

KlasSplitter User Manual

First Printing: October 2003

Version 1.0

Copyright © Klas Ltd. 2003

All rights reserved. No part of this manual may be reproduced, photocopied, stored on a retrieval system, or transmitted without the express prior written consent of Klas Ltd.

All company names and logos are trademarks or registered trademarks of their originators.

Information in this manual is subject to change without notice. Klas Ltd. reserves the right to make improvements and/or changes in the products described in this manual at any time.

TABLE OF CONTENTS

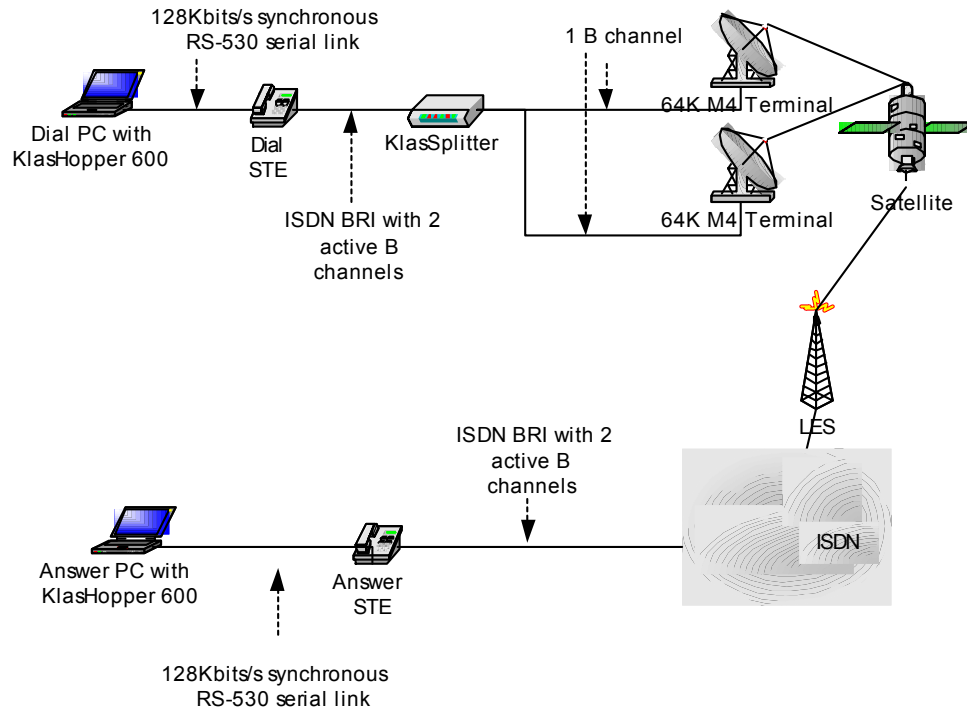
| | | |
|----------|---|----|
| 1. | INTRODUCTION AND OVERVIEW | 1 |
| 1.1. | INTRODUCTION | 2 |
| 1.2. | KLASSPLITTER PACKAGE CONTENTS | 2 |
| 1.3. | KLASSPLITTER PORTS..... | 2 |
| 1.4. | KLASSPLITTER LED INDICATORS..... | 4 |
| 1.5. | OVERVIEW OF MANUAL | 4 |
| 2. | INSTALLING KLASSPLITTER CONFIG | 5 |
| 2.1. | SOFTWARE INSTALLATION | 5 |
| 3. | USING KLASSPLITTER WITH STE | 6 |
| 3.1. | CONNECTING KLASSPLITTER TO STE | 6 |
| 3.2. | M4 SATELLITE TERMINALS | 6 |
| 3.3. | CONFIGURING THE STE FOR 128K..... | 6 |
| 3.3.1. | DIAL-SIDE STE | 7 |
| 3.3.1.1. | ISDN | 7 |
| 3.3.1.2. | Secure Application Control System | 7 |
| 3.3.1.3. | Mode..... | 7 |
| 3.3.1.4. | Data Port..... | 7 |
| 3.3.2. | ANSWER-SIDE STE..... | 8 |
| 3.3.2.1. | ISDN | 8 |
| 3.3.2.2. | Secure Application Control System | 8 |
| 3.3.2.3. | Mode..... | 8 |
| 3.3.2.4. | Data Port..... | 8 |
| 3.3.2.5. | Answer Mode..... | 8 |
| 3.4. | MAKING A 128K CALL..... | 9 |
| 3.4.1. | CALL INITIATION..... | 9 |
| 3.4.2. | FIRST B CHANNEL SETUP..... | 9 |
| 3.4.3. | SECOND B CHANNEL SETUP..... | 10 |
| 3.4.4. | CONFIGURING SECOND DIALLED NUMBER USING KLASSPLITTER CONFIG10 | |
| 3.4.5. | LOGIN | 11 |
| 4. | TROUBLESHOOTING | 12 |
| 4.1. | TRACING | 12 |
| 4.2. | KLASSPLITTER TROUBLESHOOTING WITH THE STE..... | 13 |
| 4.2.1. | CALLED PARTY NUMBER CONFIGURATION..... | 13 |
| 4.2.2. | SECURITY INCOMPATIBILITY | 13 |
| 4.2.3. | SECURE APPLICATION CONTROL SYSTEM..... | 13 |
| 4.2.4. | MANUAL ANSWER VS. AUTO ANSWER..... | 14 |
| 4.2.5. | CONNECTIVITY ISSUES..... | 15 |
| 5. | UNINSTALLING KLASSPLITTER CONFIG..... | 16 |
| 6. | APPENDICES | 17 |

