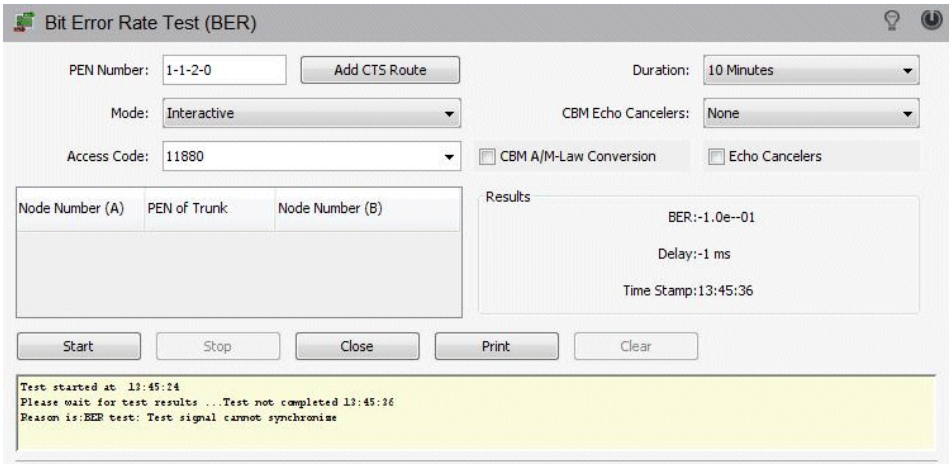
Adding additional nodes:



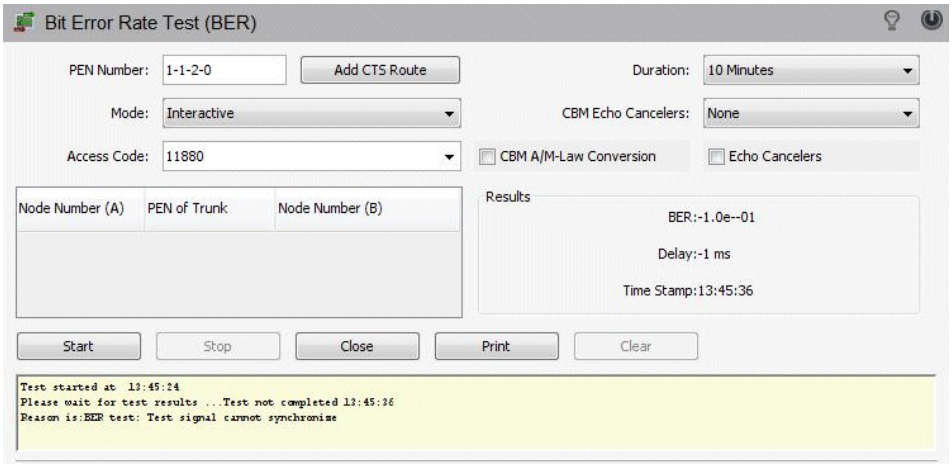
NOTICE: You have to connect two nodes within 10 seconds otherwise the complete connection *will be canceled!*

When the Network-wide BER test is in progress, clicking the **Cancel** *button will NOT terminate the test.* All other tests are terminated by clicking the **Cancel** button. The Network-wide BER Test continues running even if you log off your session. To stop the testing before the end of the duration time, select the **Stop** button.

Clicking the **Start** button:



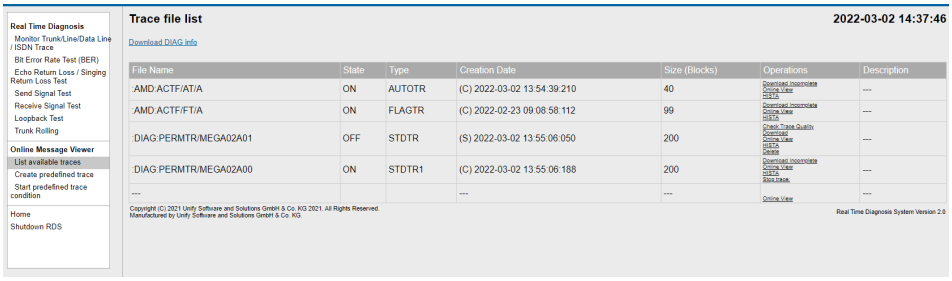
Test successfully completed:



For printing the Network-wide BER Test data and test results a special print page will be used. Clicking the **Print** Button on the BER Test Control Page activates a new instance browser window. The results will be displayed in formatted Hypertext Markup Language (HTML) in the browser window. With the Browser facilities (e.g. using the Printer icon or selecting from the menubar) you can send the HTML-File to the printer or alternatively save the file on the harddisk.

