Operation instructions
V 532

Transport stream router

Pictograms and safety instructions

Pictograms are graphical symbols with a defined meaning. You will find the following pictograms in these instructions for installation and use:

These symbols alert you to situations in which there is mortal danger as a result of dangerous voltage or noncompliance with these instructions.

This symbol alerts you to various health, environmental and material risks.

Recycling: all of our packaging (cardboard, paper inserts, plastic films and bags) is fully recyclable.

Used batteries should be disposed of at approved recycling stations. This requires the batteries to be completely discharged when handed in.

Electronic equipment should not be placed in household garbage but rather - pursuant to guideline 2002/96/EC FROM THE EUROPEAN PARLIAMENT AND THE COUNCIL dated January 27, 2003 relating to old electrical and electronic appliances - should be disposed of in a competent manner. Please hand in such equipment for disposal at the relevant public collection stations when you have finished using it.

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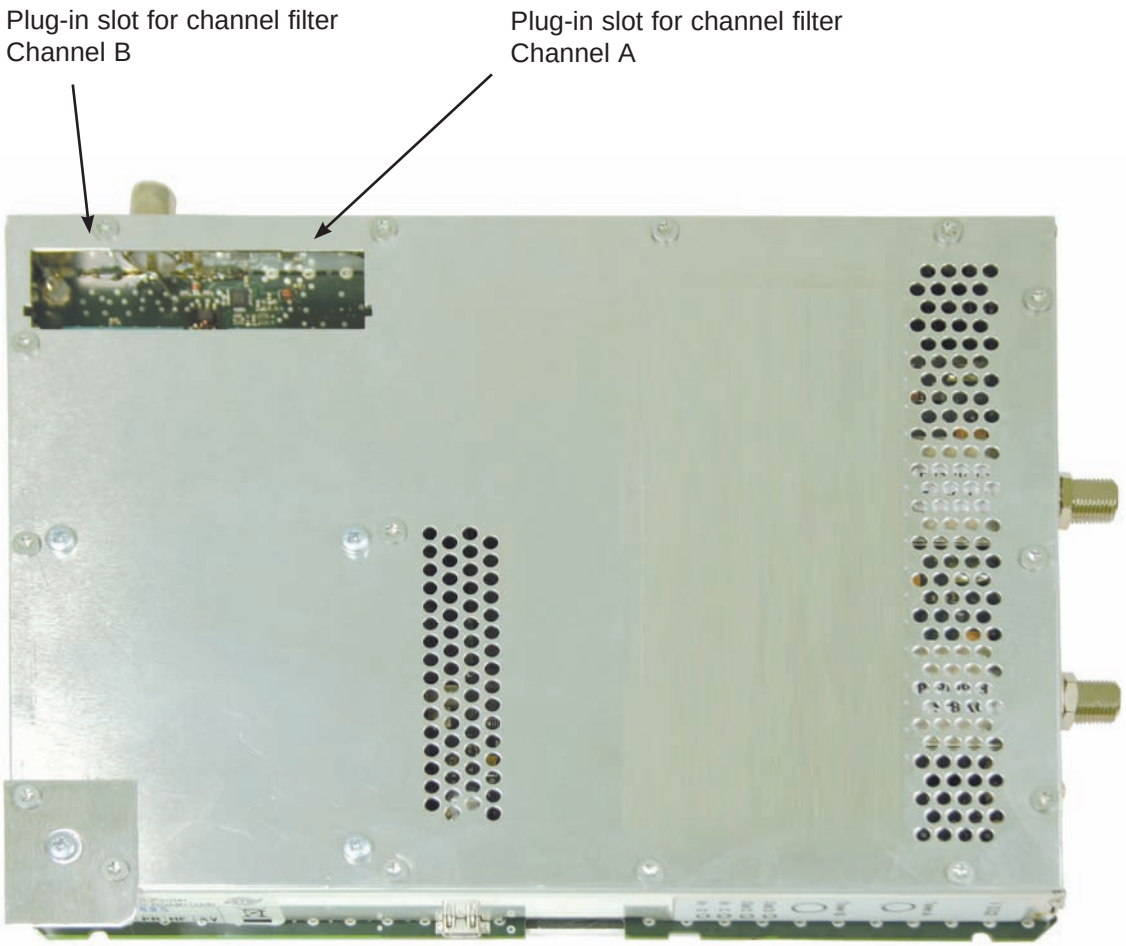
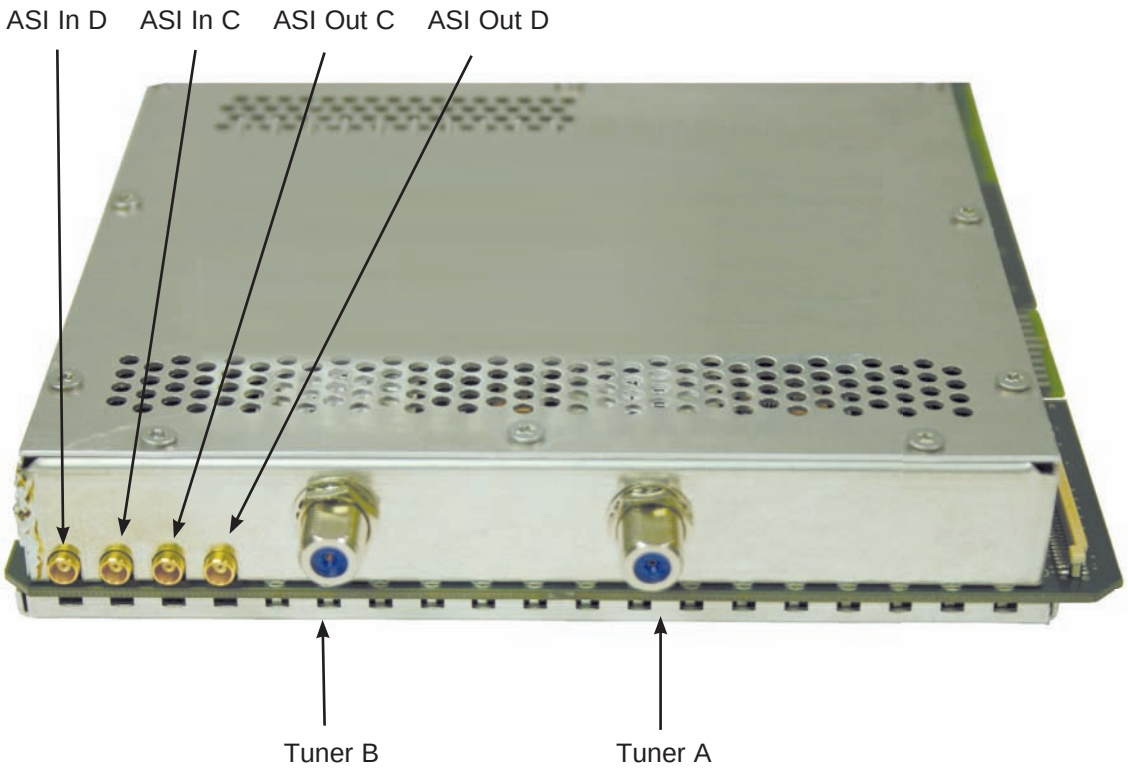
Illustrations:





1 Description

The V 532 plug-in board is used for converting two independent DVB-S(2)-inputs and two ASI-inputs into two independent & DVB-conformant QAM-output channels. It can process both HDTV signals as well as SDTV signals. The V 532 is designed for processing the so-called Barker-channel. This Barker channel contains information about the channel occupancy (NIT = Network Information Table), registration data (EMMs) and other transport stream information. The NIT, EMMs and where appropriate other transport stream data originally contained in the transport stream of the user channel are replaced. The user transport stream contains the NIT, the EMMs and where appropriate other transport stream information about the Barker channel. The Event Information Table (EIT) for obtaining the EPG data is also multiplexed. The EIT from all channels – transformed by the V 532 – can be written into every output channel of the QAM network.

The plug-in board is also capable of eliminating services from the transport stream of the user channel in a standard-conformant manner (by processing the DVB-Tables).
The V 532 has two channel output filters for improving the performance of the output signal.

When starting up the device care should be taken to ensure that all channels have the same output level and where appropriate, are matched to existing units.

The delivery package contains 2 cables for connecting the SAT-Tuners, and 2 cables for connecting the ASI-Interfaces (KMX on F)

Note:

The V 532 is only to be used in the V16 base unit!
The V16 base unit may only be installed with a maximum of 6 V 532 units!

Please observe the following:

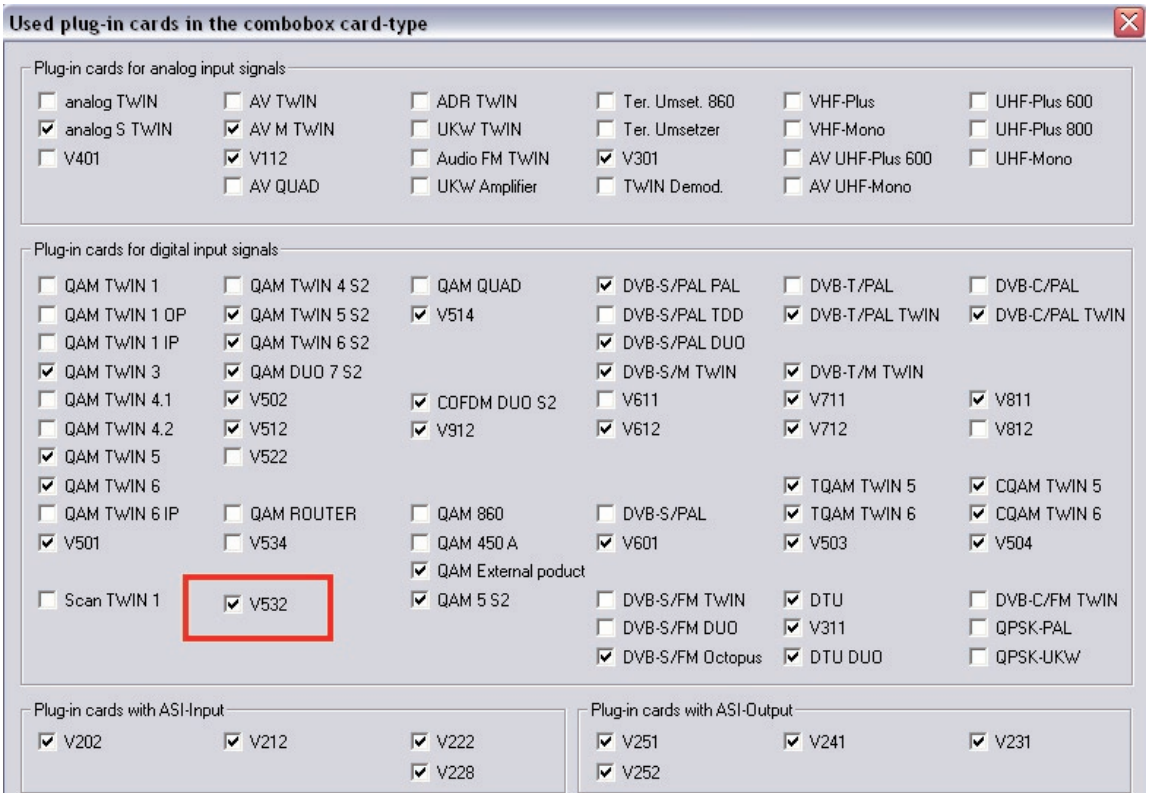
Exchange or replacement of the modules may only be undertaken by IHK tested and authorised technical personnel (Certified specialist). When doing so, the danger and safety warnings given in the operating instructions of the V16 base units, together with the relevant safety guidelines according to DIN VDE-Regulation 0701, Part 1 and 200, must be observed.

2 Preferred board types

After installation in the base unit, the V 532 board can be programmed with the HE-Programming software. If it is not possible to select the board in the HE-Programming software, then you should check the settings under "Options" R "Preferred board types“. The board must be activated with a tick, so that it is visible in the selection in the planning screen of the basic unit. After selecting the basic unit the V 532 board appears in the planning screen of the basic unit on the plug-in slot that was used.

Please observe the following: recommended software version.