KlasSplitter User Manual

| | | |
|--------|---|----|
| 6.1. | CONNECTIVITY DEVICES | 17 |
| 6.2. | MANUAL CONFIGURATION COMMANDS | 17 |
| 6.2.1. | KLASPLITTER COMMANDS | 18 |
| 6.3. | TRACING COMMANDS | 20 |
| 6.4. | LED STATUS DISPLAY | 24 |
| 6.5. | CONTACT INFORMATION AND TROUBLESHOOTING | 25 |

1. Introduction and Overview

KlasSplitter enables two 64 kbits/s M4 satellite terminals to be used with a STE bulk encryption device to give a 128 kbits/s satellite link and is typically used in the configuration shown below:



1.1. Introduction

KlasSplitter can be used to split an ISDN 128K line into 2 separate 64K lines. Each 64K line can then be carried over a 64K M4 to give a 128K link over satellite. In this way KlasSplitter can be used with encryption devices such as the STE or with 128K Video conferencing terminals. An easy-to-use configuration program called KlasSplitter Config is also supplied with KlasSplitter.

1.2. KlasSplitter package contents

Please ensure that the following have been included with KlasSplitter:

- KlasSplitter unit
- Power supply
- 3 ISDN cables each with RJ-45 connectors (Cable code:KTA206)
- RS-232 serial cable with DB-9 connector at either end (Cable code:KTA205)
- CD with KlasSplitter Config Installation software

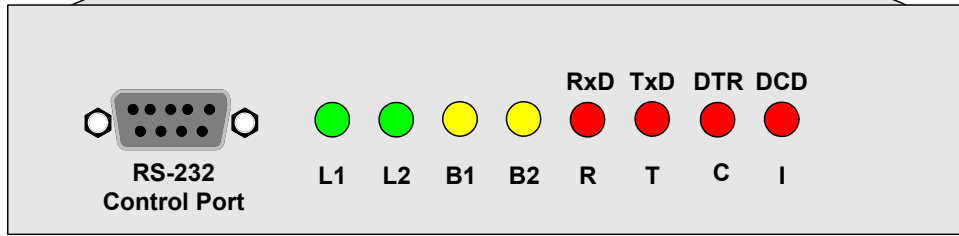
Please contact your distributor if any of these items are missing.

