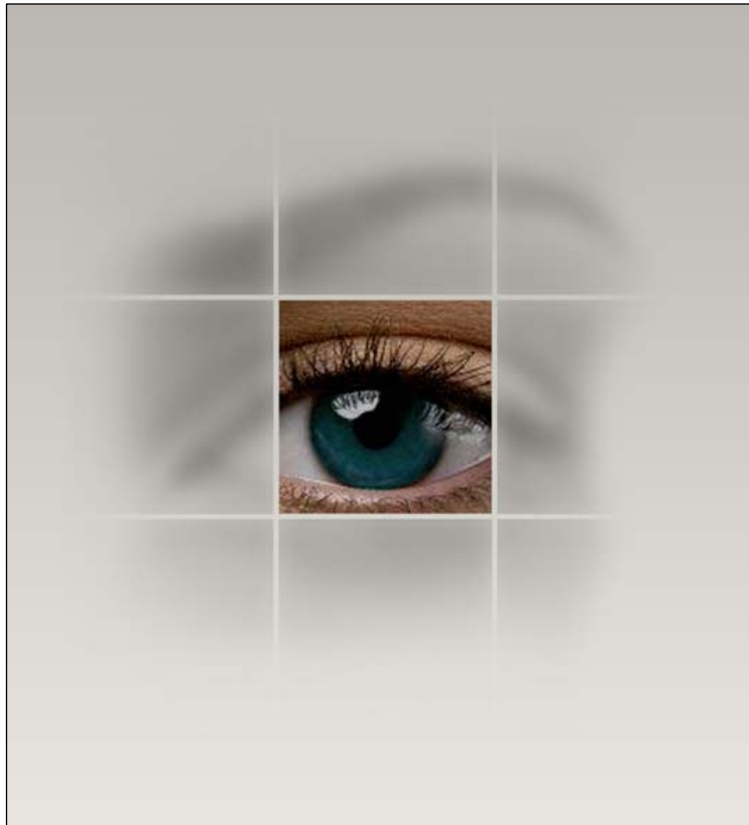




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Enter the Intelligent Communication Age!

SGA-XS Portable T1/E1 Tester



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1. General Description

The SGA-XS Portable T1/E1 Tester is the newest member of the SGA (Signaling Generator and Analyzer) family. The Tester can monitor 2 bidirectional 1544 kbps (T1) or 2048 kbps (E1) trunks. It is a small box, which is connected to the USB port of an IBM compatible PC, typically a Notebook or eventually a desktop computer if portability is not needed.

High level processing and data visualizing applications run on the computer. This way the Tester – combined with a PC - provides complex measuring services – e.g. protocol or BER testing at a significantly lower price than most available measuring instruments with similar features. SGA-XS is the most economic solution for monitoring and analyzing signaling traffic on primary PCM trunks.

1.1 Technical Data

- 2 x RJ45 connections, with 4 x T1/E1 Rx/Tx interfaces
- Terminations: 120/1200 (or optionally 100/1200 Ohms symmetrical or 75 Ohms asymmetrical connection with external transformers)
- Line codes: AMI, HDB3, B8ZS
- Frames: G.703 unframed, G.704 framed CAS, CCS, CRC4, CRC6
- Included speaker (with μ - and A-law decoder)
- Supports USB v1.0 / v2.0 version
- Low power consumption – fed from USB port
- Supports Win2000/XP operation systems

1.2 Application Possibilities

- Capturing signaling traffic on T1/E1 trunks
- Testing ANSI SS7/ITU C7/HSL, GPRS, DSS1, ATM links
- Detailed protocol decoding and analysis
- B.E.R.T.: Bit-Error Ratio Testing (G.821 and M.2100)

1.3 The SGA-XS Tester

The SGA-XS Tester is a flexible but simple to use and small-sized device.

The connection points on the Tester:

- 1 standard USB-A connector for the PC
- 2 RJ-45 connectors for the T1/E1 PCM trunks

There are 1 “operation” and 4 status signaling LEDs on the top of the box. The red LED gives information about the operation of the Tester and the green LEDs mark the presence of line signals at the inputs.

The Figure below is the top view of the box:

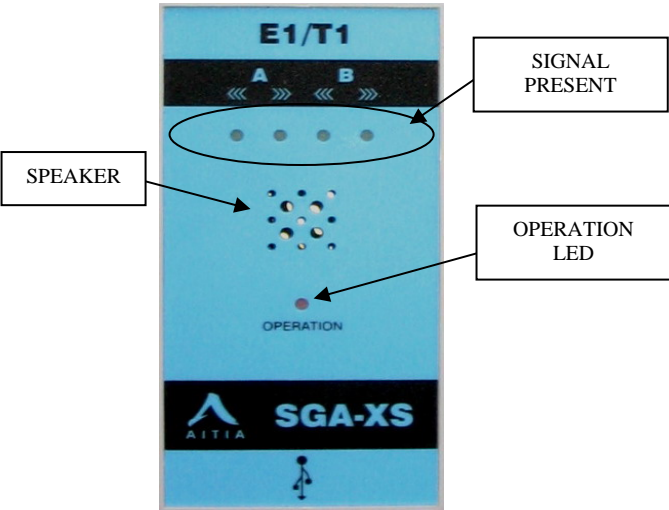


Figure 1: Top view of SGA-XS

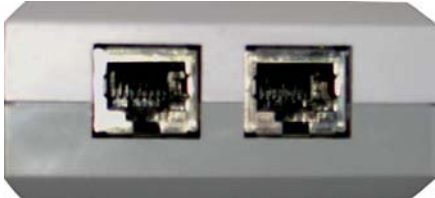


Figure 2: RJ-45 connectors for E1

Pin assignment of RJ45 connectors:

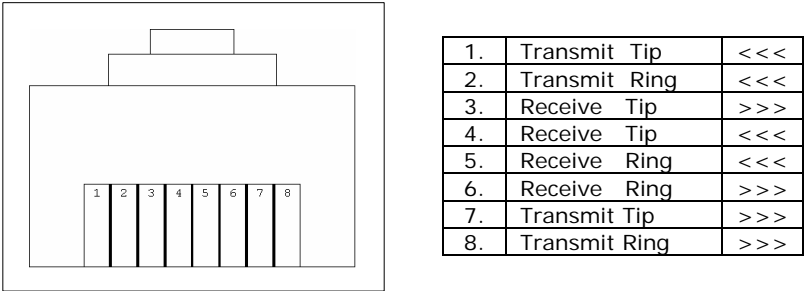


Figure 3: Trunk line connector pins

Status indication by the LEDs

There are 3 display states of the "OPERATION" LED:

- The LED is off: the Tester is not connected to the PC or no software has been run on it since the connection.
- The LED is blinking: a critical error occurred during uploading the software.
- A LED is on: the Tester is working normally.