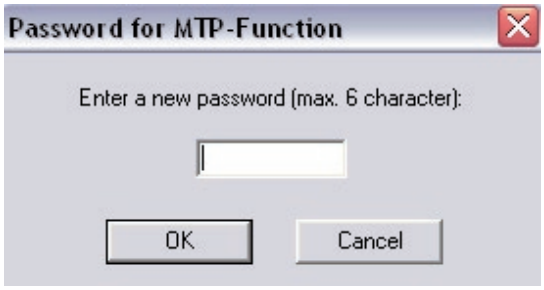
V16:	xx.27
Programming software:	5.40



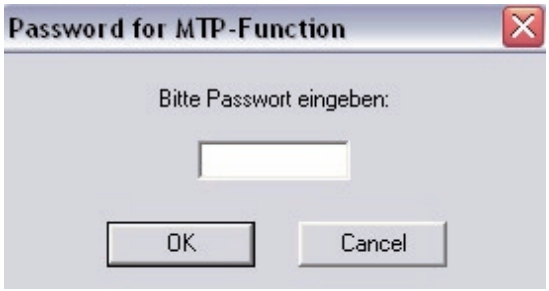
3 Password protection for MTP function

In order to prevent unauthorised operation of the V 532, the board can be provided with password protection. Password entry is accessed via "Options“ R "Password protection for MTP function“

After activation of password protection the user is requested to enter the password. This password must consist of a max. 6 characters.

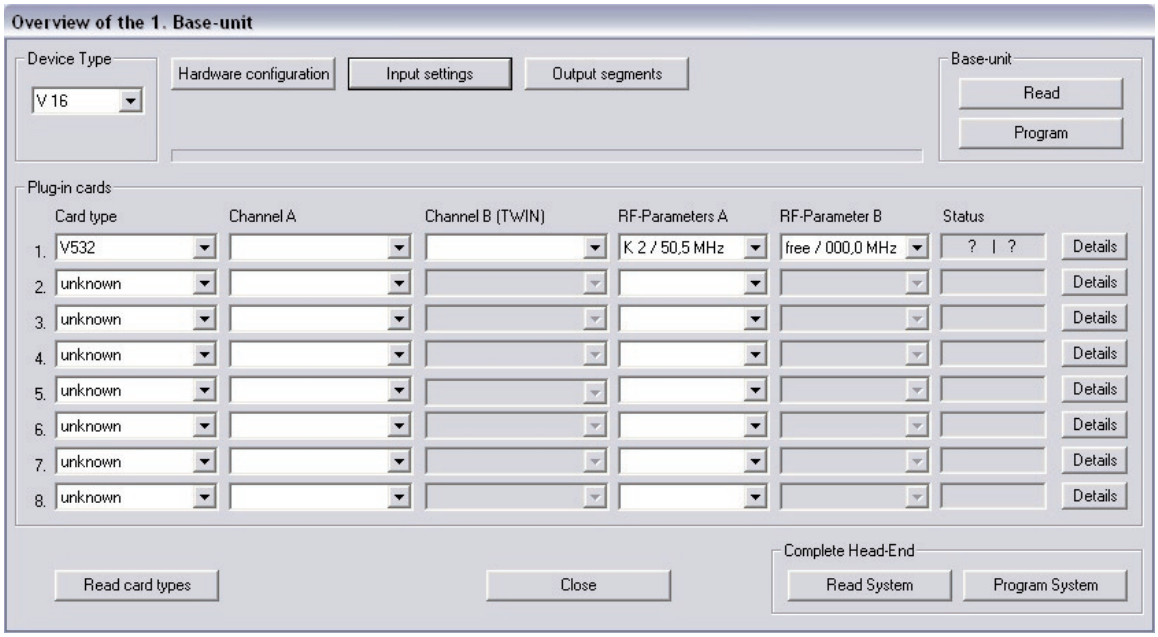


Every write command (e.g. "program board“) must now be confirmed and enabled by entering the password. The same applies to the removal of password protection.



4 Planning screen of the basic unit

After selecting the basic unit the V 532 is displayed on the planning screen of the basic unit.



Under "HF Parameter A" and "HF Parameter B" on the planning screen of the basic unit, the output channels of the V 532 board are selected, that is, the channels in which the QAM channels assembled from the DVB-S(2) / ASI Bouquet are to be fed into the cable.

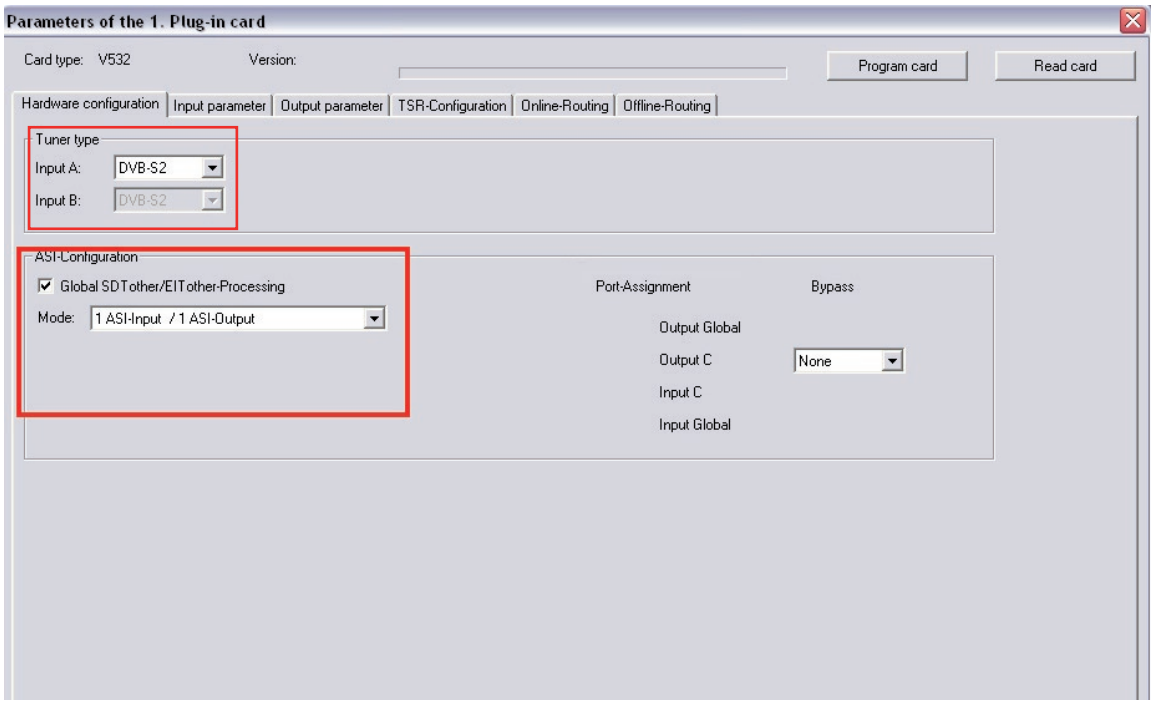
If the user now clicks the "Details" button, this opens the screen with the board details. Here all relevant settings for operation of the device are made.

5 Hardware configuration

In the "Hardware configuration" sub-item, preparations can be made in offline mode for programming the V 532 board, which can then be programmed into the module on site.

5.1 Tuner selection

Tuner selection is required as part of the offline programming in the office. Here the planner can select the tuners that will later be used in the unit. If a selection is made that does not correspond to the tuner being used, then an error message will be generated after programming of the board.

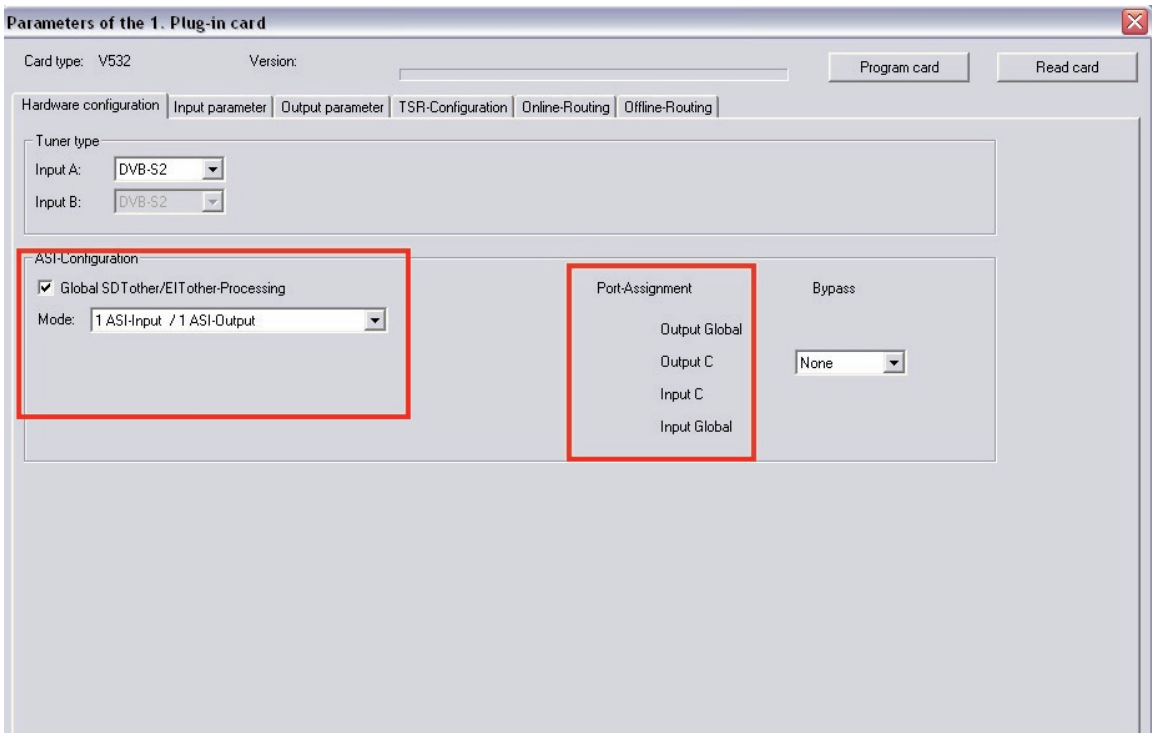


5.2 Global SDT other / EIT other processing

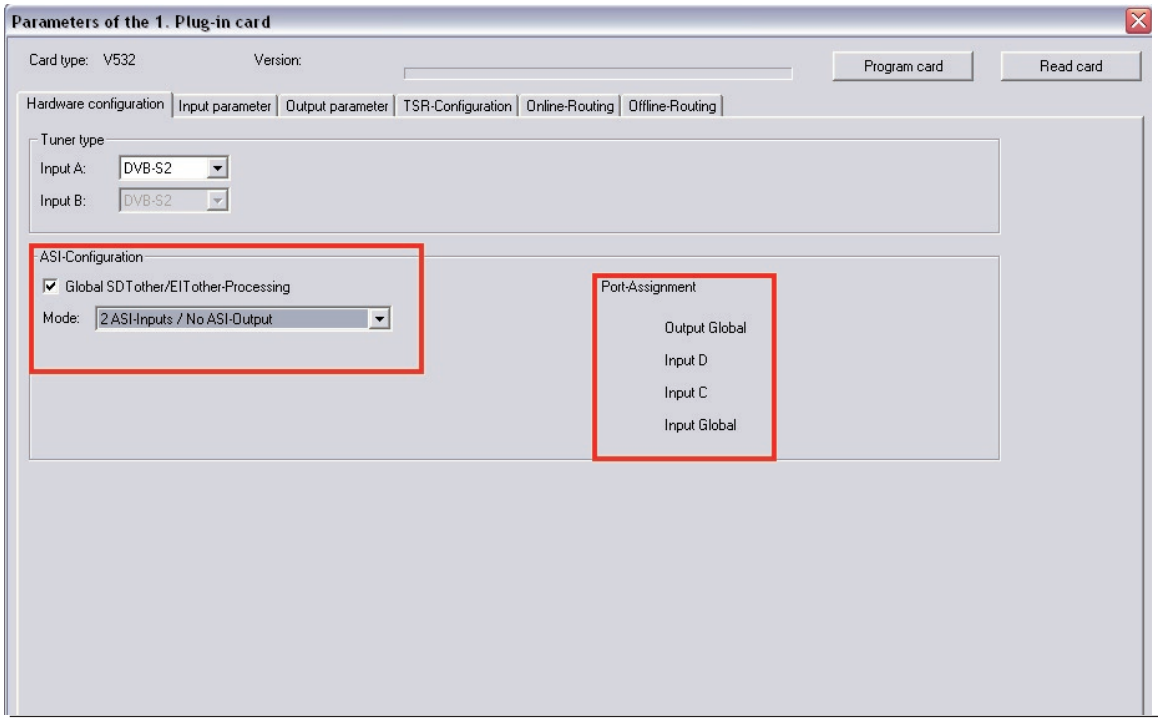
The ASI ports of the V 532 can be configured as required. If trans-module so-called "global processing“ of the SDT other and EIT other is intended to take place, this is enabled by activating the "Global SDT other/EIT other-Processing" check box. Since this function requires the various V 532 boards of the QAM network to exchange data between themselves, this selection also has implications for the configuration of the ASI ports. For exchanging information the KMX connectors located on the V 532 are used. If the flag is not set, then the board functions as a "Four into four" multiplexer, i.e. 2 x DVB-S2 inputs plus 2 x ASI inputs into 2 QAM output channels plus 2 ASI output streams.

