Documentation of the test_tool Program

1. Running the program from the command line

The SCTP-Test program is controlled by a script file (see chapter 2)

The name of the script file must be specified as a command line parameter:

```
test_tool <scriptfile>
```

The program directory contains two examples of script files ("script1" and "script2"). They can be run on different machines and do some (useless) communication. Of course, IP-addresses in the INITIALIZE and ASSOCIATE commands have to be adapted first.

2. The Script File

2.1 Syntax description

The syntax of commands depends on whether they have parameters or not. If parameters are specified, they always consist of a key and a value. The value may either be a positive integer or a character string. Character strings may optionally be enclosed in quotation marks (see remarks below).

COMMAND;
COMMAND: *PARAMKEY=VALUE*, *PARAMKEY=VALUE*, ... ;

- Spaces can be omitted.
- If parameter values are enclosed in quotation marks, they may contain any printable characters (including punctuation marks). Without quotation marks, only alphanumeric characters, dots and underscores are allowed.
- The case of letters does not matter, as the parser automatically converts everything to upper case, unless it is enclosed in quotation marks.

Comments are preceded by at least one '#' character and may occur anywhere in the script file:

 # COMMENT (to be printed on 'stdout' when reached in script file)
COMMENT (NOT to be printed)

Examples:

```
INITIALIZE: IP=192.168.0.1, PORT=10000, INSTREAMS=15, OUTSTREAMS=15;
SET_PAYLOAD_BODY: CONTENTS="Hello, world!", LENGTH=200;
DISABLE_RECEIVE;
```

2.2 Commands and Parameters

2.2.1 Loops

Syntax: LOOP: TIMES=<*number of executions of the loop body*>;
<loop body>
ENDLOOP;

- Loops can also be contained within other loops.

2.2.2 Initialization

Command: INITIALIZE
Parameters: IP=<*local IP address*>
PORT=<*local port*>
INSTREAMS=<*maximum number of in-streams*>
OUTSTREAMS=<*maximum number of out-streams*>

- This must be the first command in the script file.

2.2.3 Pause in script

Command: PAUSE
Parameter: TIME=<*delay time in milliseconds*>

- This command interrupts the script process for the specified time, but does not block callback events.

2.2.4 Wait for an association

Command: WAIT_FOR_ASSOC
Parameters: none

- Interrupts the script process until an association is established.

2.2.5 Associate

Command: ASSOCIATE
Parameters: IP=<*destination IP*>
PORT=<*destination port*>
OUTSTREAMS=<*number of out-streams*>

2.2.6 Shutdown an association

Command: SHUTDOWN
Parameters: none

- Sends a "shutdown" chunk to the peer, if an association exists.

2.2.7 Abort an association

Command: ABORT
Parameters: none

- Sends an "abort" chunk to the peer, if an association exists.

2.2.8 Send chunks

Command: SEND_CHUNKS
Parameters: NUM=<*number of chunks to be sent*>
DELAY=<*delay (in msec) between two successive chunks*> (*optional;* default: 0)
STREAM=<*stream ID*> (*optional;* default: 0)

- Sends the specified number of chunks; the payload contents can be set with SET_PAYLOAD_HEADER and SET_PAYLOAD_BODY.

2.2.9 Disable chunk receive on stream 0

Command: DISABLE_RECEIVE

Parameters: none

- When receiving is disabled, all incoming chunks stay in the reception queue until ENABLE_RECEIVE is called or the association is closed.

- Disabling chunk reception on other streams than 0 is not implemented in this version.

2.2.10 Enable chunk receive (on stream 0)

Command: ENABLE_RECEIVE
Parameters: none

- This is the default setting after initialization.

- When this command is called, all chunks that are still in the reception queue will be retrieved.

2.2.11 Set payload header

Command: SET_PAYLOAD_HEADER
Parameters: TYPE=<*TYPE in hexadecimal format (2 bytes)*>
MBU=<*MBU in hexadecimal format (1 byte)*>
MCH=<*MCH in hexadecimal format (1 byte)*>
JC1=<*JC1 in hexadecimal format (1 byte)*>
JC2=<*JC2 in hexadecimal format (1 byte)*>

- The default values are 0

2.2.12 Set payload body

Command: SET_PAYLOAD_BODY
Parameters: CONTENTS=<*payload body*>
LENGTH=<*body length*>

- Default values:
  CONTENTS=ABCDEFGHIJKLMNOPQRSTUVWXYZ
  LENGTH=26

- If the CONTENTS string is enclosed in quotation marks ("), it may contain any printable characters. In addition, non-printable characters can be represented by a backslash (\), followed by the character's hexadecimal ASCII-code (2 digits). Backslashes and quotation marks that shall not be used as control characters must also be substituted by their ASCII-codes. (See also section 2.1)
  Example: If you specify `CONTENTS="abc\64\65\66"`, the payload body will contain the string `abcdef`, as 64, 65 and 66 are the hexadecimal ASCII-codes of 'd', 'e' and 'f'.

- If the LENGTH value is greater than the actual length of the CONTENTS string, the payload body is filled up to the specified length, using the CONTENTS string repeatedly.
  Example: if the CONTENTS string is set to "abc" and the LENGTH is set to "10", the payload body will actually be set to "abcabcabca".

- The LENGTH value is ignored if it is less than the actual length of the CONTENTS string.

2.2.13 Set receive mode

Command: SET_RECEIVE_MODE
Parameter: MODE=MIRROR | DISCARD

- Default: DISCARD

- When data arrives in mirror mode, a chunk is sent back to the sender; the payload of this chunk can be set by SET_PAYLOAD_HEADER and SET_PAYLOAD_BODY.

2.2.14 Set Heartbeat Time Interval

Command: SET_HEARTBEAT
Parameter: TIMEINTERVAL=<*heartbeat time interval in msec*>

- Heartbeats are turned off if TIMEINTERVAL is 0.

2.2.15 Set local receiver window size

Command: SET_RWND
Parameter: SIZE=<*size of local receiver window in bytes*>

2.2.16 Set local receive queue size

Command: SET_RECV_QUEUE
Parameter: SIZE=<*maximum number of chunks queued in the receive queue*>

- This is currently not implemented in the SCTP prototype, so changing this value will have no effect.

2.2.17 Set acknowledge delay

Command: SET_ACK_DELAY
Parameter: ACK=<*acknowledge delay in msec*>