5.6 List Available Traces

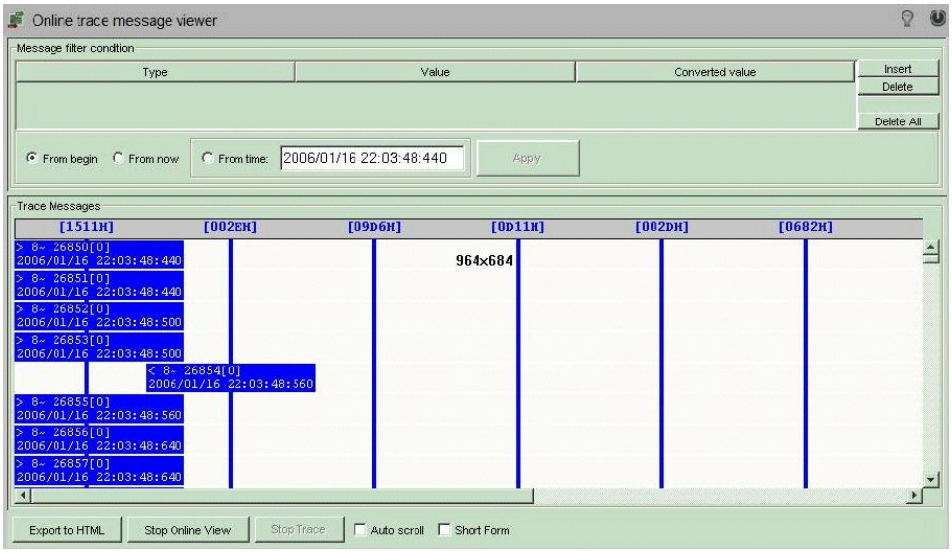
The 'Trace File List' page is opened by selecting the List Available Traces link from the RDS navigation bar. The 'Trace File List' page displays a table of all available trace files in the system.



For each trace file there is a list of available operation that can be applied.

5.7 Online View

The 'Online Trace Message Viewer' page for a particular trace is opened by selecting the Online View link related to this trace from the 'Operation' column of the 'List Available Traces' page.

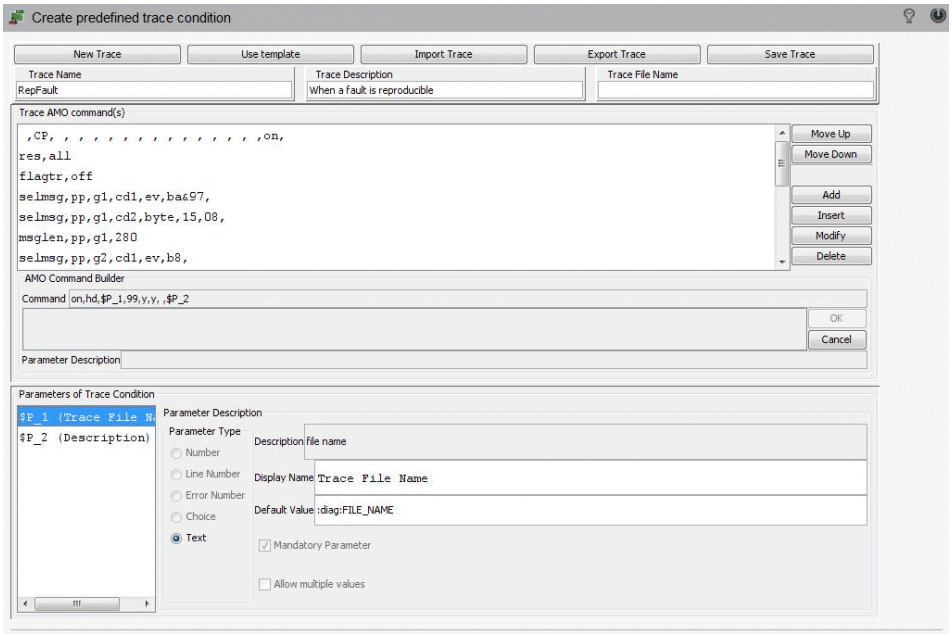


To start the online message view the user can set a filter condition and a start time and then push the Apply button. The Message view can be stopped with the Stop Online View button. After message view was stopped it can be restarted by pushing the Apply button

The trace messages fulfilling the filter condition are displayed in the Trace Message table. These Messages can also be exported in HTML by pushing the Export to HTML button.