5.3 "Three into three" or "Four into two“ multiplexer

In the "1 ASI-input / 1 ASI-output“ mode the V 532 board functions as a "Three into three" multiplexer, i.e. 2 x DVB-S2 inputs plus 1 x ASI input into 2 QAM output channels plus one ASI output stream:

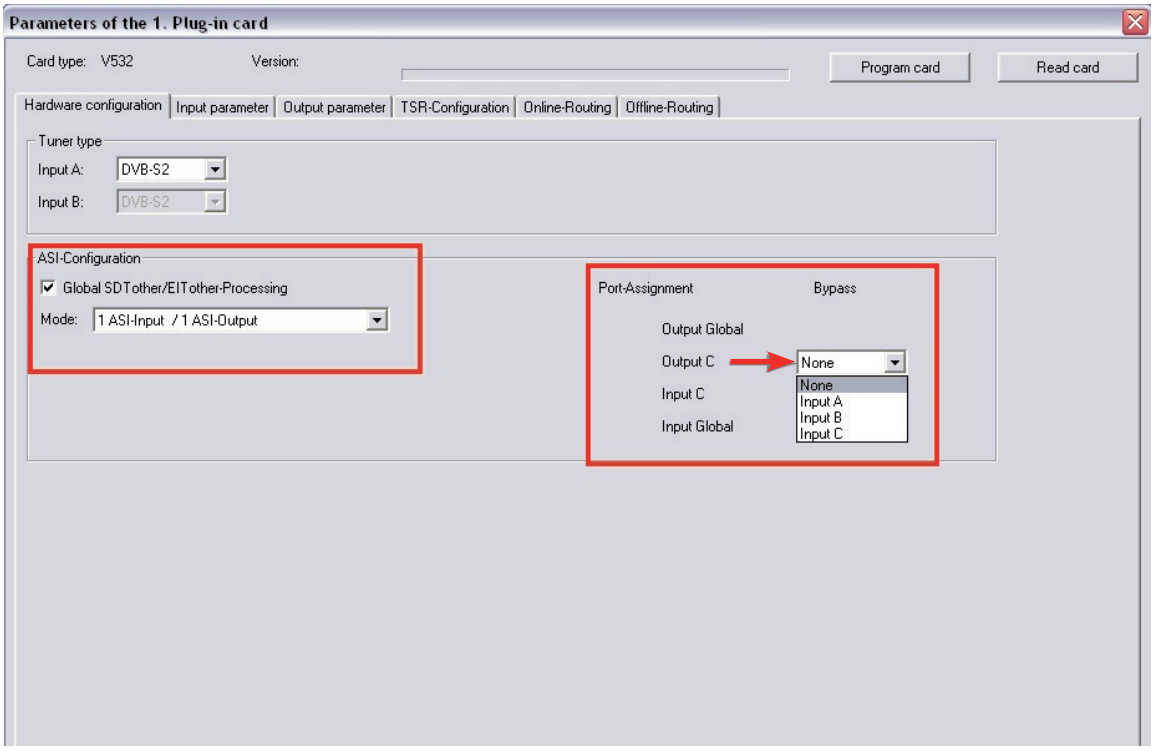


In the "2 ASI-inputs / no ASI-output" mode the V 532 board functions as a "Four into two“ multiplexer, i.e. 2 x DVB-S2 inputs plus 2 x ASI inputs into 2 QAM output channels:



5.4 Bypass function

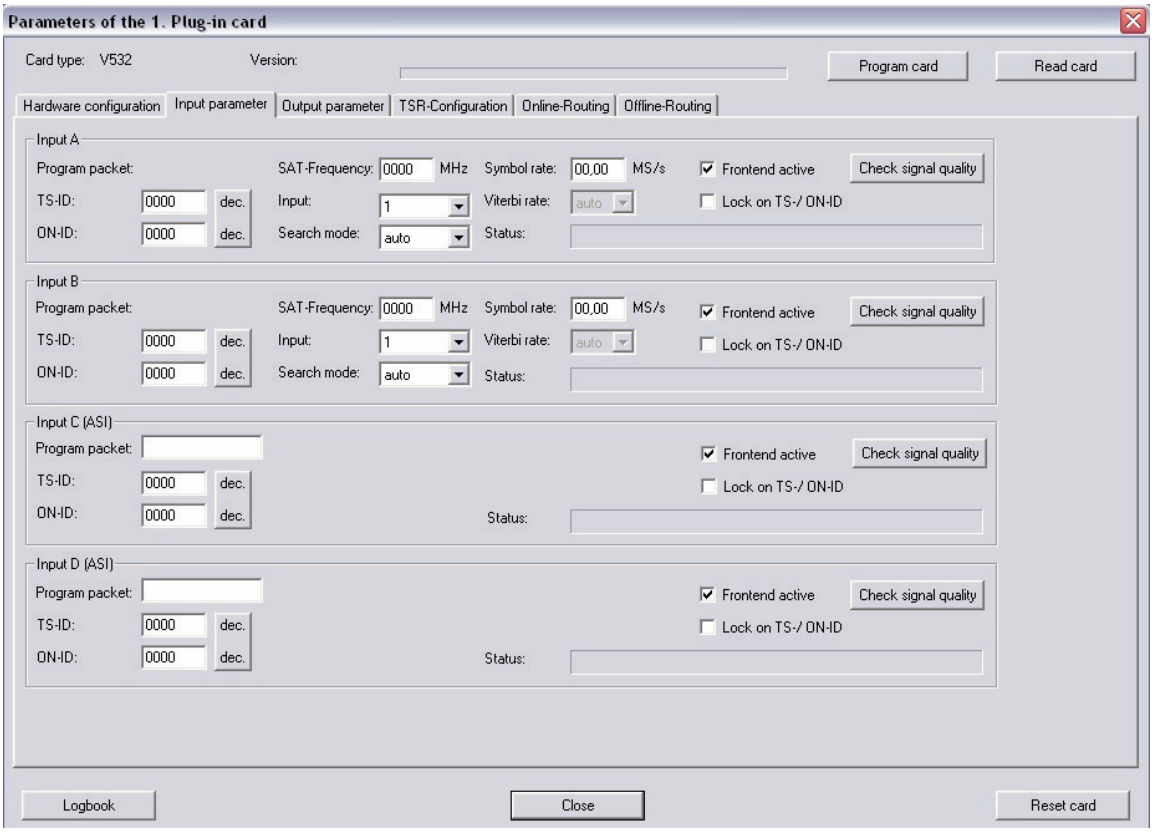
To allow flexible configuration of the inputs and outputs the V 532 is provided with a so-called bypass function. With this function the input signals can be looped through to other components for further use.



If "Input A“ is chosen as the bypass for "Output C“ as in the above example, then the DVB-S2 signal on input A is fed to output C as an ASI signal. Output C can then no longer be processed however, but is now only used for DVB-S2 / ASI conversion.

6 Test input parameters / signal quality

If the satellite transponder to be processed is selected in the planning screen of the basic unit, then all relevant input parameters such as SAT-ZF, symbol rate, TS-ID and ON-ID are transferred from the SAT database.



6.1 Manual transponder selection

When manually selecting the transponder the SAT-ZF, the symbol rate, the TS-ID and the ON-ID must be input manually. Please take care to use the correct input, as otherwise the signals cannot be processed.

6.2 (De-)activating the front end

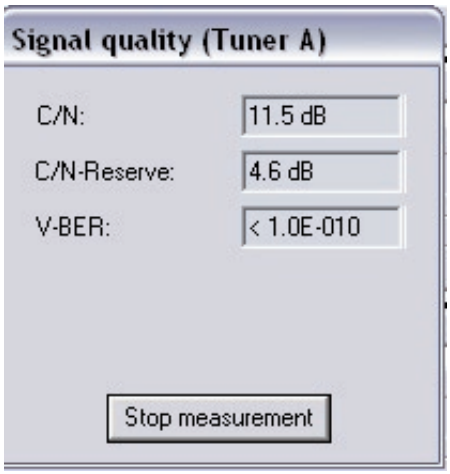
By clicking on the "Front end active" selection box the front end of the respective input can be either activated or deactivated.

6.3 Lock on TS-/ON-ID

In order to prevent the tuner logging in to an undesired transponder, the "Lock on TS-/ ON-ID“ function can be activated. On activating this check-box the tuner is only logged into the transponder IDs entered, accidentally or wrongly applied input signals are not processed.

6.4 Test signal quality

The "Test signal quality" button opens the screen with the signal parameters currently measured. The values displayed will differ depending on the input signal:

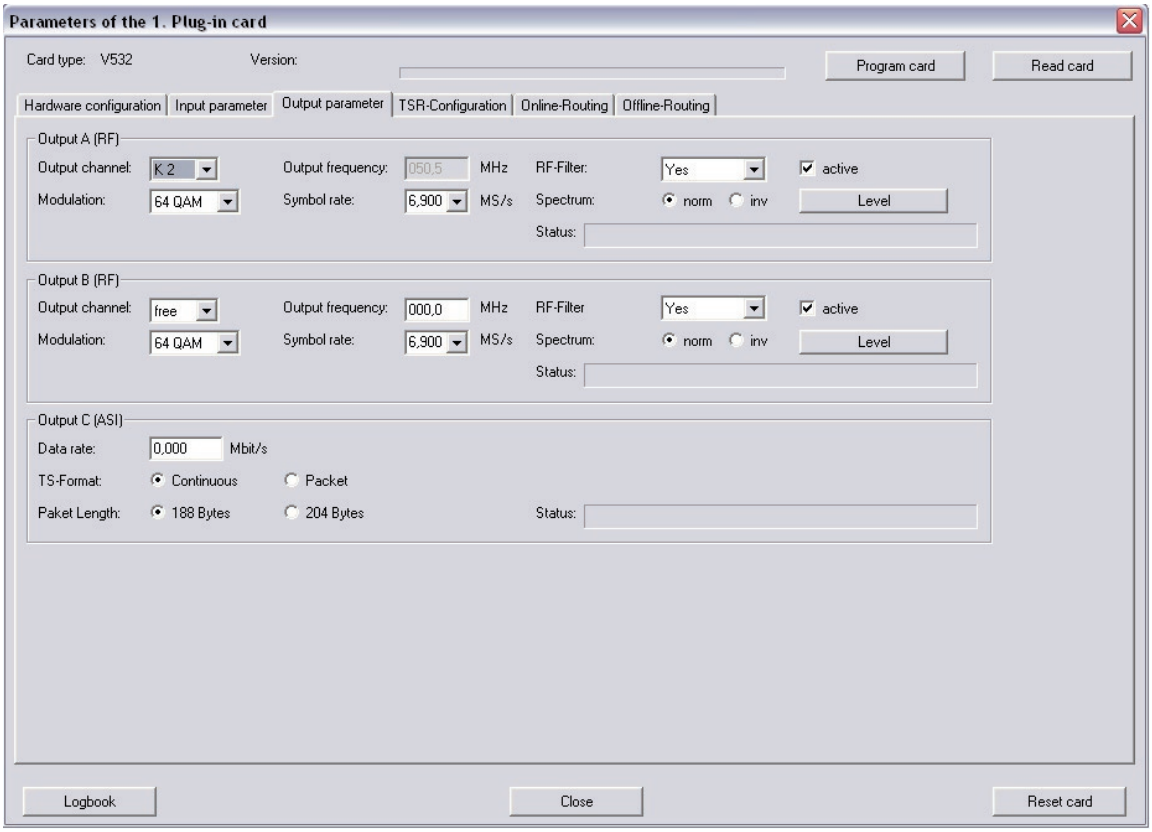


7 Output parameters / Level adjustment

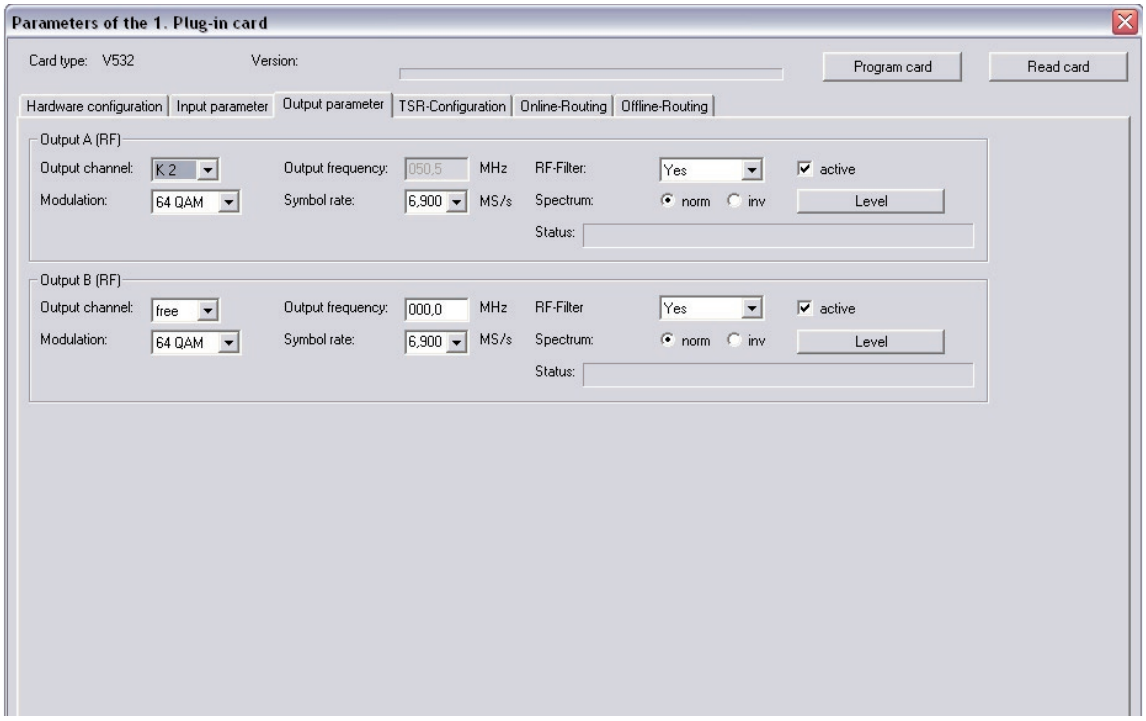
7.1 Output parameters

In the output parameters field all relevant parameters for the output signal are configured. Here, the output channel is specified, activated or deactivated, the spectrum inverted, the symbol rate adjusted and the modulation type specified.

In the view for output A and output B the respective output channel filter is also activated or deactivated. A channel filter that is unplugged but activated in the software results in an error message.

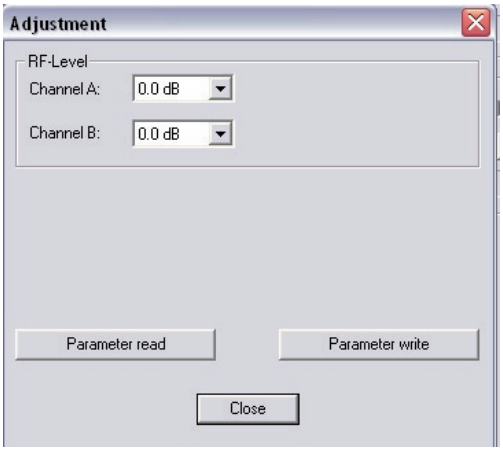


Depending on the configuration of SDT other / EIT other processing (cf. Chapter 5.2 / 5.3) the display of the output parameters may differ from the above example. In "Four into two" mode, the ASI-Outputs, for example, are no longer shown in the display:



7.2 Level adjustment

The output level for the individual output channels is matched electronically by means of the HE programming software. Clicking on the "Level adjustment" button opens the following screen:



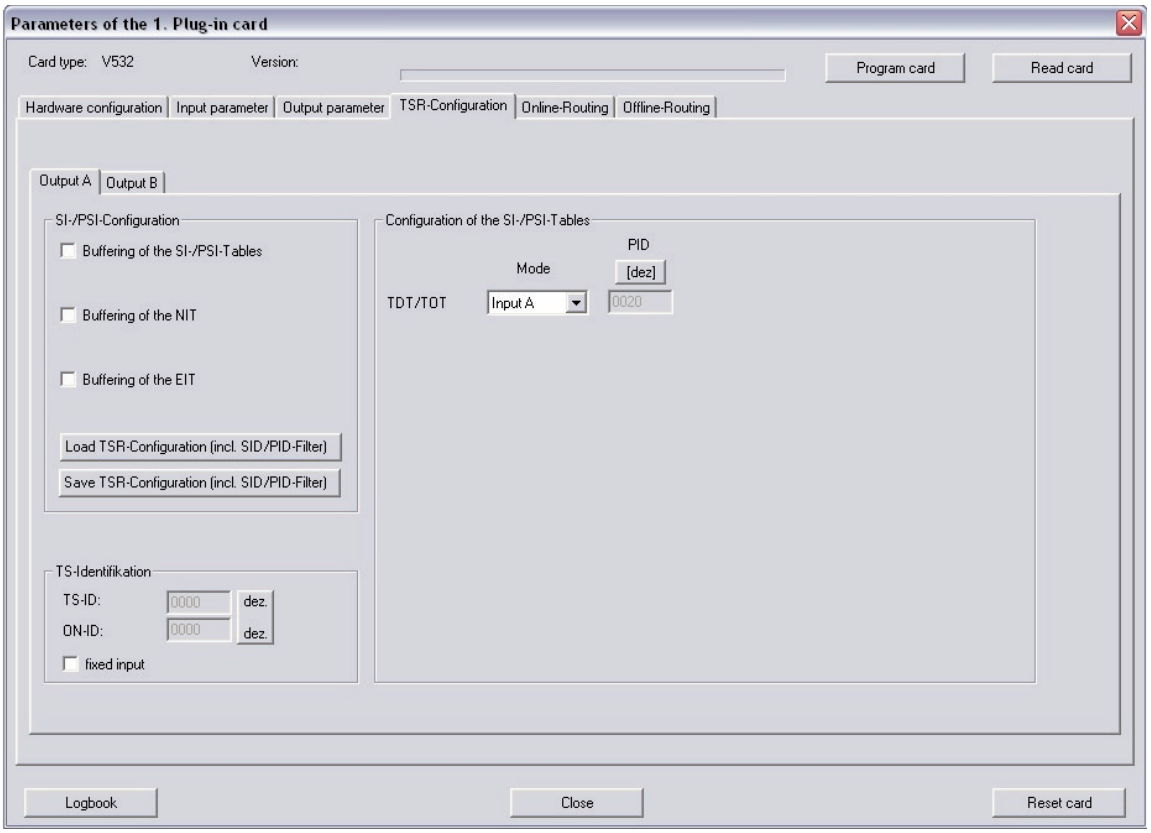
Using the "Read parameters" button the currently stored values are first read from the board. Modifications that are made are not written to the board and activated until "Write parameters" is pressed.

7.3 Configuration of the ASI outputs

The TS format and the packet length of the ASI output signals can be configured as required. In TS format the choice is between "Continuous" or "Packet burst", and the packet length is either 188 bytes or 204 bytes.

8 TSR configuration

The view of the Transport Stream Router (TSR) configuration is the same for the outputs A – D. The TSR configuration will therefore be explained using output A. Depending on the configuration of SDT other / EIT other processing (cf. Chapter 6.2 / 6.3), the view of the output parameters may differ from the example shown below (Output C and/or D not present).
In the "SI-/PSI configuration“ & "Configuration of the SI-/PSI-Tables” fields, different options are selected for processing SI-/PSI-Tables, as well as NIT and EIT.

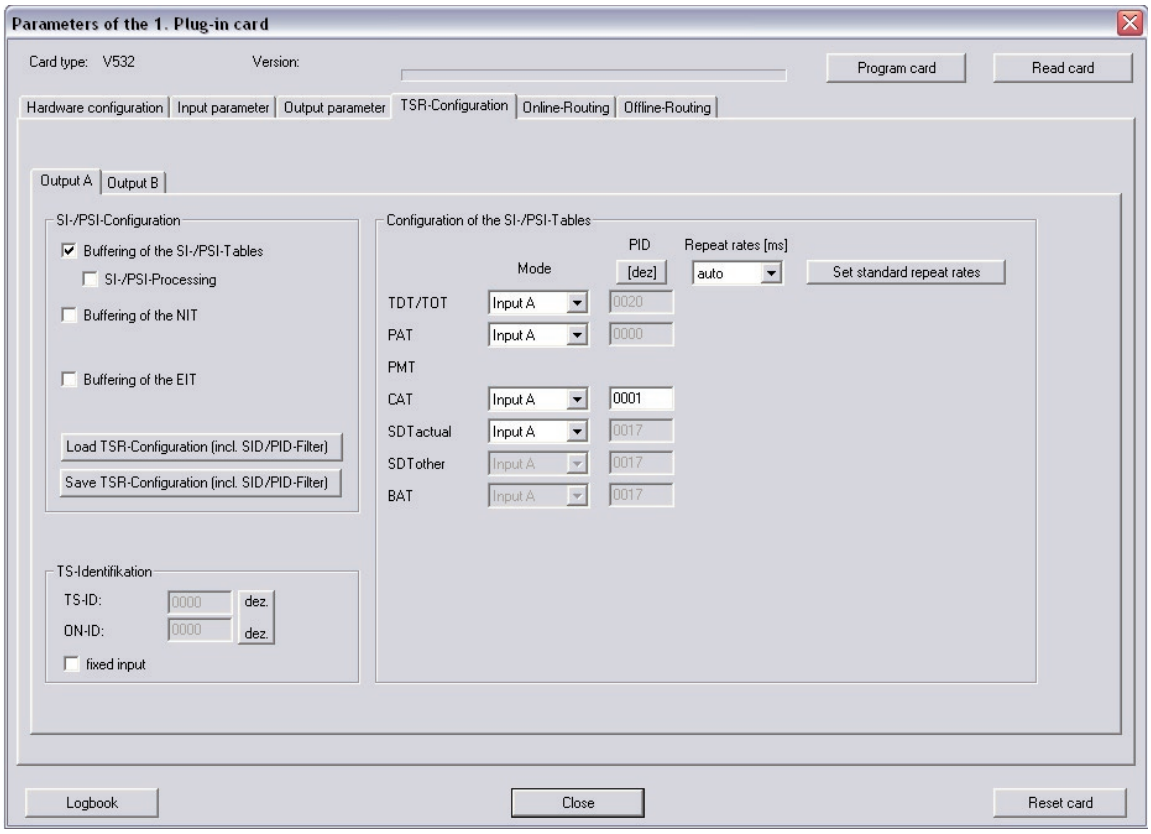


8.1 Selection of TDT / TOT

In the "Configuration of the SI-/PSI-Tables" field the source for the TDT (Time and Date Table) and the TOT (Time Offset Table) can be selected. This provides the option of choosing between the A – D inputs. The signal in which the TDT / TOT is reliably present should be chosen as the source. For the user's additional information the PID of the TDT / TOT is displayed.
If no check boxes are set in the "SI-/PSI configuration" field, then filtering (drop and pass) takes place at the pure PID level – without further processing of the SI-Tables.