The green LEDs mark the presence of the line signals at the input. If a LED is on, the signal level on the input is higher than -12dBr (0 dB=2,37 Vp)

2. SGA-XS Manager

After starting the **SgaXsManager.exe** program the **SGA-XS Manager** window appears, which displays the supported framing and applications, as well as the status of all SGA-XS Testers connected to the PC. It is used to manage the devices and applications. The SGA-XS Manager should run during all testing time and it can be used to start several different applications at the same time.

One PC can handle as many as **8** Testers simultaneously. One application program can operate one Tester but several programs can be run at the same time. After starting the program, the connected Testers and their status are shown in the **SGA-XS Manager** window. As soon as one of the Testers and Applications is selected, its Main Window appears which facilitates the setting of parameters and the control of the program operation.

If you want to run an application on the device, but another program is using it, you have to exit first from the running program then a new application can be started.

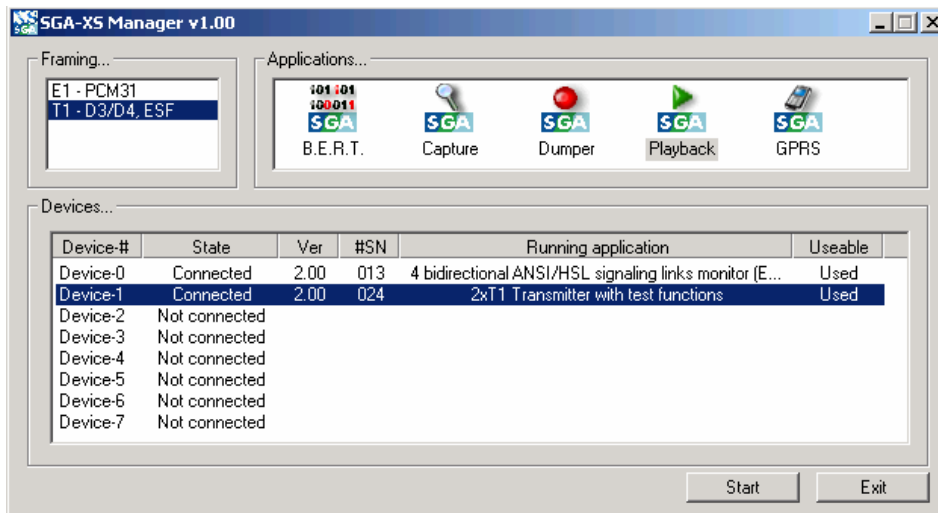


Figure 4: SGA-XS Manager Window

This view contains three different parts: Framing, Applications, and Devices. The latest version supported three framing and five applications.

Supported framing:

- E1-PCM32
- T1-ESF, D3/D4

Applications:

- **B.E.R.T.:** Bit-Error Ratio Testing (G.821 and M.2100)
- **Capture:** ANSI SS7/ITU C7/HSL protocol monitoring with filtering
- **Dumper:** live timeslot analyzing and capturing for further applications
- **Playback:** earlier captured signaling stream can be played back.
- **GPRS:** signaling monitoring for GPRS protocol

The six columns contain the following information:

- **Device-#:** Identifying the the device.
- **State:** Status of the USB port which can be:
 - not connected: The device is not connected.
 - connected: The device is connected.
- **Ver.:** The SGA-XS Tester's version number.
- **#Sn:** Serial number.
- **Running application:** Application running on the device.
- **Useable:** The „Used“ label indicates whether the device is being used by another program and the given device cannot be used while the other program is running.

It may happen that the Tester is not listed; in this case the reconnection of the device could be the solution. The filter information is refreshed every second. When the „**SGA-XS Manager**“ is running, unused devices can be removed and new ones can be connected to the PC.

If an application is running on a device, the removal of the device is not advised because the operating program will stop.

An application can be started by a double click on the icon of the application or by clicking on "**START**". Then the Main Application Window appears.

By pressing "**EXIT**", you can exit from the Manager program, but the running applications are not affected.

3. SS7/HSL Monitor Application (Capture)

This program has been created for SS7/C7 and HSL signaling monitoring. With this program any signaling problem can be detected easily. The user interface allows for setting configuration parameters including the terminations and the specification of filtering conditions, and it can display the link status as well as the statistical and measuring data.

3.1 Main Window of the Monitor Program

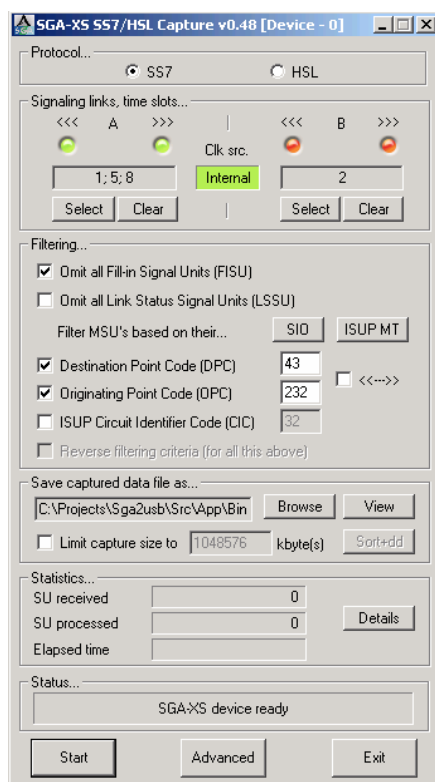


Figure 5: Capture Main Window

Note: ANSI/HSL main window looks the same as the SS7/HSL main window.

The Main Window can be divided into seven parts:

3.1.1 Protocol (link type) Selector

Here the monitoring of the C7/SS7 (single slot) or the HSL (multislot) links can be selected. After the selection a confirming dialog window appears.

Attention: Measuring results are deleted when the selection is changed!

3.1.2 Status and Timeslot Marking

This part of the screen is divided into 2 parts, which correspond to connections „A” and „B” on the box. The color of LED imitations indicates the status of the input which can be the following:

- **Grey:** Input is inactive.
- **Red:** Input is active but there is no input signal.
- **Yellow:** There is an input signal but no frame sync.
- **Green:** There is both input signal and frame sync.

After pressing "**Select**", a new dialog window appears where timeslots can be selected for monitoring. This timeslot selecting window is different for monitoring SS7, C7 (single timeslot) and HSL (multitimeslot) protocols.

By pressing "**Clear**", the settings can be cleared.

The source of time-stamping clock signal can also be selected here. If the LED is red, the selected clock is not applicable – in this case the internal clock signal is used.