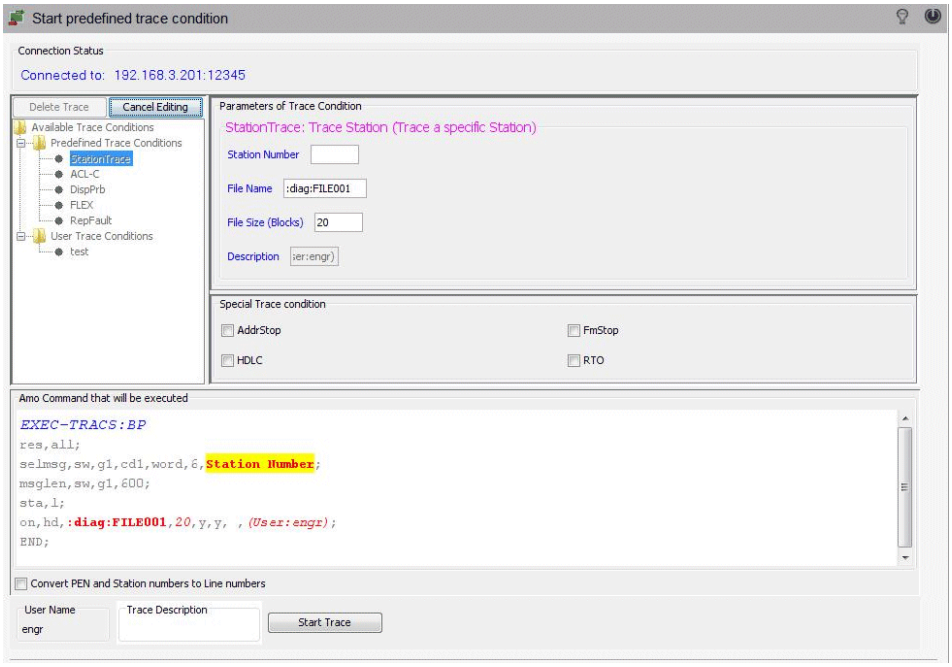
5.8 Create Predefined Trace

The 'Create Predefined Trace Condition' page is opened by selecting the Create Predefined trace link from the RDS navigation bar.



5.9 Start Predefined trace

The 'Start Predefined Trace Condition' page is opened by selecting the Start Predefined trace link from the RDS navigation bar.



6 Glossary

A B C D E F G H I J K L M N O P Q R S T U V

A

Access Code

Administration and Data Server (ADS)

Administration and Maintenance Order (AMO)

AMO FUNSU

analog-to-digital (a/d) conversion

a-law algorithm

B

BCH

bit error rate test (BERT))

bits per second (bps)

Busy Tone Detection

C

CBM

CBM Echo Cancelers

CBM A/M-Law Conversion

CBM and BER Test

CO central office

CO (central office) trunk

D

decibel (dB)

decibels relative to one milliwatt (dBm)

dBm0

DEDSVC

dial pulsing

dialed number identification service (DNIS)

digital transmission

DID direct inward dialing

DID direct inward dialing trunk

direct inward system access (DISA)

direct outward dialing (DOD)

direct trunk select (DTS)

Duration

E

E&M lead signal

Echo Cancelers

Echo Return Loss (ERL)

F

foreign exchange (FX) trunks

full duplex

G

H

hertz (Hz)

I

ISDN Trace

J

jack

jumper

K

kilobits per second (Kbps)

L

M

Measuring Rate

megabits per second (Mbps)

millisecond (ms)

Mode

Monitoring

mu-law algorithm

N

O

off-hook

OPS off-premises station

outpulsing

P

PEN number

Pop-up Windows

port equipment number (PEN)

primary rate interface (PRI)

Q

R

rotary dialing

RTO

S

SatOps tie trunk

signaling interface unit (SIU) board

Singing Return Loss (SRL)

Station

SWU

T

T1 trunk

TIE

TIE trunk

transmission

transmission facilities

trunk

trunk module central office trunk (TMCOT) board

trunk module direct inward dial (TMDID) board

TSI

U

V

voice grade

W

X

Y

Z

6.1 Access Code

1) Digit string defined in AMO WABE table to access a test termination. The preset values (e.g. ###21) are default values of the US networks. These values are not available outside the US market.