8.2 Buffering of the SI-/PSI-Tables

If the check box next to the "Buffering of the SI-/PSI-Tables" option is set, then the display of the TSR configuration changes as follows:

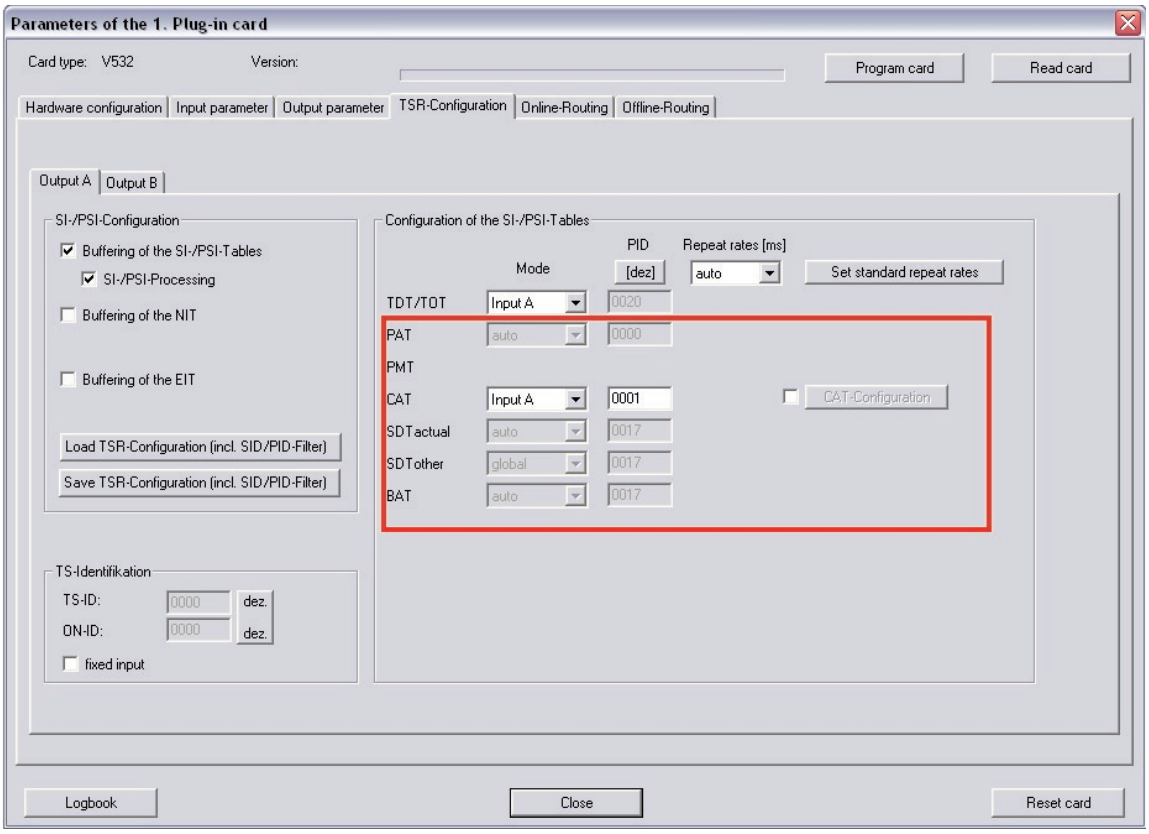


In this programming stage all tables are initially passed through to the output unchanged. However, the SI-/PSI-Tables except for NIT and EIT are buffered, so that a definite repeat rate is possible for these tables, even if they are not present in the desired interval at the input side. The sources of SI-/PSI-Tables to be saved can be freely chosen from channels A – D. If the CAT is provided by the network operator on a transponder under its own PID, then this PID and the associated input can be selected.

The repeat rates of the tables are set to standard values in the "auto" field, but it is also possible to manually enter the repeat rate in milliseconds (cf. Chap. 8.8).

8.3 SI-/PSI processing

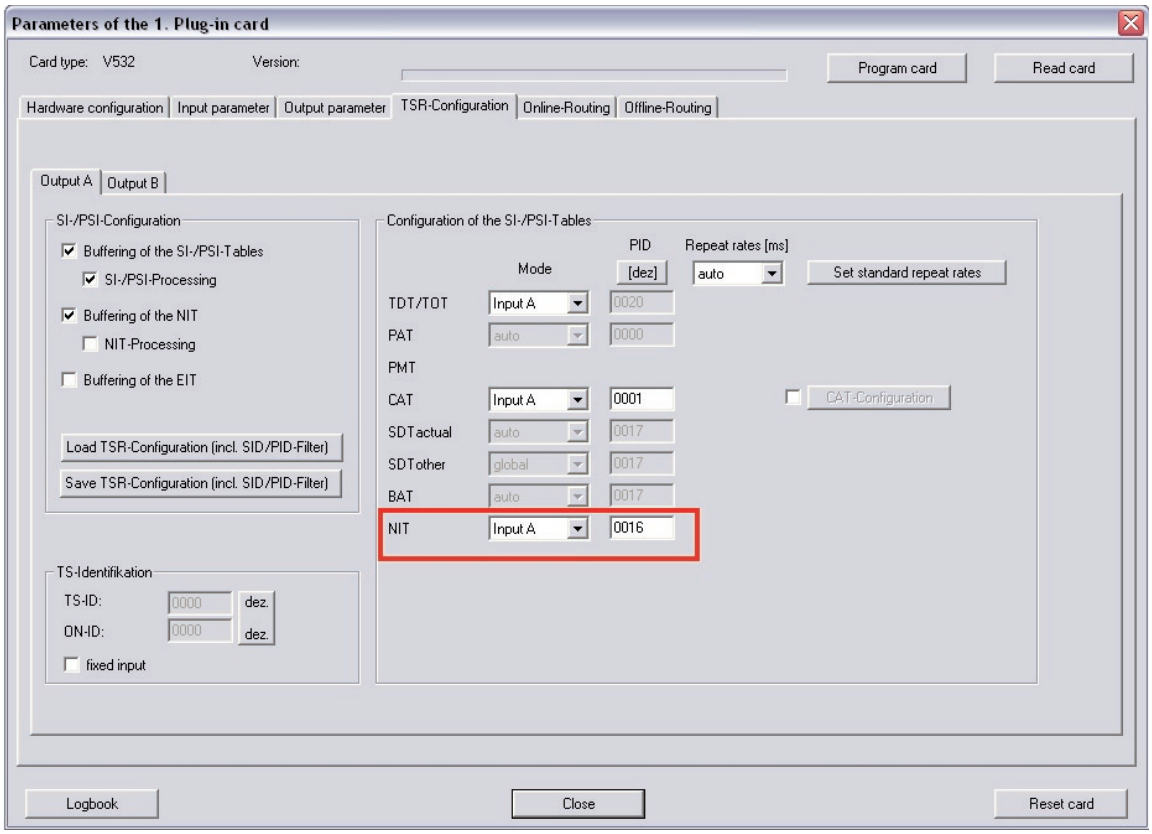
If the check box next to the "SI-/PSI-Processing" option is set, then the display of the TSR configuration changes as follows:



Selecting this option enables the routing of services. The PMT, PAT and SDT actual are automatically generated from the assembled bouquets. If the mode of the CAT is now configured to "auto", the CAT is also generated from the input streams from which services have been extracted. (CAT configuration cf. Chap. 8.9)

8.4 Buffering of the NIT

If the check box next to the "Buffering of the NIT" option is set, then the display of the TSR configuration changes as follows:

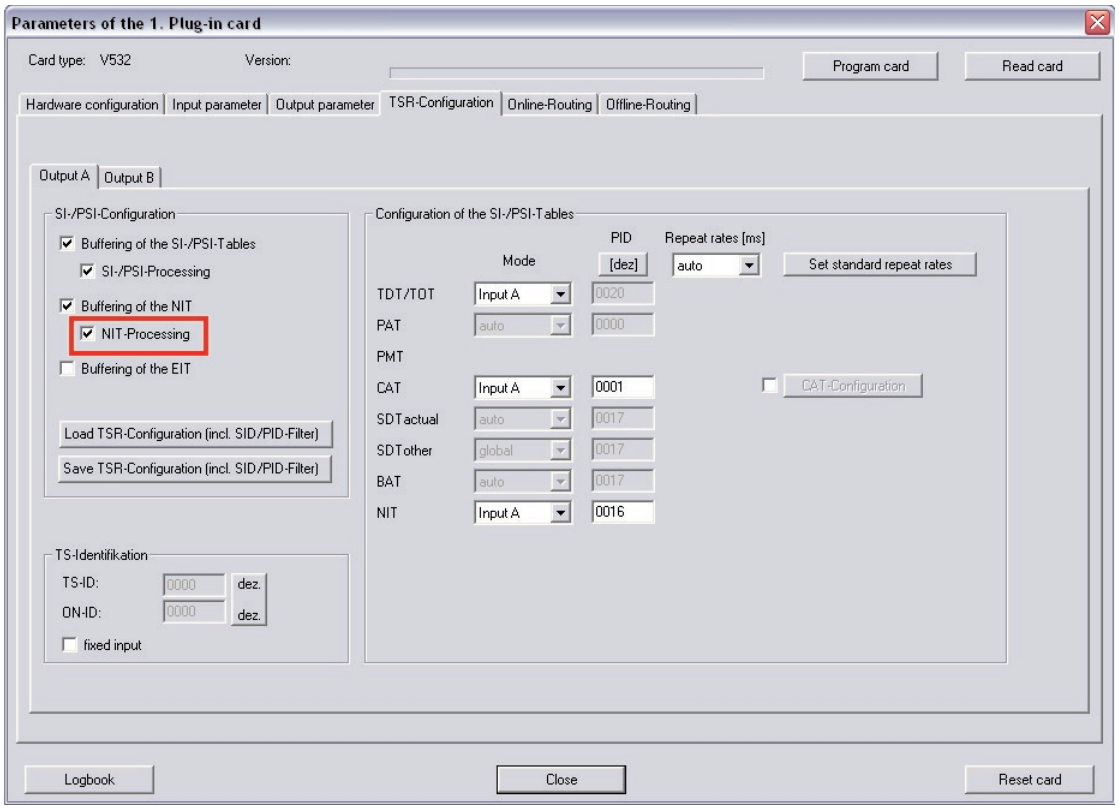


On selecting this option the NIT is displayed in a defined manner. The source of the NIT can be chosen freely from inputs A – D. If the NIT is provided by the network operator on a transponder under its own PID, then this PID and the associated input can be selected.

The repeat rate of the NIT is set to standard values in the "auto" field, but it is also possible to manually enter the repeat rate in milliseconds (cf. Chap. 8.8).

8.5 NIT processing

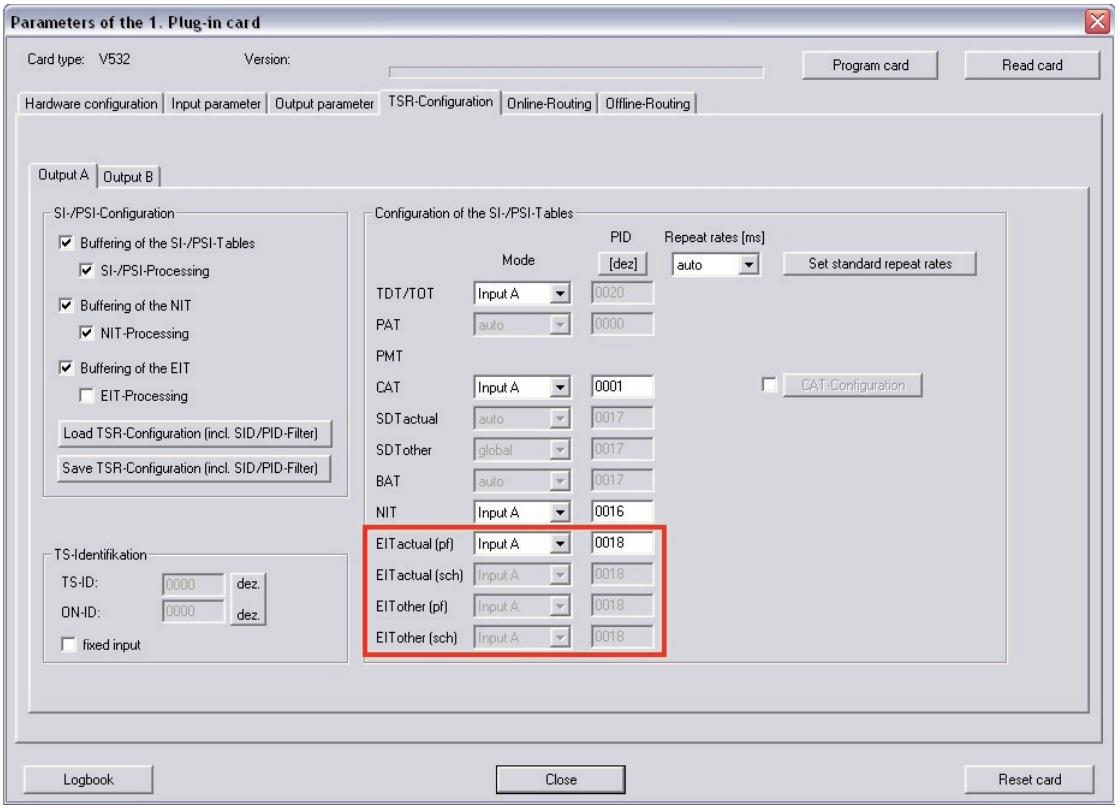
If the check box next to the "NIT-Processing" option is set, then the display of the TSR Configuration changes as follows:



On selecting this option the NIT is processed. In the event of a dropped service, the services referenced in the NIT, including all dependent PIDs, are also removed from the NIT.