3.1.3 Filtering Configuration

The following configurations can be set:

- FISU filtering
- LSSU filtering
- **SIO** key invokes SIO filter dialog
- **ISUP MT** key invokes ISUP message type dialog
- Destination Point Code (DPC)
- Originating Point Code (OPC)
- Circuit Identifier Code (CIC)
- Reverse filtering criteria: it filters by the inverse of the set conditions

3.1.4 File Saving

The monitored data is saved into files with DSP extension. Post- or real-time processing and decoding of these files can be performed with the program SGA-7W.

The decoder program can be started by pressing the "**View**" button. At the first starting of the monitoring application the access path of sga-7w.exe should be given.

Maximum size of the file can be set by the "**Limit capture size to**" option.

3.1.5 Statistics, Counters

The Main Window displays some short, summarizing information about the running monitoring operation as follows:

- **Received SU counts:** Number of SUs (Signaling Units) received by SGA-XS before hardware filtering.
- **Processed SU counts:** Number of SUs processed by the PC after hardware filtering but before software filtering.
- **Elapsed time:** The elapsed time since the start of monitoring.

By pressing **Details**, more detailed counters appear in the **Result** window.

There are three groups of the detailed counters as follows:

- Physical
 - LOS: occurrence of Loss Of Signal
 - LOF: occurrence of Loss Of Frame
 - AIS: occurrence of Alarm Indication Signal
 - ...
- Signal Unit
 - FISU: number of FISUs
 - LSSU: number of LSSUs
 - MSU: number of MSUs
 - Ratio: number of MSUs relative to all SUs, in %
 - Rate: signaling rate in kbps
 - CRC: number of SUs received with CRC error
 - Ratio: number of SUs with CRC error relative to all SUs, in %
- Filter
 - Total: number of SUs processed
 - Saved: number of SUs saved
 - ISUP: number of decoded ISUP messages
 - SCCP: number of decoded SCCP messages
 - Filtered
 - SIO
 - ISUP MT
 - OPC/DPC
 - CIC

3.1.6 Status

It provides information about the operating state of the application.

The most important states:

- SGA-XS device ready (the hardware setting has been successful)
- Capture started
- Capture stopped
- Processes shutdown
- USB device shutdown

3.1.7 Operating Keys

There are three main operating keys:

- **Start/Stop:** Starts and stops the monitoring
- **Advanced:** Additional settings (see later).
- **Exit:** Log-out from the program.

3.2 Timeslot Selecting Dialog Window

There are four different timeslot selecting windows, depending on whether C7/SS7 (single timeslot) or HSL (multitimeslot) protocol monitoring is performed.

3.2.1 SS7 Signaling Monitoring

Selection of timeslots can be done in the **"Timeslot select"** window. Timeslots can be selected automatically or manually.

With the first method, all timeslots are analyzed, and the slots with signaling traffic (containing HDLC frames) are marked with green. Information about the two directions of transmission is given separately. Directions in which signaling traffic is not found are marked with red.

The other possibility is to set timeslots manually; in this case the user marks the timeslots to be monitored.

By turning on the **"w/payload"** switch, those timeslots are searched in which not only FISUs are transmitted within 100 ms.

By pressing **"Scan"**, the signaling traffic search algorithm can be started.

By pressing **"Clear"**, the settings are cleared.

The Tester can monitor four HDLC links (either single- or multitimeslot) at the same time resulting in the following restrictions:

- either the four links are selected automatically on the two interface pairs, or
- in case of manual selection, if eg. three links have already been selected on one interface, just one link can be selected on the other.

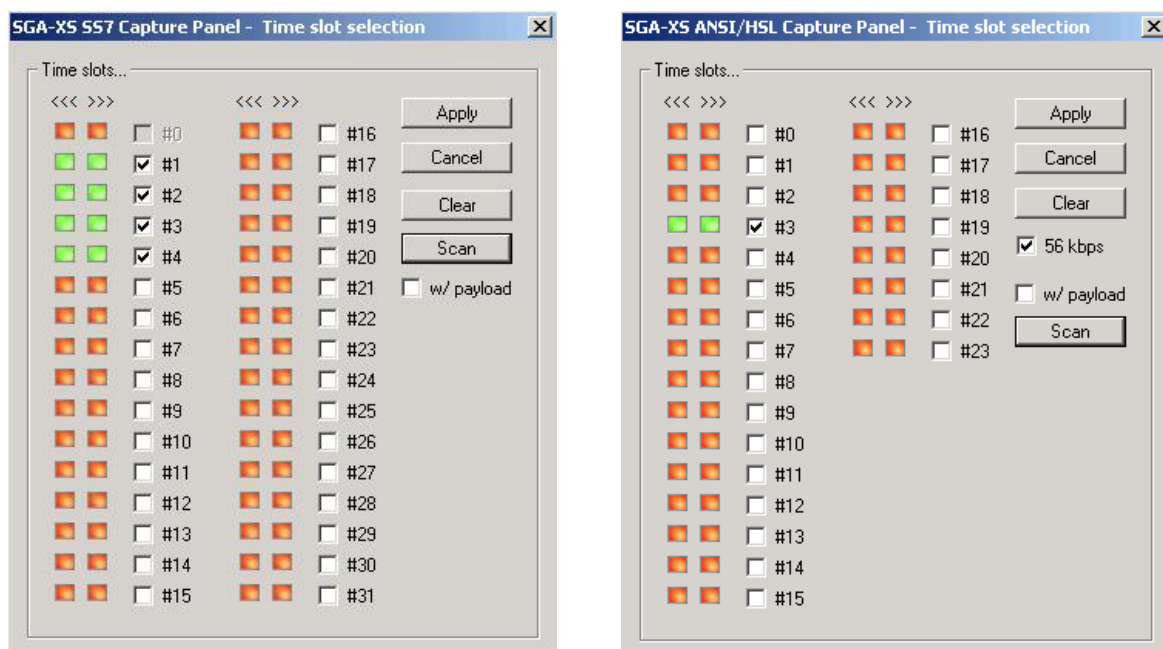


Figure 6: Timeslot selection (E1 and T1)

2.3.2 HSL Signaling Monitoring

Using HSL signaling monitoring, several timeslots can be combined, which are not necessarily adjacent. The program in this case can also monitor four links – and the selection is illustrated by colors. The four links divides automatically between the two slots. E.g. if one link is selected on side „A“, only three links can be chosen on side „B“.