In RDS you have to fill in the DAR (which represents an access code) for performing a trunk test with another PBX. The remote system must be adjusted to this code with AMO WABE. You can assign any access code (loopback, silence, milliwatt, or combo) to a DAR. For Trunk Testing over several PBXs you have to insert all DARs and their assigned access codes. (Hint: Use AMO WABE for setting all PBXs to the same DAR and access code.)

For Trunk Testing only following settings are practical: For Loopback Test, BER Test and Network-wide BER Test use the loopback access code. Adjust

the silence access code to perform an ERL/SRL Test or Send Signal Test. For the Receive Signal Test use the milliwatt access code.

Example: (english)

```
ADD-WABE:550,,,MILLWAT,N,,,,,,,;
ADD-WABE:55500,,,MILLWAT,N,,,,,,,;
ADD-WABE:###20,,,MILLWAT,N,,,,,,,;
ADD-WABE:552,,,LOOPBACK,N,,,,,,,;
ADD-WABE:55502,,,LOOPBACK,N,,,,,,,;
ADD-WABE:###22,,,LOOPBACK,N,,,,,,,;
ADD-WABE:553,,,COMBO,N,,,,,,,;
ADD-WABE:55503,,,COMBO,N,,,,,,,;
ADD-WABE:551,,,SILENCE,N,,,,,,,;
ADD-WABE:55501,,,SILENCE,N,,,,,,,;
ADD-WABE:###21,,,SILENCE,N,,,,,,,;
```

Example: (german)

```
EINRICHTEN-WABE:550,,,MILLWAT,NEIN,,,,,,,;
EINRICHTEN-WABE:55500,,,MILLWAT,NEIN,,,,,,,;
EINRICHTEN-WABE:###20,,,MILLWAT,NEIN,,,,,,,;
EINRICHTEN-WABE:552,,,LOOPBACK,NEIN,,,,,,,;
EINRICHTEN-WABE:55502,,,LOOPBACK,NEIN,,,,,,,;
EINRICHTEN-WABE:###22,,,LOOPBACK,NEIN,,,,,,,;
EINRICHTEN-WABE:553,,,COMBO,NEIN,,,,,,,;
EINRICHTEN-WABE:55503,,,COMBO,NEIN,,,,,,,;
EINRICHTEN-WABE:551,,,SILENCE,NEIN,,,,,,,;
EINRICHTEN-WABE:55501,,,SILENCE,NEIN,,,,,,,;
EINRICHTEN-WABE:###21,,,SILENCE,NEIN,,,,,,,;
```

Note that the DAR (german: KZP) respectively the access code is *only valid for the remote PBX* - it has not any effect on the local machine.

6.2 Administration and Data Server (ADS)

1) An internal server that provides administration and maintenance control functions for the OpenScape 4000.

6.3 Administration and Maintenance Order (AMO)

1) An instruction that provides administration or maintenance information directly to the OpenScape 4000.

6.4 AMO FUNSU

1) The AMO FUNSU processes jobs for the RTO of the SWU (switching Unit) for starting and stopping of individual routine tests, changing the start frequency of routine tests, changing time parameters and displaying the status and outputting the control data.

In order to run any of the Trunk tests you must first ensure that the RTO port loopback test is not running using the AMO FUNSU. The RTO loopback test can be set to run at regular intervals and will prevent the RDS Trunk tests from running.

6.5 analog-to-digital (a/d) conversion

1) Electrical conversion of analog signals to digital information.

6.6 a-law algorithm

1) a-law algorithm: A standard compression algorithm, used in digital communications systems of the European digital hierarchy, to optimize the dynamic range of an analog signal for digitizing.

6.7 BCH

1) ISDN B-Channel number (1-30).