8.6 Buffering of the EIT

If the check box next to the "Buffering of the EIT" option is set, then the display of the TSR configuration changes as follows:



On selecting this option the EIT is buffered and a defined display is therefore enabled. The source of the EIT actual (pf) can be chosen freely from inputs A – D. If the EIT is provided by the network operator on a transponder under its own PID, then this PID and the associated input can be selected.

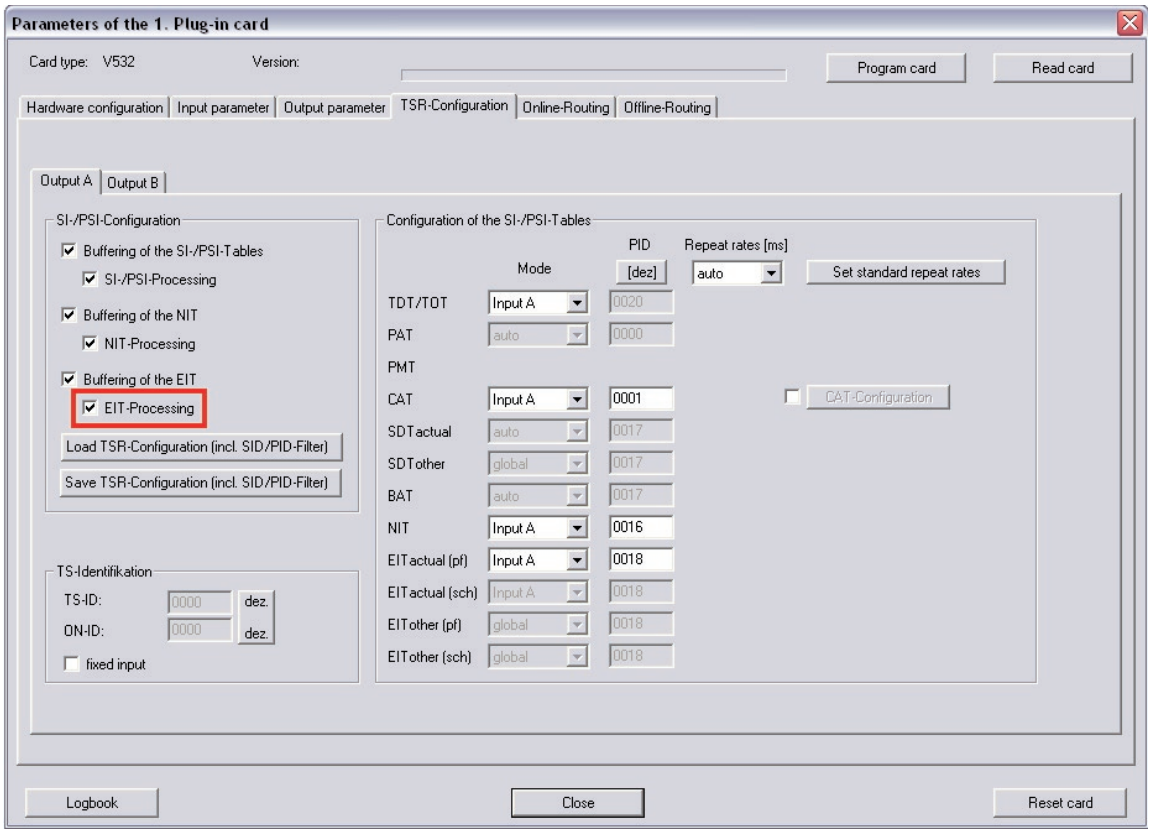
The repeat rate of the EIT is set to standard values in the "auto" field, but it is also possible to manually enter the repeat rate in milliseconds (cf. Chap. 8.8).

Explanation:

EIT actual (pf) =	Display of the present broadcast running in the TS and the following broadcast (present following)
EIT actual (sch) =	Displays the following broadcasts in the TS up to 7 days ahead (scheduled) depending on the input transponder
EIT other (pf) =	Displays the present broadcasts running in the other TS and the following broadcasts (present following)
EIT other (sch) =	Displays the following broadcasts running in the other TS up to 7 days ahead (scheduled) depending on the input transponder

8.7 EIT-Processing

If the check box next to the option "EIT-Processing" is set, then the display of the TSR Configuration changes as follows:



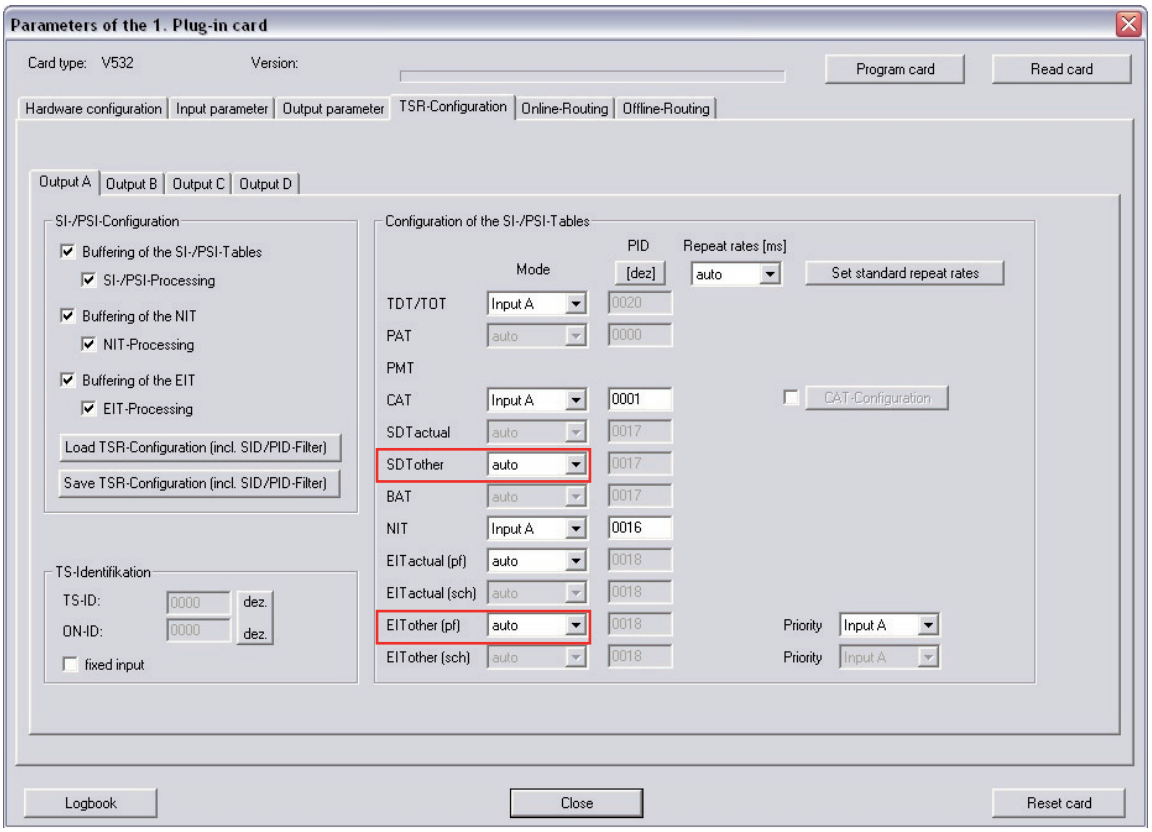
With EIT-Processing activated, processing of the EIT is possible. The mode selection "auto" ensures that the EIT is generated from all input streams from which services are taken. This option is available for the EIT actual (pf) and the EIT other (pf).

If the output data rate temporarily goes too high only the EIT other of the priority input is fed through, in order to reduce the output data rate.

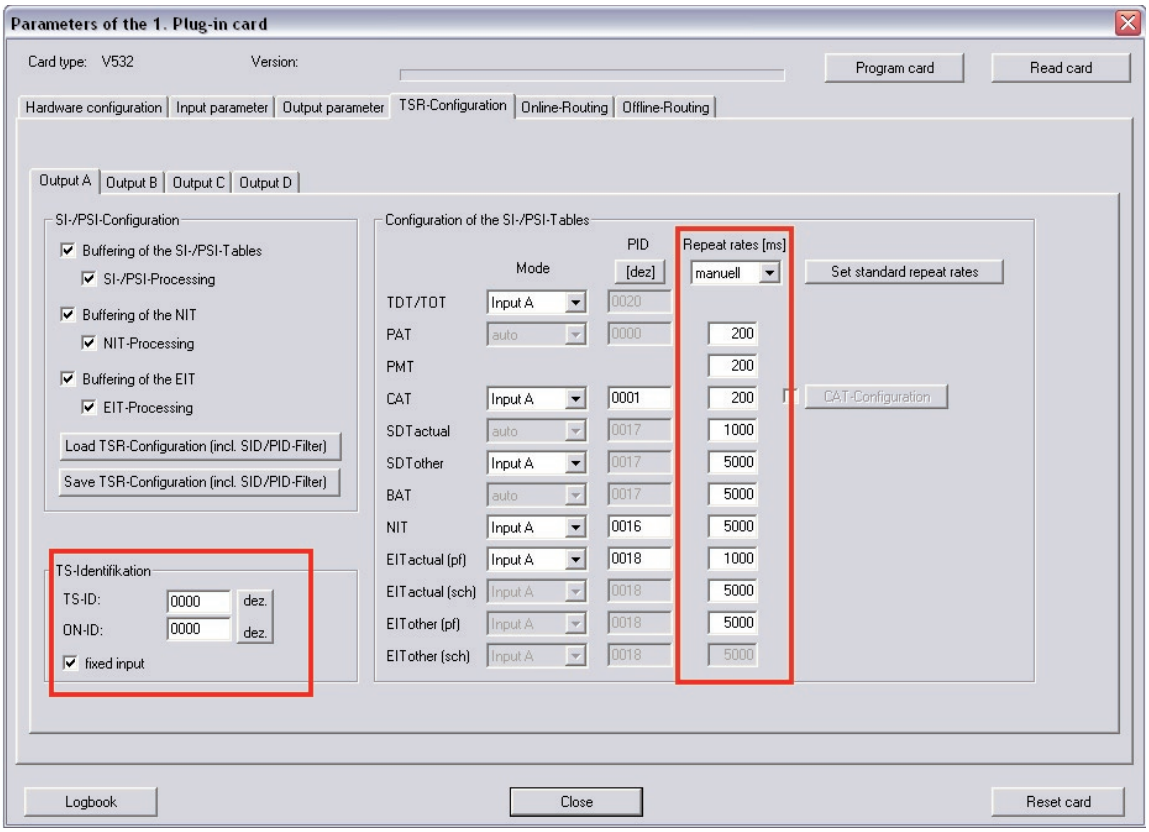
8.9 Configuring repeat rates of the SI-PSI-Tables / TS Identification

8.8 Global SDT other / EIT other processing

If during hardware configuration (cf. Chap. 5.2 & 5.3) two ports are defined for exchanging the SDT other - / EIT other - data, it is possible that multiple V 532 TS-Routers will exchange this data between one another. A prerequisite for this exchange is the appropriate wiring of the modules in accordance with the hardware configuration.