1.3. KlasSplitter ports

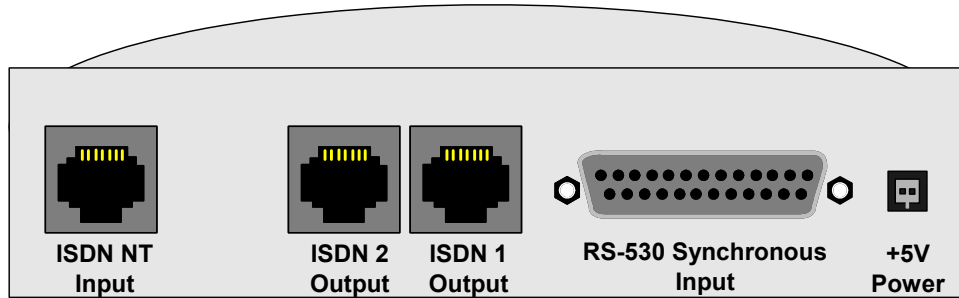
KlasSplitter features the following ports:

| Port | Description |
|---------------------|---|
| RS-232 Control port | Serial connection for configuring KlasSplitter with KlasSplitter Config |
| ISDN NT Input | BRI ISDN connection from STE or video conferencing unit |
| ISDN 1 Output | B Channel derived from B1 of ISDN NT input |
| ISDN 2 Output | B Channel derived from B2 of ISDN NT input |
| RS-530 Input | Not used |
| +5V Power | DC power jack |

KlasSplitter User Manual



KlasSplitter Front



KlasSplitter Back

1.4. KlasSplitter LED indicators

| LED | Description |
|------------|--|
| L1 | L1 and L2 indicate status or error states in coded form. See 6.4 |
| L2 | See L1 |
| B1 | B1 channel of ISDN-NT is active |
| B2 | B2 channel of ISDN-NT is active |
| RxD | Not used |
| TxD | Not used |
| DTR | Not used |
| DCD | Not used |

1.5. Overview of Manual

This manual describes the configuration and installation of KlasSplitter as follows:

- Installation of KlasSplitter Config software
- Using KlasSplitter with a STE bulk-encryption device
- Troubleshooting

2. Installing KlasSplitter Config

KlasSplitter Config is a PC software application, which configures KlasSplitter using a serial cable.

2.1. Software Installation

Close all active applications and insert the KlasSplitter CD. If the installation does not start, run setup.exe from the CD.

Software installation commences. Follow the onscreen instructions.

3. Using KlasSplitter with STE

This section describes how to use KlasSplitter with the STE to setup a 128K call over 2 64K M4 terminals. Before starting you will need the following:

- 2 STE
- 2 64K M4 terminals
- KlasSplitter
- 3 RJ-45 ISDN cables
- DAO of both dial and answer STEs
- SPIDs and Directory Numbers of the ISDN BRI which will answer the call
- 2 KlasHopper 600 with appropriate cables or 2 routers

3.1. Connecting KlasSplitter to STE

Connect the ISDN output of the STE to the ISDN NT input port of the KlasSplitter using one of the three ISDN cables provided. Connect each of the other 2 ISDN cables from the KlasSplitter ISDN output ports to an M4 satellite phone. It does not matter which KlasSplitter output is connected to which M4 terminal.

The Red Data Port is then connected to the KlasHopper 600 installed in your PC.

3.2. M4 Satellite Terminals

Detach the modem portion from the antenna of the satellite phone and position both antennae so that a signal strength of at least 520 is achieved with a Nera terminal or 56dB with a Thrane & Thrane.

3.3. Configuring the STE for 128K

For a point-to-point connection there will be a STE on the dial and answer side of the connection. The following sections describe how the dial and answer STEs are configured for a secure 128K data connection. Note that Auto Answer mode must be used on the answer side.