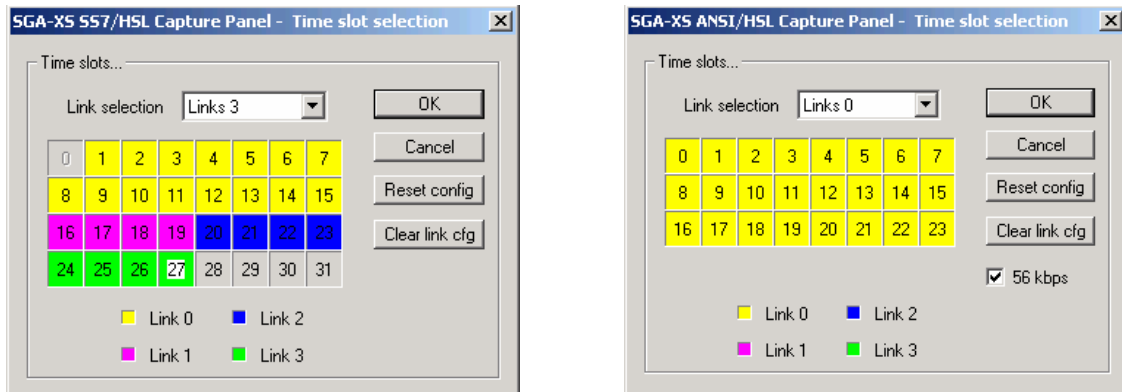


Figure 7: HSL time-slot selection (E1 and T1)

In the „**Link selection**“ menu the free links are listed.

By pressing „**Reset config**“, the settings of all links are cleared.

By pressing „**Clear link cfg**“, the settings of the selected link are cleared.

By checking „**56 kbps**“, 56 kbps data steam rate is selected, unchecked state means 64 kbps rate.

By pressing „**OK**“, settings will be saved and the timeslot number of selected links will appear in the Main Window.

3.3 Protocol Filtering (SIO, ISUP MT)

In this section, the settings of SIO and ISUP MT filtering are described. Filtering for selected messages can be set or cancelled. It is possible to set or cancel the filtering of each message types at the same time and only the selected type(s) will be processed, while others are filtered and will not be saved.

3.3.1 SIO Filtering

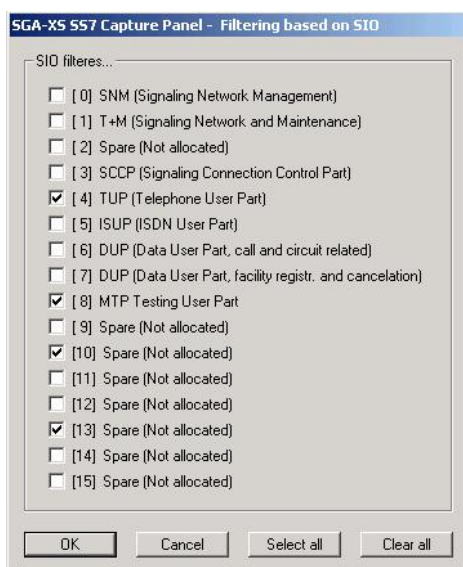


Figure 8: SIO filtering

Possible filtering conditions: **SNM, T+M, SCCP, TUP, ISUP, DUP, MTP.**

3.3.2 ISUP MT Filtering

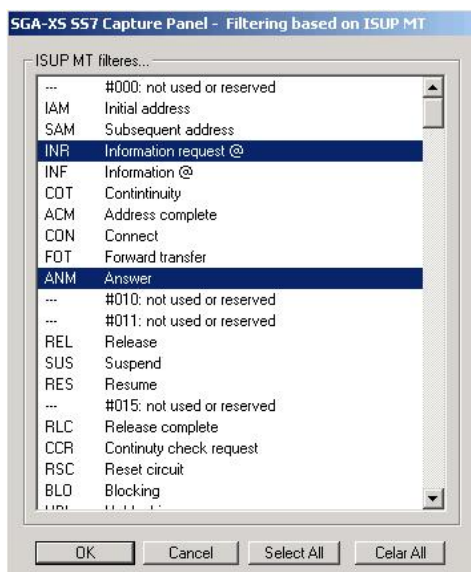


Figure 9: ISUP MT

Filtering conditions: **IAM, SAM, INR, INF, COT, ACM, CON, etc.**

3.4 Statistics

Statistical data that are collected while the program is running can be seen here. Data appear in three windows: **physical parameters, signal packages, and filtered packages**. In case of monitoring single timeslot signaling systems, the selected channel and the timeslot number appear in the headings. In case of using HSL the selected link number appears (remark: „L” is the abbreviation of Link).

In the **“Physical”** window the alarm status of the analyzed PCM channel is shown: Loss of Frame (LOF), Loss of Signal (LOS), and Alarm Indication Signal (AIS).

In the **“Signal unit”** window the FISU, LSSU, MSU (number of SUs), Ratio (number of MSUs relative to all SUs including erroneous SUs), Rate (MSU traffic in kbps) signaling traffic data is shown. In separate lines the number and the ratio of SUs with CRC error are also shown.

In the **“Filter”** window the number of filtered messages is shown together with the number of messages written to the hard disk: ISUP, SCCP, and the filter parameters: OPC/DPC, SIO, CIC, ISUP MT.

By pushing **“Copy to log file”**, the results can be saved during the measuring process. There is a possibility for automatic saving which can be set in the **„Advanced”** window. **“Reset”** clears the counters in the actual window. **“Reset All”** clears all counters.

Param	A01 <<<	A01 >>>	N/A	N/A	B01 <<<	B01 >>>	N/A	N/A	SUM <<<	SUM >>>
FISU	7457	7442	N/A	N/A	0	0	N/A	N/A	7457	7442
LSSU	0	0	N/A	N/A	0	0	N/A	N/A	0	0
MSU	9709	9464	N/A	N/A	0	0	N/A	N/A	9709	9464
ratio	56.559 %	55.980 %			0.000 %	0.000 %				
rate	54.49 kbps	54.48 kbps			0.00 kbps	0.00 kbps				
CRC	16	14	N/A	N/A	0	0	N/A	N/A	16	14
ratio	0.093 %	0.083 %			0.000 %	0.000 %				

Figure 10: Statistics - results

3.5 Additional Settings

In this dialog box some additional parameters of the Tester can be set:

- Line impedance terminations: 120/1200 Ohms or optionally 100/1200 Ohms
- Line coding: AMI, B8ZS(T1), HDB3(E1)
- Framing: D3/D4 (T1), ESF (T1), PCM32 (E1)
- Selection of clock signal source: Internal, A <<<, A >>>, B <<<, B >>> (input A or B, direction <<< or >>>)
- There is a possibility to save results automatically during the measuring process in every 1, 5, 10, 15, 30, 60 minutes.