This global SDT other / EIT other setting is done after selecting the "global“ option followed by programming of the V 532. If the "global“ option does not appear in this selection box, then the hardware configuration must be checked.

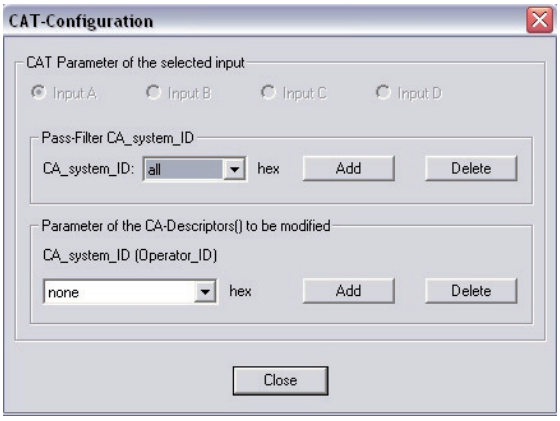


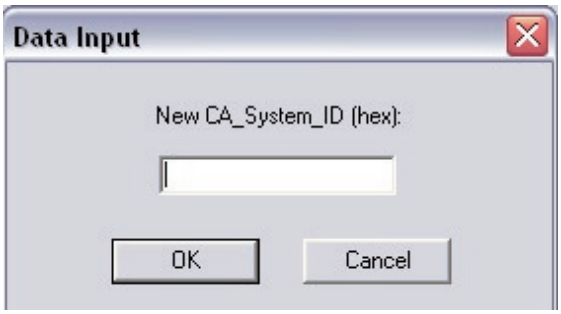
The repeat rates of the SI-/PSI-Tables can be entered individually for each table. The values shown in the above example are the standard repeat rates. Any changes made can be undone using the button "Set standard repeat rates“.

The identification of the new output stream can be entered manually. Entries can be made after activating the "manual input” check box.

8.10 CAT configuration

By clicking on the "CAT Configuration“ button that must be activated beforehand, you can access the following screen:

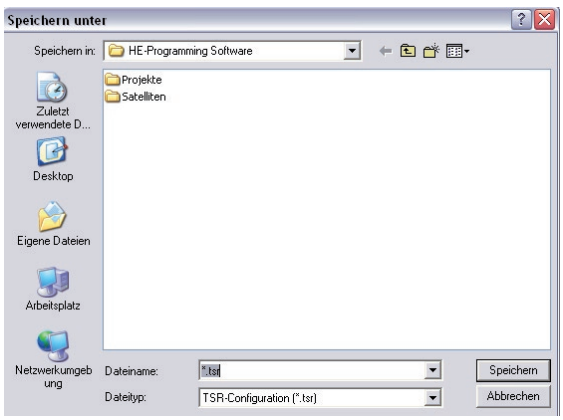


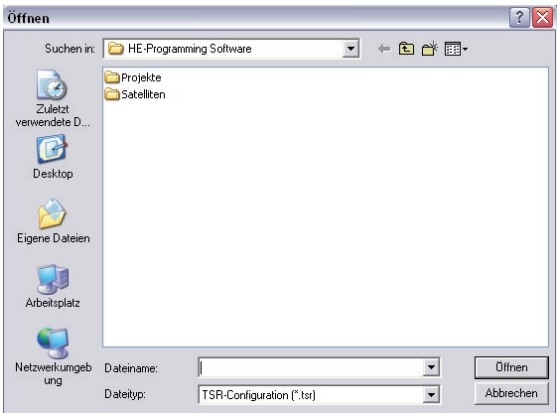


Here a Pass-Filter CA System-ID can be added to the respective input signal, or an Operator ID can be entered. To remove this SID/PID, mark the relevant SID/PID and the press the "Delete“ button.

8.11 Saving and loading a TSR configuration

If a TSR configuration is to be used on more than one device, then an already created configuration can be saved. By clicking the button "TSR configuration (incl. Save SID/PID-Filter)“ and then entering the desired file name the configuration is saved.





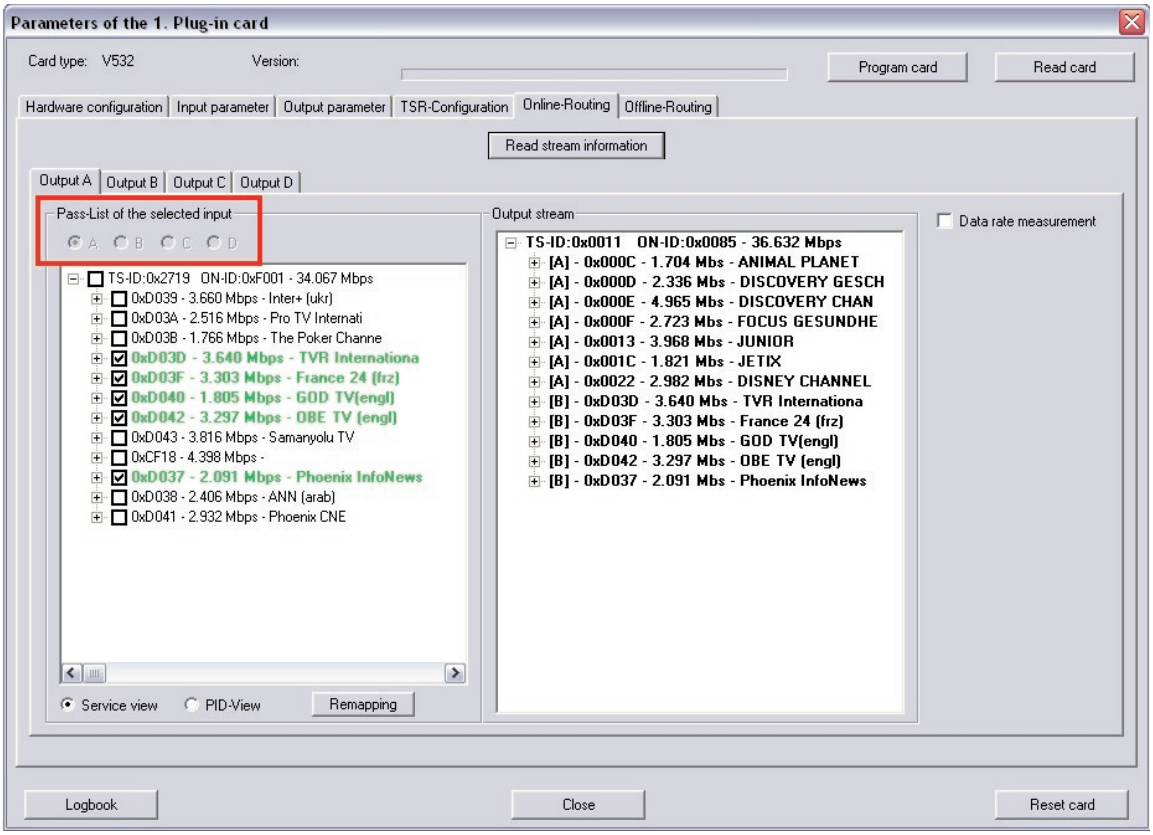
By clicking the button "TSR configuration (incl. Load SID/PID-Filter)" and then selecting the desired file, the configuration is loaded.

9 Online Routing

The most important function of the V 532 is the assembly of new QAM-output channels from different input transponders. The assembly of these channels is performed using the "Online-Routing" function.

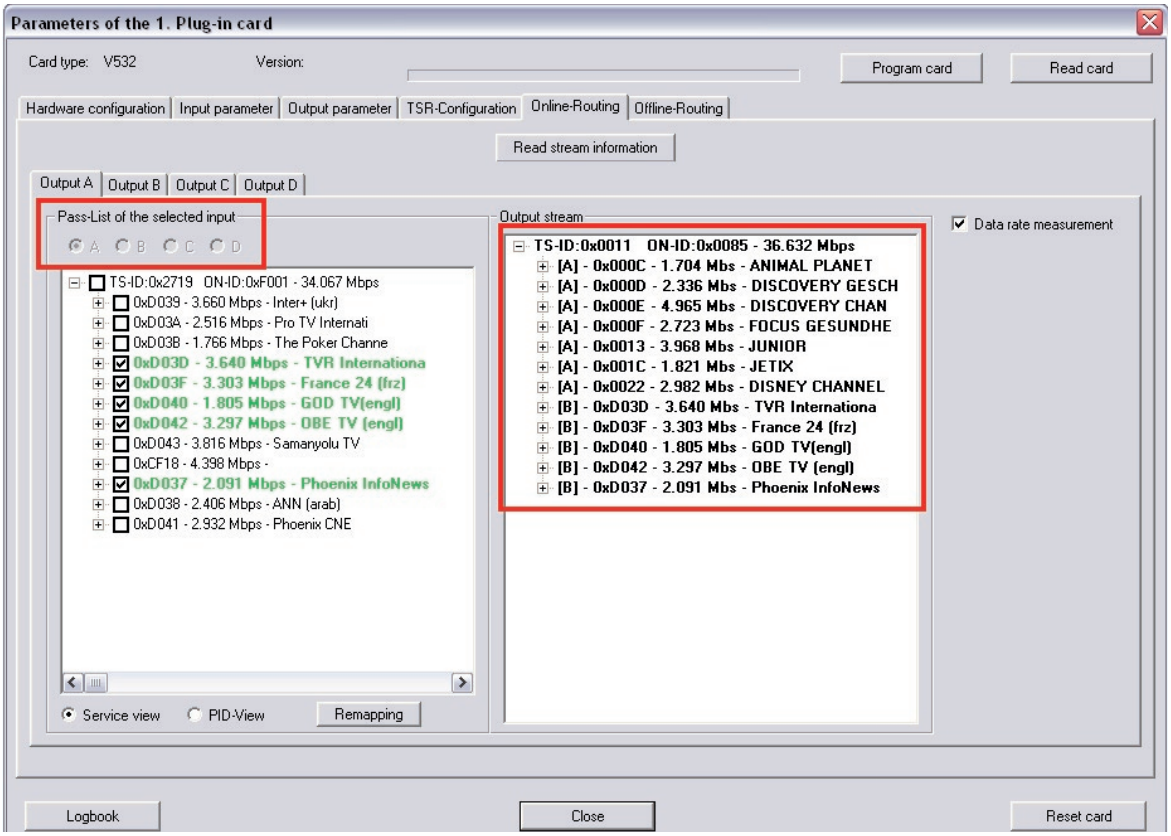
9.1 Assembling output bouquets

Clicking on the "Read stream information" button will produce the following example display:



Depending on the hardware configuration, you have up to 4 selectable inputs from which you can assemble the new QAM-Bouquet. The service view of the individual input streams is always a pass list, which means selected services are incorporated into the output stream. In the above example the whole input stream has been selected and incorporated into the output stream.