6.8 bit error rate test (BERT))

1) Testing of data on a line with a pattern of bits which are compared before and after the transmission of detect errors. bit error ratio (BER): The number of erroneous bits divided by the total number of bits transmitted, received, or processed over some stipulated period.

6.9 bits per second (bps)

1) The speed at which bits are transmitted over a circuit

6.10 Busy Tone Detection

1) In some cases the test tone and the busy tone have similar frequencies. To prevent problems, the user is able to switch off the busy tone detection.

6.11 CBM

1) Central Byte Manipulation (CBM)

Change for further information to CBM and BER Test, CBM Echo Cancelers or CBM A/M-Law Conversion.

6.12 CBM Echo Cancelers

1) This function is only possible with the test of a trunk with the module LTUCX. With other modules an error message will be displayed. Using CBM Echo Cancelers is practical even if this trunk is used in the same form in the real operation.

Change for further information to CBM and BER Test, CBM A/M-Law Conversion or CBM.

6.13 CBM A/M-Law Conversion

1) This function is only possible with the test of a trunk with the module LTUCC. With other modules an error message will be displayed. Using CBM A/M-Law Conversion is practical even if this trunk is used in the same form in the real operation.

Note that a-Law to m-Law conversion and vice versa is always performed in the m-Law country on the receive as well as the transmit channels.

Change for further information to CBM and BER Test, CBM Echo Cancelers, a-law algorithm or CBM.

6.14 CBM and BER Test

1) Different byte manipulations are required when subscribers of different networks are connected: e.g. a-Law / m-Law conversion, Echo Cancellation, Voice compression, encryption...

The following integrated byte manipulations are available: voice compression on VCM Module in IM markets only and attenuation for loss plan implementation. All additional byte manipulations such as a-Law / m-Law conversion and Echo Cancellation have to be performed by external equipment. Note that a-Law to m-Law conversion and vice versa is always performed in the m-Law country on the receive as well as the transmit channels.

Echo Cancellation: One source of echo is high end-to-end delay between subscriber equipment. Current public TDM networks offer forms of echo cancellation. ATM networks don't offer that functionality. In addition ATM networks produce higher delays due to de/packetization. Thus, especially if analog trunks or analog devices are included in the scenario echo problems may occur.

The Call processing Software is impacted in regards setting up a-Law / m-Law conversion and/or Echo Cancellation on a call by call basis.

The customer requires an integrated, cost effective and easy to manage a-Law / m-Law conversion and Echo Cancellation solution. Up to 256 timeslots or B-channels per LTUCX shelf need to be processed in real time; the granularity of the feature will be in increments of 128 B-channels per CBMLX stuff option on the LTUCX.

The feature solves the customer problems by providing the following features: Global, integrated solution, Support for a-Law / m-Law conversion and/or Echo Cancellation on a call-by-call basis, Granularity of 64/128 B-channels up to 256 B-channels per LTUCX shelf (depending on delay of echo path), High reliability/MTBF (Hardware-only solution) and for 80CXE systems the LTUCX with the CBMLX stuff options can only be used in the expansion shelves (CBMLX is not applicable in the base shelf).

Fault isolation, display and resource monitoring are required. This means, if a trunk is involved in a connection monitored by RDS, the CBM-specific information (CBM-type, TSL/HWY-information) must be displayed beside the other monitored trunk data.

Change for further information to CBM, CBM Echo Cancelers or CBM A/M-Law Conversion.

6.15 CO central office

1) A switching system that connects lines to lines, lines to trunks, and trunks to trunks; sometimes refers to a telephone company building in which a switching system is located.

A central office may include other equipment (such as transmission system terminals) located in the building.

6.16 CO (central office) trunk

1) A trunk used for trunk services that connect the OpenScape 4000 to a central office (CO), such as direct, wide-area telephone service (WATS), and foreign exchange (FX) services.

6.17 decibel (dB)

1) A unit of measure to express relative power (that is, loss or gain) between two points in a telephone circuit. The difference between the input and output is also expressed in dB.

6.18 decibels relative to one milliwatt (dBm)

1) The unit of a logarithmic measure to express absolute power in terms of decibels. 0 dBm represents 1 milliwatt of power, imposed on 600 Ohms of impedance, at a frequency of 1004 hertz (Hz).

The dBm unit is used in telephony to provide a reference point for voice signal power.