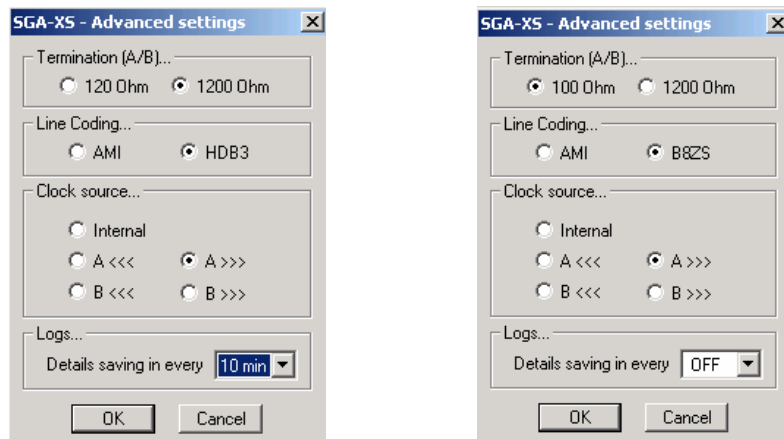


Figure 11: Additional setting possibilities (E1 - T1)

3.6 Log File

The program writes a log file in its library. The file name indicates the name of the application and the actual date.

The log file is saved in html format so it can be opened by any web browser. It contains the main events and failure reports.

At the start of a measuring session the actual settings, and at the end of the session the counter values are saved.

Also, by pressing **"Copy to log"**, the present counter values can be saved. All events have a time stamp which helps in their fast retrieval. Failure events are marked by red.

A log-file on the screen:

```
2006.08.29 16:16:14.234 B <<<: Link state changes to signal not detected
2006.08.29 16:16:14.234 B >>>: Link state changes to signal not detected
2006.08.29 16:16:14.781 "C:\Projects\Sga2usb\Src\App\Bin\Debug\SgaXsCapture.dsp" file exists
2006.08.29 16:16:15.187 "C:\Projects\Sga2usb\Src\App\Bin\Debug\SgaXsCapture.dsp" file created
2006.08.29 16:16:15.187 ----- Configuration -----
2006.08.29 16:16:15.187 HSL protocol enable..... OFF
2006.08.29 16:16:15.187 ----- Signaling links, time slots... -----
2006.08.29 16:16:15.187 Selected timeslot on channel A..... 1; 3; 4; 5
2006.08.29 16:16:15.187 Selected timeslot on channel B..... No timeslot selected
2006.08.29 16:16:15.187 ----- Filtering... -----
2006.08.29 16:16:15.187 Omit all Fill-in Signal Units (FISU)..... ON
2006.08.29 16:16:15.187 Omit all Link Status Signal Units (LSSU)..... OFF
2006.08.29 16:16:15.187 SIO under development
2006.08.29 16:16:15.187 ISUP MT under development
2006.08.29 16:16:15.187 Destination Point Code (DPC)..... OFF
2006.08.29 16:16:15.187 Originating Point Code (OPC)..... OFF
2006.08.29 16:16:15.187 ISUP Circuit Identifier Code (CIC)..... OFF
2006.08.29 16:16:15.187 ----- Save captured data file as... -----
2006.08.29 16:16:15.187 Limit capture size to..... OFF
2006.08.29 16:16:15.187 ----- Advanced... -----
2006.08.29 16:16:15.187 Termination..... 120 Ohm
2006.08.29 16:16:15.187 Timestamp clock source..... B >>>
2006.08.29 16:16:15.187 ----- Configuration finished -----
2006.08.29 16:16:15.203 Capture started ...
2006.08.29 16:16:15.703 B <<<: Link is inactive
2006.08.29 16:16:15.703 B >>>: Link is inactive
2006.08.29 16:16:17.250 A <<<: Link state changes to signal not detected
2006.08.29 16:16:17.250 A >>>: Link state changes to signal not detected
2006.08.29 16:16:18.250 A <<<: Link state changes to PCM sync detected
2006.08.29 16:16:18.250 A >>>: Link state changes to PCM sync detected
2006.08.29 16:16:18.250 A <<< [TS01]: CRC SU found
2006.08.29 16:16:18.250 A >>> [TS04]: CRC SU found
2006.08.29 16:16:23.765 A <<< [TS01]: CRC SU not found in the last 5 ms
2006.08.29 16:16:23.765 A >>> [TS04]: CRC SU not found in the last 5 ms
2006.08.29 16:16:26.828 Processes shutdown...
2006.08.29 16:16:27.656 Copy counters to log file...
2006.08.29 16:16:27.656 ----- Results -----
2006.08.29 16:16:27.656 Elapsed time: 0:00:12
2006.08.29 16:16:27.656 SU received: 1907
2006.08.29 16:16:27.656 SU processed: 1880
2006.08.29 16:16:27.656 ----- Physical -----
2006.08.29 16:16:27.656 <<< A >>> <<< B >>>
2006.08.29 16:16:27.656 LOS: 1 1 1 1
2006.08.29 16:16:27.656 LOF: 1 1 1 1
2006.08.29 16:16:27.656 AIS: 0 0 0 0
2006.08.29 16:16:27.656 ----- Signal unit -----
2006.08.29 16:16:27.656 <<< A01 >>> <<< A03 >>> <<< A04 >>> <<< A05 >>> <<< SUM >>>
2006.08.29 16:16:27.656 FISU: 0 27 0 0 0 0 0 0
2006.08.29 16:16:27.656 LSSU: 0 0 0 0 0 0 0 0
2006.08.29 16:16:27.656 MSU: 0 943 0 0 935 0 0 935 943
2006.08.29 16:16:27.671 ratio[]: 0.000 97.216 0.000 0.000 100.000 0.000 0.000 0.000
2006.08.29 16:16:27.671 rate[kbps]: 0.000 63.811 0.000 0.000 63.880 0.000 0.000 0.000
2006.08.29 16:16:27.671 CRC: 0 1 0 0 1 0 0 0 1
2006.08.29 16:16:27.671 ratio[]: 0.000 0.103 0.000 0.000 0.107 0.000 0.000 0.000 0.107 0.103
2006.08.29 16:16:27.671 ----- Filter -----
2006.08.29 16:16:27.671 Total: 0 944 0 0 936 0 0 936 944
2006.08.29 16:16:27.671 Saved: 0 944 0 0 936 0 0 936 944
2006.08.29 16:16:27.671 ISUP: 0 48 0 0 62 0 0 62 48
2006.08.29 16:16:27.671 SCCP: 0 56 0 0 69 0 0 69 56
2006.08.29 16:16:27.671 Filtered: 0 0 0 0 0 0 0 0 0
2006.08.29 16:16:27.671 SIO: 0 0 0 0 0 0 0 0 0
2006.08.29 16:16:27.671 ISUP MT: 0 0 0 0 0 0 0 0 0
2006.08.29 16:16:27.671 OPC/DPC: 0 0 0 0 0 0 0 0 0
2006.08.29 16:16:27.671 CIC: 0 0 0 0 0 0 0 0 0
2006.08.29 16:16:28.687 Capture stopped ...
2006.08.29 16:16:28.687 B <<<: Link state changes to signal not detected
```

Figure 12: Log screen

4. DSP File Player (Playback)

By the Capture application saved data (C7/SS7/HSL) can be played back on E1/T1 interfaces. It is a passive application, which means it does not modify, change the signal units queue and add new signal unit to the captured data, but it can facilitate speed increasing and decreasing, error insertion: LOS, AIS, FSN and BSN errors, long and short signal unit(s), etc.