In order to use Auto Answer mode, dial and answer STE must pass a Security Compatibility test, which is carried out by the STEs when the first call is established. Therefore the DAO to which each STE belongs is required. Each organization will have its own DAO and this information can be obtained from your

STE Administrator. If your STE is dialling or answering a call from a STE that belongs to a different DAO, the DAO of that organization is also required.

3.3.1. Dial-Side STE

3.3.1.1. ISDN

Go to 'Network Settings' by going to 'Menu' | 'Terminal Management'. Set the following parameters:

| | |
|-----------|----------|
| Network: | ISDN |
| Protocol: | EuroISDN |
| SPID#1: | Empty |
| DN#1: | Empty |
| SPID#2: | Empty |
| DN#2: | Empty |

3.3.1.2. Secure Application Control System

In 'Terminal Management' scroll to 'Terminal Privileges...' and hit 'Modify'. There may be a delay as the STE validates TPA privileges. Hit 'Select' and scroll to 'Secure Application Setup System'. Select 'SECAPP'. Change 'Secure Application' to enabled. Set Secure data to enabled and set maximum and minimum data security to 'None'. Set secure voice to disabled. Scroll until 'Secure Application Setup' is again shown. This time select ACL. Select 'Add' and then select entry type as DAO. Enter the DAO of the answer-side STE.

3.3.1.3. Mode

Select the blue 'Mode' button and set to Auto-Secure mode, 128 Kbit/s and Synchronous mode.

3.3.1.4. Data Port

Set Data port to EIA-RS530A if using a KlasHopper 600. KlasHopper 600 must also be configured for RS-530 mode. See your KlasHopper manual for details.

3.3.2. Answer-Side STE

3.3.2.1. ISDN

Go to 'Network Settings' by going to 'Menu' | 'Terminal Management'. Set up the following parameters:

| | |
|-----------|--|
| Network: | ISDN |
| Protocol: | NI1/NI2 |
| SPID#1: | Primary SPID of answering ISDN BRI |
| DN#1: | Primary Directory Number of answering ISDN BRI |
| SPID#2: | Secondary SPID of answering ISDN BRI |
| DN#2: | Secondary Directory Number of answering ISDN BRI |

3.3.2.2. Secure Application Control System

In 'Terminal Management' scroll to 'Terminal Privileges...' and hit 'Modify'. There may be a delay as the STE validates TPA privileges. Hit 'Select' and scroll to 'Secure Application Setup System'. Select 'SECAPP'. Change 'Secure Application' to enabled. Set Secure data to enabled and set maximum and minimum data security to 'None'. Set secure voice to disabled. Scroll until 'Secure Application Setup' is again shown. This time select ACL. Select 'Add' and then select entry type as DAO. Enter the DAO of the answer-side STE.

3.3.2.3. Mode

Select the blue 'Mode' button and set to Auto-Secure mode, 128 Kbit/s and Synchronous mode.

3.3.2.4. Data Port

Set Data port to EIA-RS530A if using a KlasHopper 600. KlasHopper 600 must also be configured for RS-530 mode. See your KlasHopper manual for details

3.3.2.5. Answer Mode

Set Auto Answer to enabled and set the number of rings to 2.

3.4. Making a 128K call

If you have not already done so create a Dial-Up Networking connection specifying KlasHopper 600 as the desired modem as described in your KlasHopper manual. Set the KlasHopper 600 to Manual Dial mode on the dial side. Note that a number must be entered in the 'Phone Number' section of the connection but it doesn't matter what it is. The KlasHopper card on the answer side must be set to Hot Answer mode.

3.4.1. Call initiation

Go off-hook with dial-side STE. The STE will have the following display:

| |
|---|
| Auto-Secure SV 32 |
| NonSecure SecureData |

Select SecureData and then enter the number you want to dial including international access code, country code and a '#'.
E.G.