6.19 dBm0

1) The power in dBm referenced to or measured at a zero transmission level point (TLP). For example, 0 dBm0 = TLP and -13 dBm0 = TLP -13 dB

6.20 DEDSVC

6.21 Dedicated Service

The protocol of a trunk must be compatible with DEDSVC. Following dates can occur in the static data fields:

NONE	No Calling Service
IN_WATS	Inward Wide Area Telecommunications Services
INTL_WATS	International Wide Area Telecommunications Service

OUT_WATS	Outward Wide Area Telecommunications Service
FOREIGN_EX	Foreign Exchange Selection
TIE_TRUNK	Tie Trunk Selection
HOTEL	Hotel/Motel Service Selection
PAY_CALL	Pay Per Call
LONG_DIST	Long Distance Service
VPN	Virtual Private Network
SDS	Switched Digital Service
SCOCS	Selective Class of Call Screening

6.22 dial pulsing

1) See rotary dialing.

6.23 dialed number identification service (DNIS)

1) A system feature that provides the capability to identify the nature of a received call.

DNIS enables the system to receive digits from the network and match them to the configured DNIS table entries for routing.

6.24 digital transmission

1) The transmission of digital signals by means of a channel or channels that may assume in time any one of a defined set of discrete states.

6.25 DID direct inward dialing

1) A system feature that allows an incoming call from the public telephone network to reach specific extensions within a customer's premises without attendant assistance; usually includes vacant number intercept to the attendant.

6.26 DID direct inward dialing trunk

1) An incoming trunk from a central office (CO) to the OpenScape 4000, with the special characteristic that the last two or three digits dialed by the caller are transmitted over the trunk to the OpenScape 4000.

This allows the caller to directly dial an extension within the OpenScape 4000.

6.27 direct inward system access (DISA)

1) A feature that allows an outside caller to access the system and its outbound trunks by calling a special telephone number and entering a special code identifying the caller, without attendant intervention.

6.28 direct outward dialing (DOD)

1) A class of service (COS) feature that allows a caller to call outside numbers without going through an attendant.

6.29 direct trunk select (DTS)

1) A system feature that allows service personnel to test specific trunks for operational problems.

6.30 Duration

1) The length of time the test runs if not interrupted (10 min., 30 min., 2 hrs., or 8 hrs.)

6.31 E&M lead signal

1) An arrangement in which communication between a trunk circuit and a separate signaling unit is accomplished over two leads: an M-lead, which transmits battery or ground signals to the signaling equipment, and an E-lead, which receives open or ground signals from the signaling unit.

6.32 Echo Cancelers

1) For the On-Demand Trunk Facility Transmission Tests with RDS you can select if trunk circuits contain echo cancelers, or not.

If checked, the echo canceler tone of 2100Hz is sent for 2 seconds and followed by the test signals and measurement begins after the echo round trip delay of 1 second otherwise test signals are sent and measurement starts immediately.

6.33 Echo Return Loss (ERL)

1) The measure of signal power reflection in the frequency range of 500 to 2500 hertz (Hz) exhibited by a hybrid on its 4-wire side.

6.34 foreign exchange (FX) trunks

1) A connection between the OpenScape 4000 and a distant, or foreign central office (CO).

These trunks are used when a large number of calls go to, or come from, a specific CO.

6.35 full duplex

1) A method of transmission in which both stations can receive and transmit simultaneously.

6.36 hertz (Hz)

1) In trunk testing, the frequency of a signal in cycles per second.

6.37 ISDN Trace

1) The RDS monitor tool is composed of two functions:

- Call processing monitoring - provides information about call setup and disconnect
- ISDN trace - provides information about the ISDN layer 3 messages

6.38 jack

1) A receptacle used to connect a cord, a plug, an earphone, or a speaker.

6.39 jumper

1) A wire used to connect two pins of a plug or a board.

6.40 kilobits per second (Kbps)

1) 1024 bits per second; used in specifying the modulation rate of a digital transmission system.

6.41 Measuring Rate

1) Rate at which signal is tested: 1 or 5 sec. (default is 1 second)

6.42 megabits per second (Mbps)

1) Used in specifying the modulation rate of a digital transmission system.

6.43 millisecond (ms)

1) One thousandth of a second

6.44 Mode

1) Forced or Interactive Modus.