4.1 Main Window of the Player Program

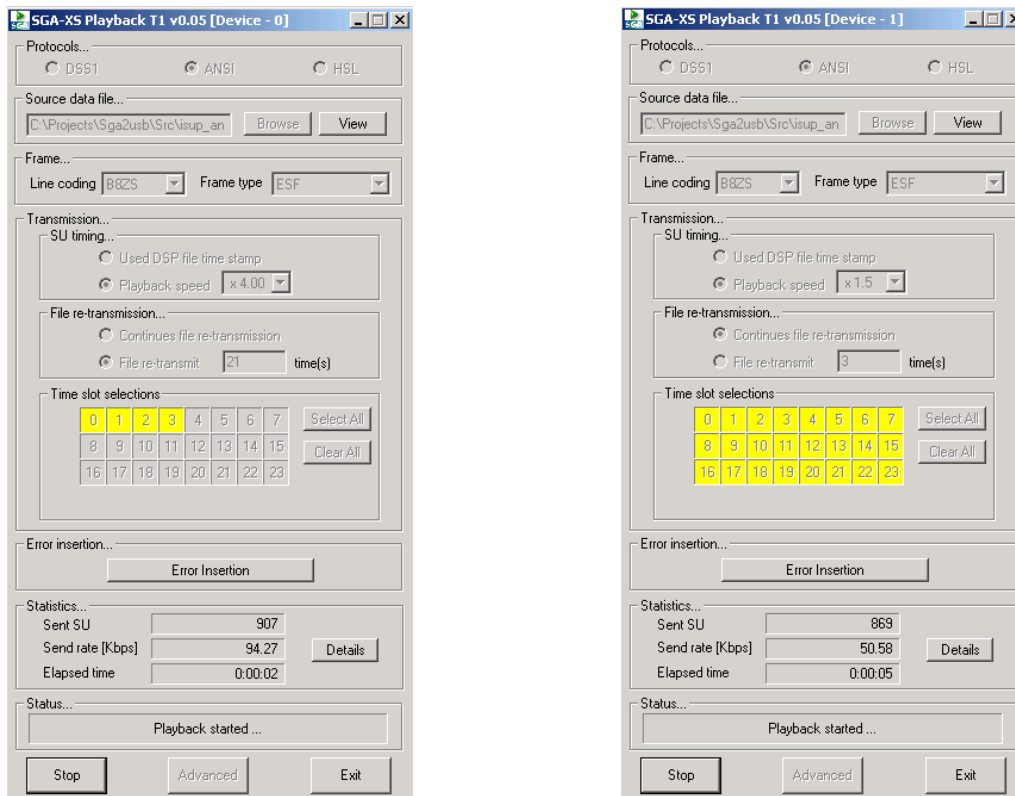


Figure 13: Playback Main Window

4.1.1 Protocol (link type) Selector

Itt lehet kiválasztani az adás protokollját:

- DSS1 (64 kbps) / ITU C7 (64 kbps) / HSL (nx64 kbps)
- ANSI SS7 (56 kbps) / HSL (nx56 kbps)

4.1.2 File Source

By pressing „**Browse**”, source file can be set and by pressing „**Viewer**” can be checked and read the DSP file. At the first time the **Viewer** directory is had to set.

4.1.3 Transmission settings

It contains three parts:

- SU timing: One of two timing modes can be selected:
 - Playback with the original timestamps contained in the stored DSP file.
 - Playback with increased or decreased speed:
 - Increase:
 - Full: Playback with maximum speed, almost continuous sending without filling flags or messages.
 - Other rate multipliers : x8, x4, x2, x1.75, x1.5, x1.25
 - Decrease: x0.75, x0.5, x.25, x0.1, x0.05, x0.01
- The repetitions can be also selected here:
 - Playback repetitions until the "STOP" is pressed.
 - The number of playback repetitions can be set.
- The transmitting time slots can be selected here by clicking on the timeslot number. The „Clear All" clears all selections, while the „Select All" selects all timeslots.

4.1.4 Error Insertion

During the playback process various errors can be inserted into the output signal. The following errors can be generated:

- E1/T1 framing error:
 - LOF
 - AIS
- SU frame error:
 - CRC
 - Invalid Frame
- C7/SS7/HSL
 - Too long message (>278/ >281 with CRC)
 - Too short message (<5 ill. <8 with CRC)
 - Increased FSN to simulate message loss
 - Negative acknowledge simulation

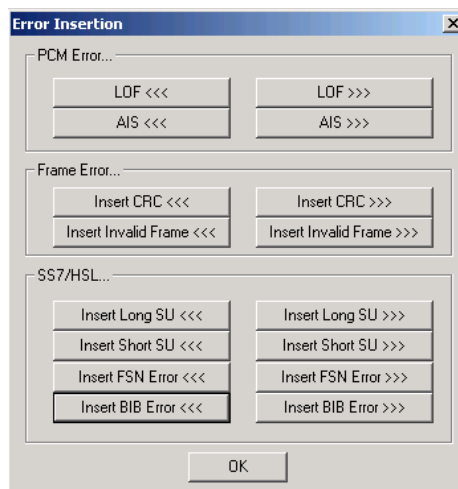


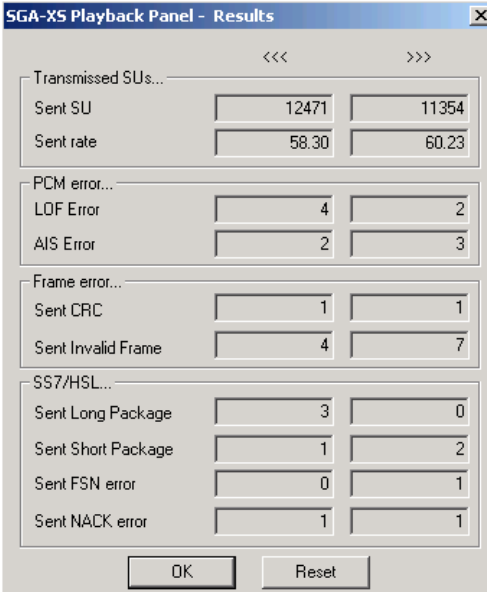
Figure 14: Error Insertion Window

4.1.5 Statistics

Aggregated statistics are calculated about the playback:

- Number of messages sent in both directions
- The total speed for the two directions
- Time elapsed from the start of the test

Detailed information can be viewed in the „Results“ window by pressing the „**Details**“ key.