If the answering Primary SPID/Directory Number is:
SPID: 12312312310101
DN: 1231231231

Then dial:
0011231231231#.

Note that the International Access code is 001 when dialling over satellite from the US to the US.

3.4.2. First B channel Setup

After '#' is pressed the dial STE's display will go to 'Call proceeding ...' and the first satellite terminal will dial the number. The answer STE will ring and then indicate it is answering after 2 rings. Security compatibility will then be authenticated. Consult Section 4.2 if the security compatibility check fails.

3.4.3. Second B channel Setup

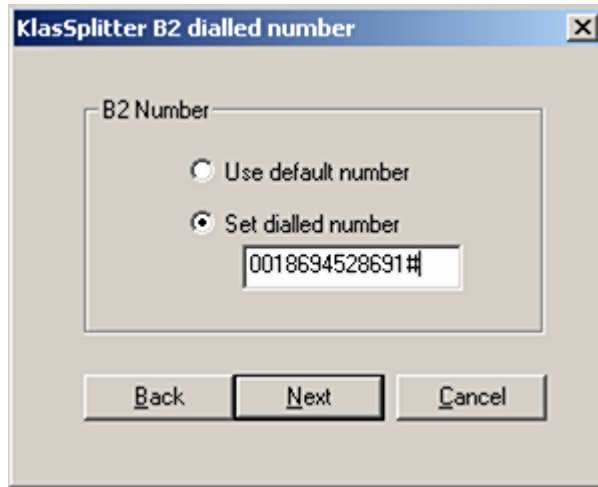
The second B channel is setup approximately 10 seconds after the first. Note that the STE will not indicate when the second channel is active. The user will need to check the satellite phone display to verify if the second B channel is active. If the second B channel cannot be established then you will need to configure KlasSplitter to ensure that the number dialled is correct.

3.4.4. Configuring second dialled number using KlasSplitter Config

Got to 'Start' | 'Programs' | 'KlasSplitter Config' and run the configuration app.



Select STE as the input device and click Next.



Enter the number to be dialled for the second B channel. A pound sign ('#') must be appended to the number to initiate dialling on the M4. Select 'Next'. A summary of the configuration is then shown. Click 'Next' to download configuration to KlasSplitter.

3.4.5. Login

Double click the Dial-Up Networking connection to connect. Note that it can take up to 45 seconds to go from 'Verifying username and password...' to 'Registering your computer on the network...'.

4. Troubleshooting

4.1. Tracing

If you are experiencing difficulties in establishing a 128K call, you can use the tracing program included with KlasSplitter Config.

If the main KlasSplitter Configuration program is running, close it by clicking the Exit button.

To start tracing, browse to:

'Start' > 'Programs' > 'KlasSplitter Config'

and select 'KlasSplitter Trace'.

When prompted, connect a serial cable to the RS-232 control port of KlasSplitter. Follow the on-screen instructions. You will be asked to make and disconnect a few calls to provide data to work with. Make at least two or three calls. If successful, a log file will be created containing data of the following form:

```
trcread
00000 0018957550 0722 0012 08 01 02 05 A1 04 02 88 90 18 01 83 70 04 81 38
      > 35 35
00001 0018957551 8712 0012 08 01 40 05 A1 04 02 88 90 18 01 83 70 04 81 38
      > 35 35
00002 0018957555 0712 0007 08 01 C0 02 18 01 8A
00003 0018957556 8722 0007 08 01 82 02 18 01 89
00004 0018957560 0712 0008 08 01 C0 01 1E 02 80 88
00005 0018957560 8722 0004 08 01 82 01
00006 0018957589 0712 0004 08 01 C0 07
00007 0018957589 8712 0004 08 01 40 0F
00008 0018957590 8722 0004 08 01 82 07
00009 0018957592 0722 0004 08 01 02 0F
00010 0018957636 0722 0008 08 01 02 45 08 02 80 90
00011 0018957637 8712 0008 08 01 40 45 08 02 80 90
00012 0018957640 0712 0004 08 01 C0 4D
00013 0018957640 8712 0004 08 01 40 5A
00014 0018957641 8722 0004 08 01 82 4D
00015 0018957643 0722 0004 08 01 02 5A
```

#

You should now email this file to Klas at support@klasonline.com so that it can be analyzed. A support engineer will contact you shortly afterwards.