6.45 Monitoring

1) The RDS monitor tool is composed of two functions:

- Call processing monitoring - provides information about call setup and disconnect
- ISDN trace - provides information about the ISDN layer 3 messages

6.46 mu-law algorithm

1) mu-law algorithm: A standard analog signal compression algorithm, used in digital communications systems of the North American digital hierarchy, to optimize the dynamic range of an analog signal prior to digitizing.

6.47 off-hook

1) The condition indicating a closed electrical current loop or the active state of a line (data or voice).

6.48 OPS off-premises station

1) Station equipment that is not located on the site where the switching equipment is located.

These stations or extensions are located more than 2.2 miles from the switching equipment.

6.49 outpulsing

1) Sending direct current or tone pulses out on a circuit.

6.50 PEN number

1) See port equipment number (PEN)

6.51 Pop-up Windows

1) This is an example for a Popup Window. Popup Windows provide definitions or information about keywords. The information in Popup Windows cannot be printed.

6.52 port equipment number (PEN)

1) The number identifying the port on a board to which a station is connected. Trunk to be tested.

6.53 primary rate interface (PRI)

1) An integrated services digital network (ISDN) interface that provides 23 information channels (64 Kbps) and one signaling channel (64 Kbps). This interface is also represented as 23B + D.

6.54 rotary dialing

1) A type of telephone signaling that uses pulses of current to represent digits 0 through 9.

6.55 RTO

1) Routine Test Organisation

In order to run any of the Trunk tests you must first ensure that the RTO port loopback test is not running using the AMO FUNSU. The RTO loopback test can be set to run at regular intervals and will prevent the RDS Trunk tests from running.

The AMO FUNSU processes jobs for the RTO of the SWU (switching Unit) for starting and stopping of individual routine tests, changing the start frequency of routine tests, changing time parameters and displaying the status and outputting the control data.

6.56 SatOps tie trunk

1) A special type of Satellite tie trunk service that connects two OpenScape 4000. In addition to standard address signaling, extra information is also transmitted, such as the calling party's number and class of service (COS).

6.57 signaling interface unit (SIU) board

1) A Model 30 service unit board that transmits and receives dual-tone multi frequency (DTMF) signals and generates or receives test tones to and from the system.

6.58 Singing Return Loss (SRL)

1) A loss introduced into a loop to cancel any singing caused by instability of a circuit. SRL-LO and SRL-HI are the two frequency ranges measured.

6.59 Station

1) Trunk Station to be tested.

6.60 SWU

1) Switching Unit

6.61 T1 trunk

1) A DS-1 digital facility that operates at a line rate of 1.544 megabits per second (Mbps) and provides 24 information channels usable for either voice or data communication.

6.62 TIE

1) A private or leased voice-grade communication line of the type provided by communications common carriers for linking two or more points.

6.63 TIE trunk

1) A direct circuit extending between two private branch exchanges (PBXs) with no intermediate PBXs with no intermediate switching.

The physical connection between the two PBXs can consist of either one or two pairs of wires or may involve 4-wire terminating sets, repeaters, carrier systems, and one or more central offices (COs) where no switching of the tie trunk occurs.

6.64 transmission

1) The process of communicating by electrical signals over a distance (to a receiver of the transmission) without unacceptable attenuation, distortion, masking by noise, crosstalk, or echo, and without losing the integrity of the information sent.

6.65 transmission facilities

1) The cable and radio facilities consisting of interswitch trunks and access lines; an element of a physical telephone plant that carries out the function

of transmission; for example, a multipair cable, a coaxial cable system, or a microwave radio system.

6.66 trunk

1) A message circuit between two points, both of which are switching centers or individual message distribution points.

A communications channel between two different offices or between groups of equipment within the same office.

6.67 trunk module central office trunk (TMCOT) board

1) A board that connects eight facility provider ground- or loop-start trunks to the system. It supports both inbound and outbound calls.

6.68 trunk module direct inward dial (TMDID) board

1) A board that supports incoming-only (loop-reverse battery) trunks from the facility provider and permits a caller to directly dial a station without the assistance of an attendant.

6.69 TSI

1) Terminal Selection Index. Terminal to be tested.

6.70 voice grade

1) An access line suitable for voice and low-speed data and telegraph service.

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