The screenshot shows a window titled "SGA-XS Playback Panel - Results" with a close button (X) in the top right corner. The window contains several sections of statistics, each with two columns of data. Navigation arrows (left and right) are located above the first section. The sections are:

- Transmitted SUs...**

Sent SU	12471	11354
Sent rate	58.30	60.23
- PCM error...**

LDF Error	4	2
AIS Error	2	3
- Frame error...**

Sent CRC	1	1
Sent Invalid Frame	4	7
- SS7/HSL...**

Sent Long Package	3	0
Sent Short Package	1	2
Sent FSN error	0	1
Sent NACK error	1	1

At the bottom of the window are two buttons: "OK" and "Reset".

Figure 15: Results Window

4.1.6 Status

It provides information about the operating state of the application.

The most important states:

- SGA-XS device ready (the hardware setting has been successful)
- Playback started
- Playback stopped
- Processes shutdown
- USB device shutdown

5. Timeslot Bit/Byte Analysis (Dumper)

This application has been created for timeslot bit/byte analysis. It is suitable to show and save to hard-disk unframed or framed data stream in real time. The captured data can be saved in two different file formats: text or binary. The saved data stream helps to create any future application. For example: voice analysis, voice recorder, etc.

5.1 Main Window of the Analysis Program

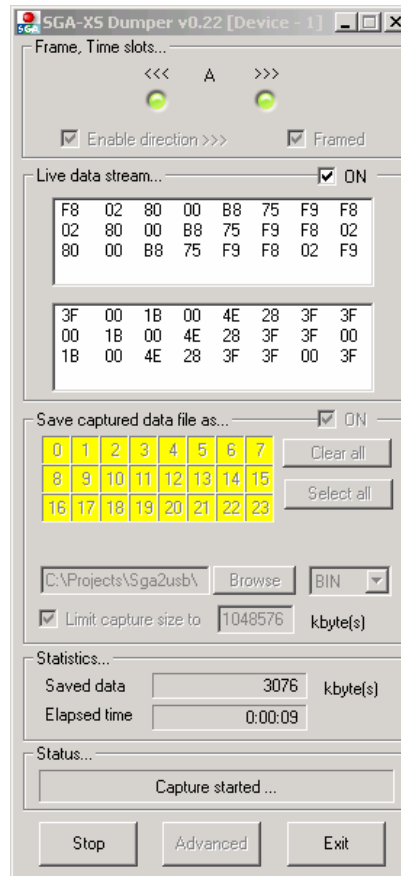


Figure 16: Dumper Main Window

The main view contains six parts:

5.1.1 Status and Timeslot Marking

In this part the user can select frame or unframed stream and enable or disable interface „A“, direction „>>>“.

The color of LED imitations indicates the status of the input which can be the following:

- **Grey:** Input is inactive.
- **Red:** Input is active but there is no input signal.
- **Yellow:** There is an input signal but no frame sync.
- **Green:** There is both input signal and frame sync.

5.1.2 Live Data

Here the user can view the traffic of certain timeslots. This option can be switched on and off. In the left upper corner timeslot 0 is shown, and in the right lower corner the content of the timeslot 23 or 31 is displayed.

There can be seen the live data stream of the 24 or 32 timeslots

5.1.3 File Saving

In this part of the application, the parameters for data saving to disk can be set. File saving can be turned off if the user just wants to examine the live traffic in the timeslots in real time. For later examination, data of the selected timeslot(s) can be saved to disk.

File format can be either text or binary: text format is useful for time slot examination, because the saved data is directly readable by a simple text viewer. On the other hand, it requires more CPU resources and more space on the disk than the binary file format. In case of long time capturing, the text file format is not advised. The binary file format can be used easily for further processing. The selected timeslots are saved sequentially into the file. The two directions of the data stream are saved to two different files with file extension **he0** and **he1**.

The timeslots can be selected by pressing „**SPACE**” or double click on their number in the timeslot matrix.

By pressing „**Select all**”, all timeslots will be selected.

By pressing „**Clear all**”, all timeslots will be unselected.

Destination file name and directory can be added in the „File save as...” window which is opened by pressing the „**Browse**” key.

By checking „Limit size capture to”, the file size limit can be set. This value refers to the sum of the size of the two files.

A short extract from the saved file as an example (TEXT format):

```
0000000018: 4922FCFC00009A7400014922FCFC0000FFFFFFFFFFFFFFFFFFFF
0000000019: 9A7400014922FCFC00009A7400014922FFFFFFFFFFFFFFFFFFFF
```

The first column indicates the serial number of the frame, while the contents of the saved timeslots are shown after the colon. This extract shows T1 traffic in 24 timeslots of 2 consecutive frames. The numbers are expressed in hexadecimal form. The first 2 numbers refer to timeslot 1, and the last 2, to timeslot 24.

5.1.4 Statistics, Counters

The Main Window displays some short, summarizing information about the running monitoring as follows:

- **Saved data:** size of data files.
- **Elapsed time:** The elapsed time since the start of monitoring.

5.1.5 Status

It provides information about the operating state of the application.

The most important states:

- SGA-XS device ready (the hardware setting has been successful)
- Capture started
- Capture stopped
- Processes shutdown
- USB device shutdown

5.2 Additional Settings

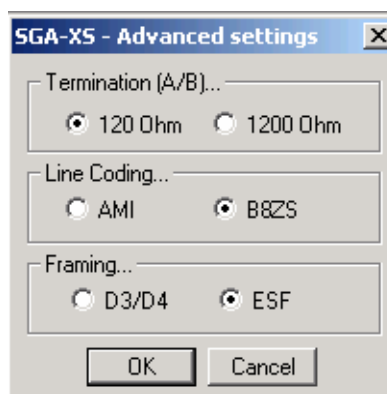


Figure 18: Advanced Window

In this dialog box some additional parameters of the Tester can be set:

- Line impedance terminations: 120/1200 Ohms or 100/1200 Ohms
- Line coding: AMI, B8ZS(T1), HDB3(E1)
- Framing: D3/D4 (T1), ESF (T1), PCM32 (E1)

6. Protocol Decoder

The **SGA-7W** decoder program decodes signaling messages. The decoder can simultaneously run with the monitor program so the messages can be analyzed on-line, too. The decoder program is described in a separate documentation.