4.2. *KlasSplitter troubleshooting with the STE*

4.2.1. Called Party Number configuration

Problems may arise in establishing the second B channel of your 128K connection. This is often due to an incorrect number being dialled for the second B channel. KlasSplitter can be used to circumvent this problem by using KlasSplitter Config to set the Called Party Number for the second call (B2). This is usually the secondary Directory Number of the answer-side STE when dialling a STE in the US.

If the secondary directory Number is:
1231231232

Then the Called Party Number for B2 should be:
0011231231232#.

4.2.2. Security Incompatibility

Following setup of the first B channel, the STEs exchange security information to verify that they have the correct security settings. Possible reasons for a Security Compatibility failure are:

- Dial STE is in Secure Voice 32kb/s mode while answer STE answers in data mode. This occurs if 'SECDATA' is not pressed before dialling.
- The dialled number doesn't match that in the SPID/DN information of the answer STE
- There is a mismatch in the ACL lists. Note that the answer STE may have multiple entries but the dial STE should only have the answer STE's DAO.

4.2.3. Secure Application Control System

Remote Control must be enabled in order for a STE to answer a particular STE. There are two different types of Remote Control:

- Remote Authentication and
- Secure Application.

Secure Application is used for 128K data so Remote Authentication is disabled. The ACL list is a list of 6-digit numbers. An organisation will get one DAO and STEs that want to dial each other must have that DAO in the ACL list of dial and answer STE.

4.2.4. Manual Answer vs. Auto Answer

STE can be operated in a Manual Answer or Auto Answer mode. However with 128K connections over satellite the STE can only be used in Auto Answer mode. The difficulties with using Manual Answer can be illustrated as follows:

Put the answer side STE in Manual Answer mode by disabling Auto Answer. A SV32 call is first established in manual mode by dialling the primary SPID of the answer STE. Go off-hook at the answer side and then users on both sides must press 'NonSecure' to go to non-secure mode. Press 'secure data' on dial or answer side to establish the second channel. The answer STE will then start ringing but it can only answer multiple ISDN voice calls in voice mode and there is therefore no method of answering the second call. Auto answer must therefore be used for a 128K data connection.

4.2.5. Connectivity issues

128K operation requires that 2 B channels established over separate M4 satellite terminals be bonded together to form a 128K link. Congestion can occur on the satellite network or at the Land Earth Station linking the satellite network to ISDN. If your satellite phone indicates conditions such as "LES congestion", "MES busy" when establishing a call then retry the connection leaving a 10 second gap between call termination and the next call attempt.

5. Uninstalling KlasSplitter Config

KlasSplitter Config can be uninstalled by running the Uninstall program from 'Start' > 'Programs' > 'KlasSplitter Config'.

Alternatively you can uninstall in the usual way using 'Control Panel' > 'Add or Remove Programs'.

6. Appendices

6.1. Connectivity devices

Satellite Terminals

NERA World Communicator M4

Thrane & Thrane M4

OSS E-lite M4

DTE devices

KlasHopper 600

Cisco 1600 router

Cisco 1700 router

Bulk Encryption Devices

STE

BRENT ISDN

BRENT 2

6.2. Manual Configuration Commands

KlasSplitter may also be configured using a Hyperterminal session if you cannot install KlasSplitter Config. Please note that certain combinations of commands are not compatible and in-depth ISDN knowledge is required before using these commands.

Commands can also be entered using Hyperterminal with the following settings:

| | |
|---------------|----------|
| Speed: | 115200 |
| Data Bits | 8 |
| Parity: | None |
| Stop Bits: | 1 |
| Flow Control: | Hardware |

Hit <Return> a number of times and you will get a '#' prompt.

The KlasSplitter Config commands must have the correct syntax and be complete, including all blanks. The entry is not case sensitive. The values in bold are factory defaults. The usage is:

[?]<command>[=parameter]

Example to **set** the device such that the ISDN ports are not activated after power on:

iinit=0

Example to **show** the activation profile:

iinit

Example to **show all** selectable activation profiles:

?iinit

Note:

Please make sure that after altering any parameter and storing, you reset KlasSplitter.

6.2.1. KlasSplitter Commands

defa
default settings

Sets up factory default parameter setting.

defa 0: setup all parameter concerning data port

defa 1: setup all parameter including ISDN protocol and MSN settings.

iinit
ISDN initialisation after power ON

Defines the behavior of the KlasSplitter after Reset. If set to 1 the ISDN interface will be automatically activated after Power ON. As a result, the LED1 will show the correct state regarding the ISDN line.

If set to 0, the TA stays passive to the ISDN line after power on, the LED1 will stay blinking till the first successful communication through the ISDN line takes place.

- iinit **0** : no activation after Power On
- iinit **1** : Automatic activation after Power On
- iinit **2** : Automatic activation every time the S-Bus is deactivated
- iinit **3** : Automatic Tei-Request after Power On
- iinit **4**: Automatic Tei-Request and LAPD link setup after Power On
- iinit **5** : Automatic Tei-Request and LAPD link setup and Restart after Power On (X.25 D channel only)

reset
reset KlasSplitter

Resets the whole functionality of the KlasSplitter by a forced hardware reset (like Power off / on).

save **store parameter changes**

Stores the actual set of parameters in non volatile memory

show **show parameters**

Displays the actual set of parameters

showall **show all parameters**

Displays the all accessible parameters

ver **show version string**

Displays the complete version string including software creation date.

<cmd>? **more information for one command**

Displays the allowed values for one selected command *<cmd>*

ccifnr **Set B2 number to dial**

ccifnr=xxxx Set B2 number. Ensure '#' is appended to the number

6.3. Tracing Commands

For more sophisticated debugging an internal trace function is implemented. This logging mechanism allows the setup of ISDN calls through KlasSplitter to be analysed.

trcclr **clear trace buffer**

trcclr clear actual tracebuffer contents

trcread **read trace buffer**

trcread Output of the complete tracebuffer in hexadecimal chars (ASCII, max. line length 72 chars).
Before reading out B channel data you have to stop tracing using the command *trcoff*.

Every entry of the trace buffer is output using the following format:
Entry number – Timestamp – Type – Length – Databytes

Entry number Sequence number of entry

Timestamp in units of 10 ms

TypeAndSource Source of traceentry:

bit0-7: type from tracemask

bit8-14: source of traceentry:

0100 : B channel layer 1 (bl1)

0200 : B channel layer 2 (bl2)

0500 : D channel layer 1 (dl1)

0600 : D channel layer 2 (dl2)

0700 : D channel layer 3 (dl3)

0900 : Serial line (sl1)

bit15: 0xxx : incoming event (from ISDN line)

8xxx : outgoing event (to ISDN line)

“FFFF” : Reset for firmware

Length Length of following data bytes

Databytes Data bytes; continued lines are indicated by an “>”.