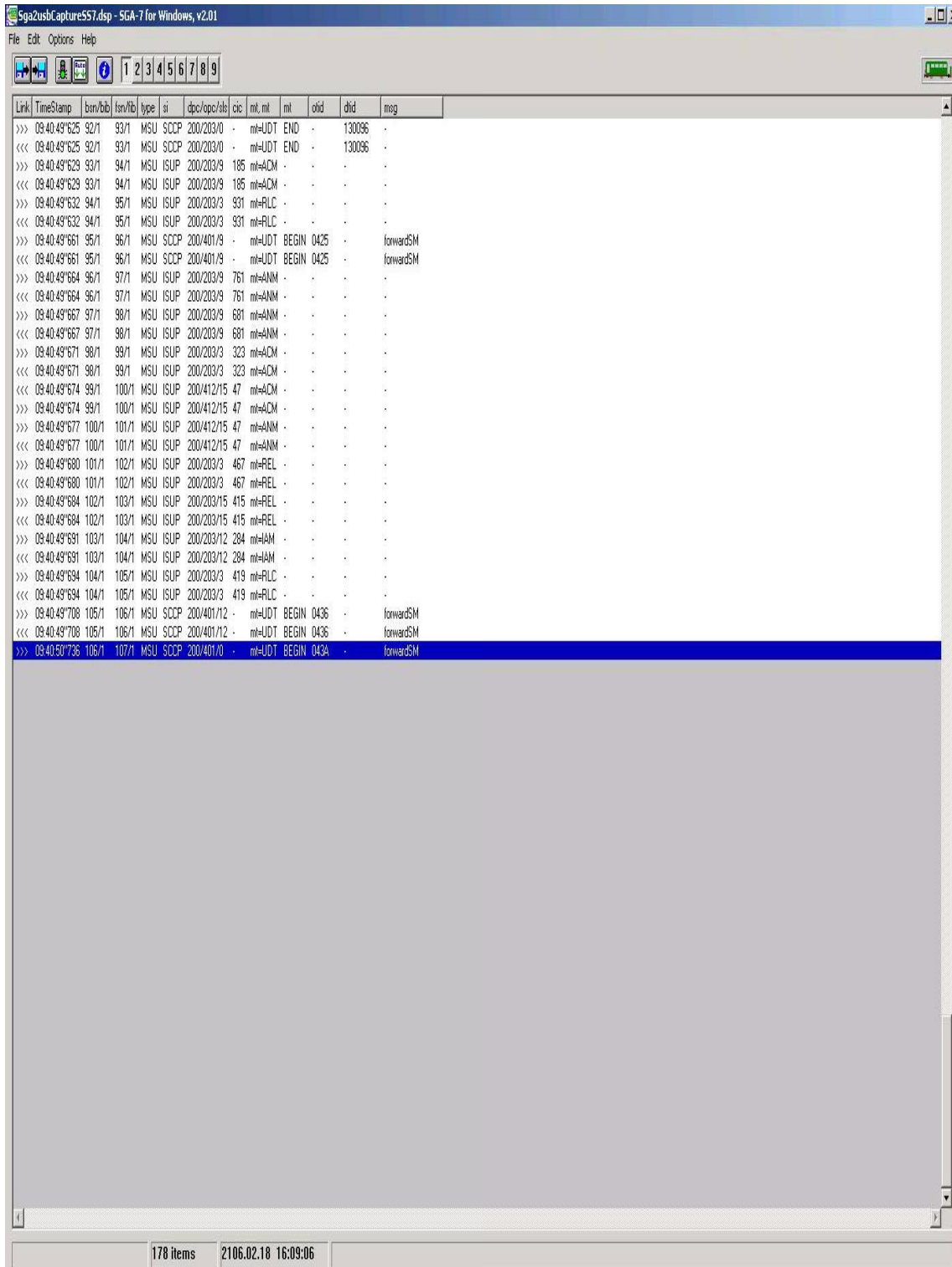


Figure 13: SGA-7W Main Window

7. Minimal Computer Configuration

- PII 1GHz
- 256 MB RAM
- 1 GB free memory on the hard disk (depending on file saving requirements)
- 800x600 screen resolution
- USB 2.0 port
- Windows 2000/XP operation system

8. Installation Process

Required files:

Driver programs: SgaXs.sys
SgaXs.inf

Operating programs: SgaXsManager.exe
SgaXsCapture.exe
SgaXsPlayback.exe
SgaXsDumper.exe
SgaXsCapture.ini
SgaXsPlayback.ini
SgaXsDumper.ini

Protocol decoder: SGA-7W software (distributed separately)

The Windows operation system finds the Tester when connected, and recognizes it as a standard USB device. For correct operation the required drivers should be installed first.

The SGA-XS applications can be copied anywhere on your hard-disk. The started applications will create a „**LogFiles**“ subdirectory where the log files will be saved.

The monitor program can be started by the **SgaXsManager.exe** file.

9. Main Messages

Message	Description
Not enough memory!	There is not enough memory to run the program.
USB device communication has failed! Program shutdown ...	The program will be closed because a failure occurred in the USB communication.
Not enough space on the destination disk!	There is not enough free space on the destination disk to save the data.
There is no selected timeslot! Please select a timeslot and restart capturing!	No timeslot has been assigned for monitoring. Please choose one and restart monitoring.
File size limit has been reached - measurement shutdown	Because the file size exceeded the specified value, the measuring will stop.
Would you like to overwrite it?	If the destination file already exists, the program asks confirmation for overwriting.
Capture error, please restart the capturing!	A failure occurred in the USB communication during monitoring therefore the measuring should be restarted.
Hardware buffer overflow, some signaling units have been lost!	Signaling units are lost because SGA-XS buffer is full.
PC buffer overflow, some signaling units have been lost!	Signaling units are lost because the buffer in the PC is full.
Only "N" timeslot(s) may be selected!	If more timeslots are marked than possible, a warning dialog window appears (N= 1,2,3,4).
All links reserved! You have to change configuration on the other side (A/B)!	All links are reserved! You have to change the settings on side A or B to make link-selection possible.
Copy results to log file...	Results have been copied into the given log file.

10. Physical Data

Mechanical	
- Size	L=125 mm, H=33 mm, W=66 mm
- Weight	appr. 0,2 kg
Control interface	Compatible with USB1.0 and USB2.0
- Type of bus	Packet switched
- Speed of data transfer	Max. 12 Mbps at USB1.0 and 480 Mbps at USB2.0
- Power	5 V DC
PCM interface	Quad(A/B) Q.703 2048 Mbps (E1) or 1544 (T1) interface
- Connector type	2xRJ-45 mother connector
- Output	3 Vp (at 120 Ohms)
- Line termination	120/1200 Ohms or 100/1200 Ohms
- Input level range	0..-12 dBr (0dB = 3 Vp).
Clock signal	
Internal (1544 KHz T1)	Accuracy: ± 10 ppm
Regenerated from external signal(T1)	Accuracy: ± 100 ppm (limited by standard)
Internal (2048 KHz E1)	Accuracy: ± 10 ppm
Regenerated from external signal(E1)	Accuracy: ± 100 ppm (limited by standard)
Speaker connection	2 interlocking Berg type
- Application	e.g.: monitoring speech channels