Coding of trace data bytes dependent of *TypeAndSource*:

0202/8202: B channel HDLC frames

0501/8501: D channel layer 1 status
0 : deactivated
1 : activation pending
2 : activated
3 : deactivation pending

0502/8502: D channel layer 1 C/I code
1c : Power up
00 : Deactivate request
08 : Slip detected
0c : Disconnected
18 : Error indication
10 : Level detected
20 : Activate request downstream
28 : Test indication
2c : Awake test indication
30 : Activate indication priority 8
34 : Activate indication priority 10
3c : Deactivate indication downstream

07x2/87x2: D channel messages,
coding refers to Q.931 and ETS 300102-1.
Coding of Message Type
within D channel layer 3 message – 4th data byte
in trace output:

| Message code (Hex) | Message name |
|--------------------|---------------------|
| 01 | ALERTING |
| 02 | CALL PROCEEDING |
| 03 | PROGRESS |
| 05 | SETUP |
| 07 | CONNECT |
| 0D | SETUP ACKNOWLEDGE |
| 0F | CONNECT KNOWLEDGE |
| 20 | USER INFORMATION |
| 21 | SUSPEND REJECT |
| 22 | RESUME REJECT |
| 25 | SUSPEND |
| 26 | RESUME |
| 2D | SUSPEND ACKNOWLEDGE |
| 2E | RESUME ACKNOWLEDGE |
| 45 | DISCONNECT |
| 46 | RESTART |
| 4D | RELEASE |
| 4E | RESTART ACKNOWLEDGE |
| 5A | RELEASE COMPLETE |
| 60 | SEGMENT |
| 75 | STATUS ENQUIRY |
| 79 | CONGESTION CONTROL |
| 7B | INFORMATION |
| 7D | STATUS |
| 7E | NOTIFY |

0602/8602: D channel LAP-D frames,
coding refers to Q.921

0901/8901: Serial line control line change:
bit0 : 1 = DSR is ON
bit1 : 1 = DCD is ON
bit2 : 1 = CTS is ON
bit3 : 1 = RING is ON
bit4 : 1 = RTS is ON
bit5 : 1 = DTR is ON

0910/8910: Serial line LAP-B frames

| trcdln | length of trace entry |
|---------------|--|
| trcdln xx | set trace buffer entries to a maximum length of xx. (default: 256) |

6.4. LED Status Display

Active states:

| L1 | L2 | Status |
|--------------|-----------|---|
| ⊗ | ⊕ (2sec) | Power-On-Phase; Wait |
| ⊕ (1x1s) | ○ | ISDN not OK; Check ISDN interface/ -connector |
| ⊗ | ○ | Active phase; ISDN OK, no ISDN connection established |
| B1,B2 | | Status B channels |
| ○ | | B channel offline |
| ⊗ | | B channel online; ISDN connection established |

Error states:

| L1 | L2 | Status |
|-----------|-----------|--|
| ○ | ○ | KlasSplitter not OK; |
| | | Hardware error, KlasSplitter repair necessary |
| ⊕ | ○ | ISDN not OK; Check ISDN interface/ -connector |
| ○ | ⊕ (nx1s) | KlasSplitter not OK; |
| | | Hardware error, KB128 repair necessary |
| ⊕ | ⊕ | B1, B2 flashing; Bootloader active, no operational firmware programmed. Use KlasSplitter-Config to download firmware |

LED Legend:

| | | | |
|---|--------|--|-------------|
| ⊗ | On | | |
| ∅ | occ | short on, long off | Cycle 1 sec |
| ⊕ | fl | long on, short off | Cycle 1 sec |
| ⊕ | (nxms) | continuous blinking: <i>n</i> times every <i>m</i> seconds | |
| ○ | Off | | |

6.5. Contact Information and Troubleshooting

Please report any problems encountered during the installation or use of KlasSplitter.

Sales & Support Enquiries:

Web: www.klasonline.com
Email: sales@klasonline.com
support@klasonline.com

Tel: USA toll free 1-866-263-5467
Tel: Canada toll free 1-866-296-5199
Tel: UK toll free 0800-056-4250
Tel: International +353-1-662-4270

Fax: USA toll free 1-866-532-3091
Fax: Canada toll free 1-866-237-0879
Fax: UK toll free 0800-056-4366
Fax: International +353-1-662-4272

Postal Address:

Klas Ltd.,
Bracetown Business Park,
Clonee,
Co. Meath,
Ireland.