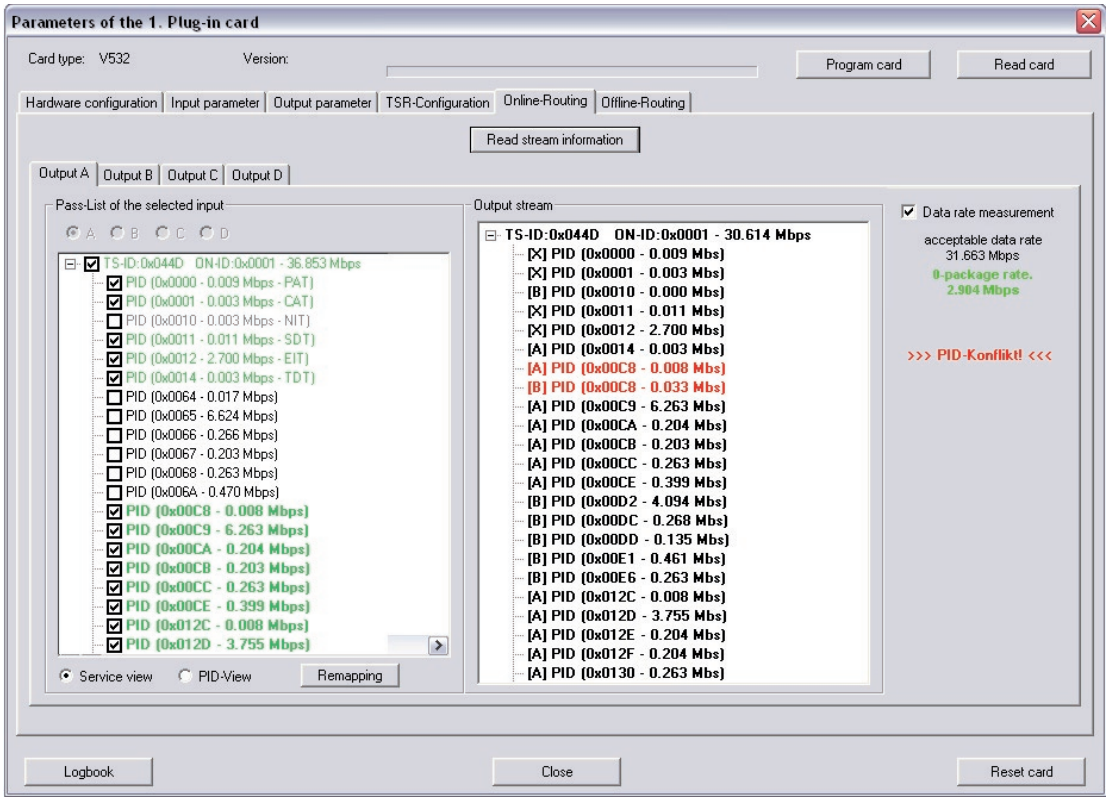
In the example below the output is fed from input A and B. The activated data rate measurement remains permanently in place, and the existing reserve is displayed (cf. Chap. 9.3).



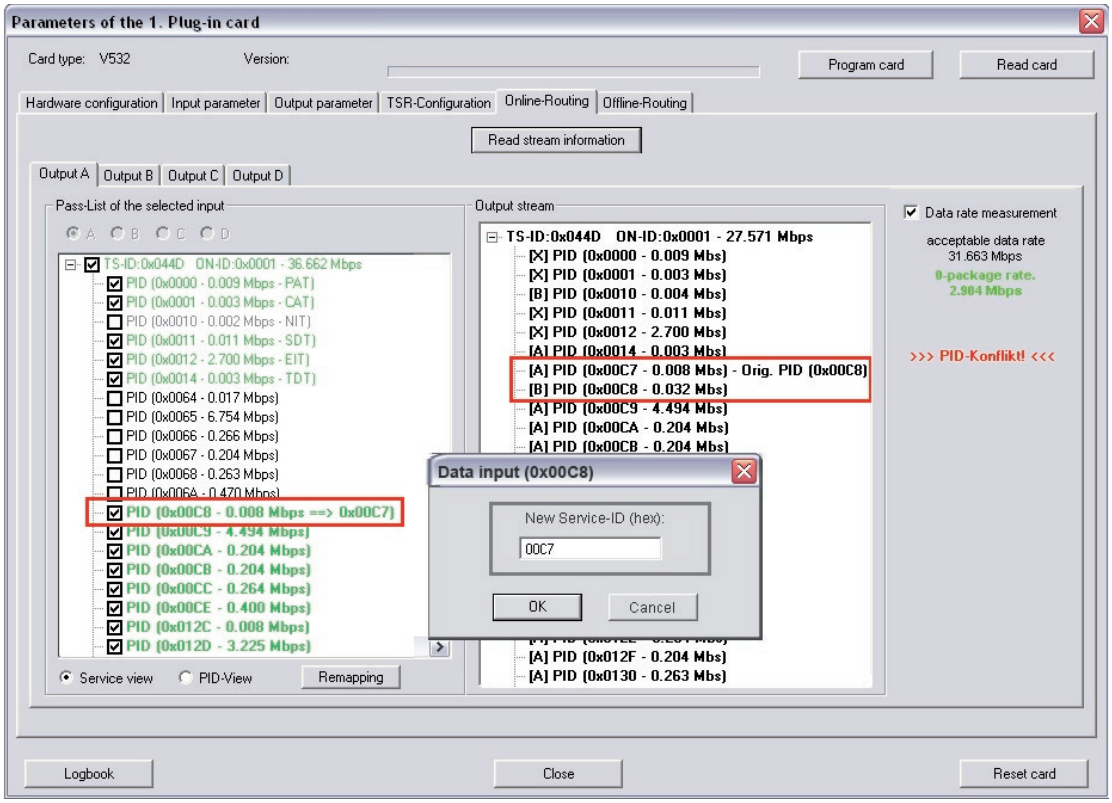
If you click on the crosses next to the services, the dependent PIDs are also displayed. The letter given in brackets indicates which input is used as the source of the individual service. In addition, when data rate measurement is activated the data rate of each individual service is displayed.

9.2 Resolving ID-conflicts / remapping of PIDs

When different input streams are assembled in a new output stream, ID-Conflicts can occur. These conflicts arise when two services are identified as the same by identical IDs. These conflicts are illustrated in the following example:

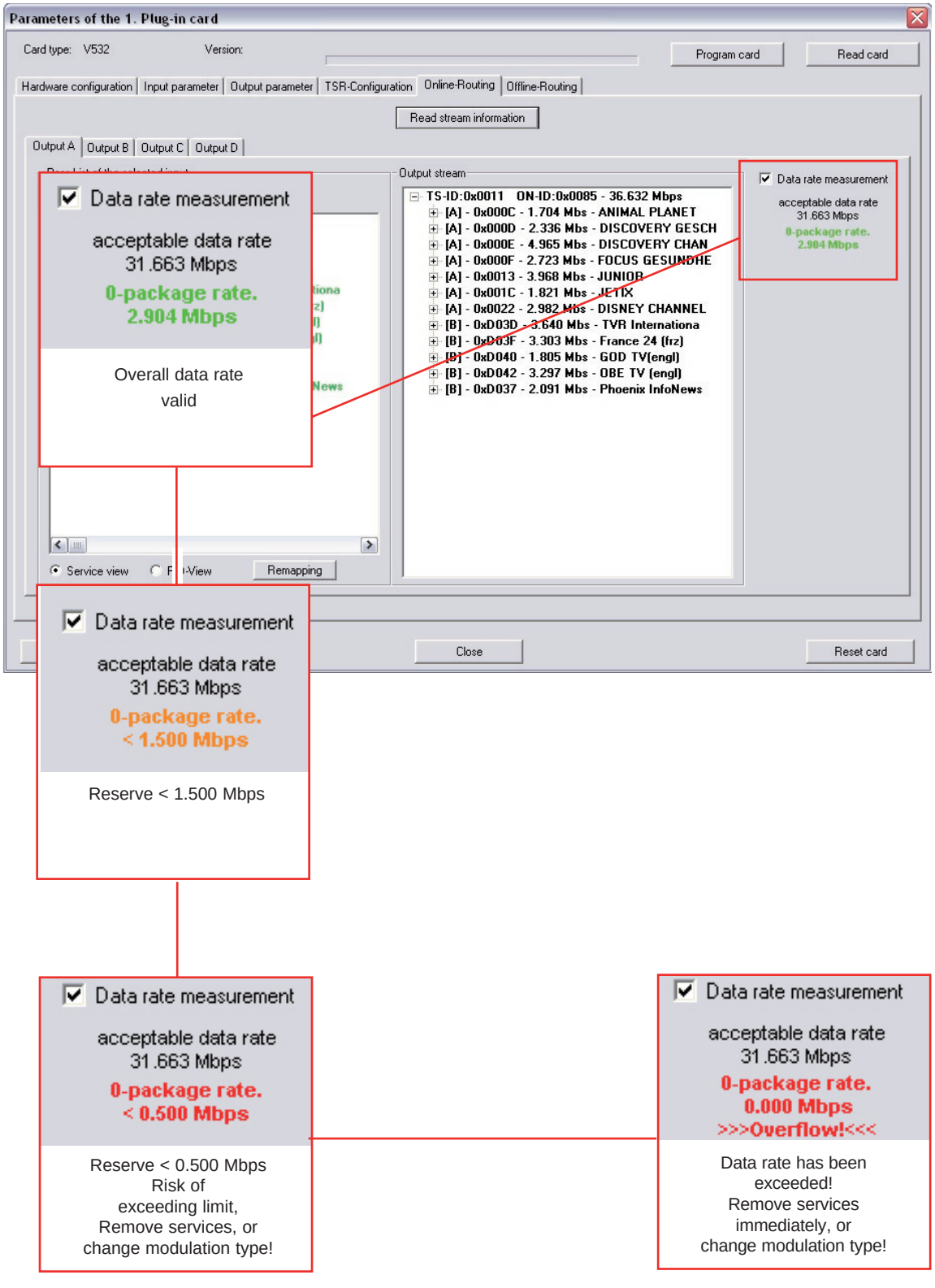


Both services used by input A and B have stored the same PID for the PMT. In order to resolve this conflict, the PID for the PMT of the service from e.g. input A can be renamed (remapping):



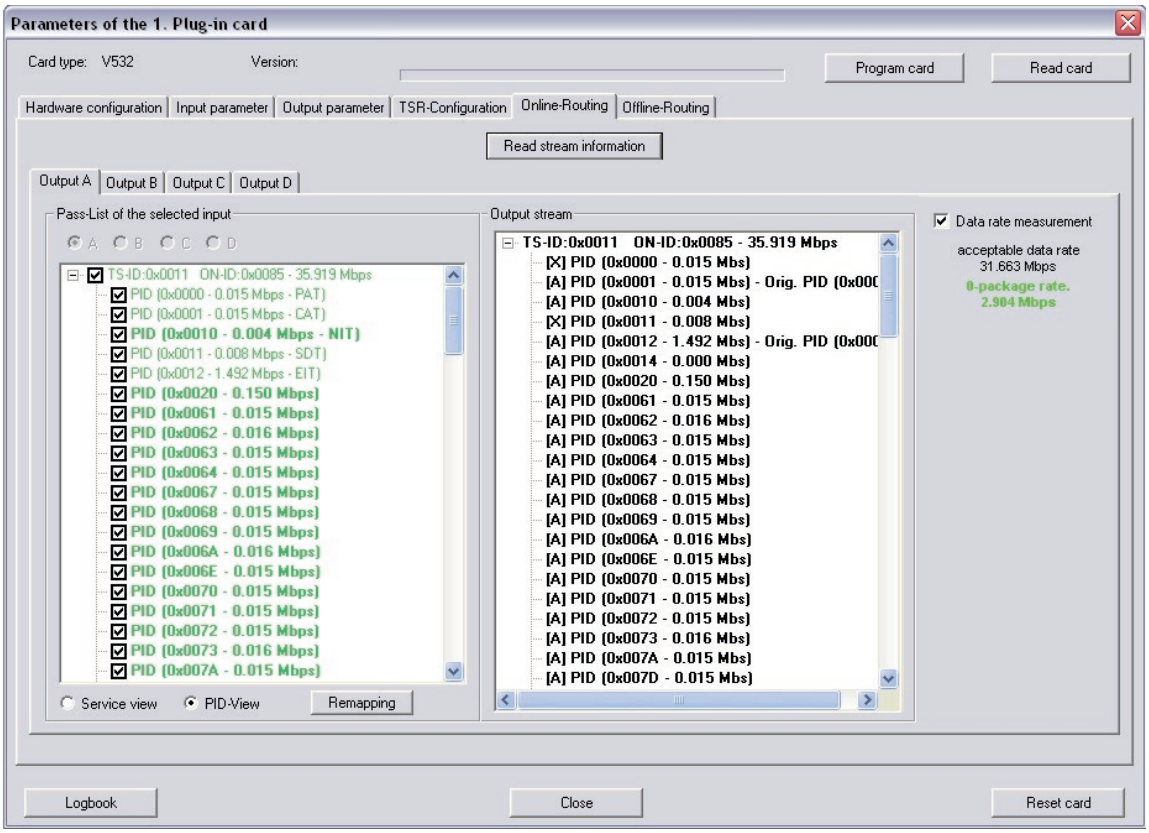
9.3 Exceeding the max. output data rate

The maximum output data rate of the newly created output stream is limited. If this limit is reached, or even exceeded, then either services must be removed from the output stream or the modulation type of the output channel changed. Reaching and exceeding this limit in Online Routing with data rate measurement activated is displayed as follows:



9.4 Service and PID view

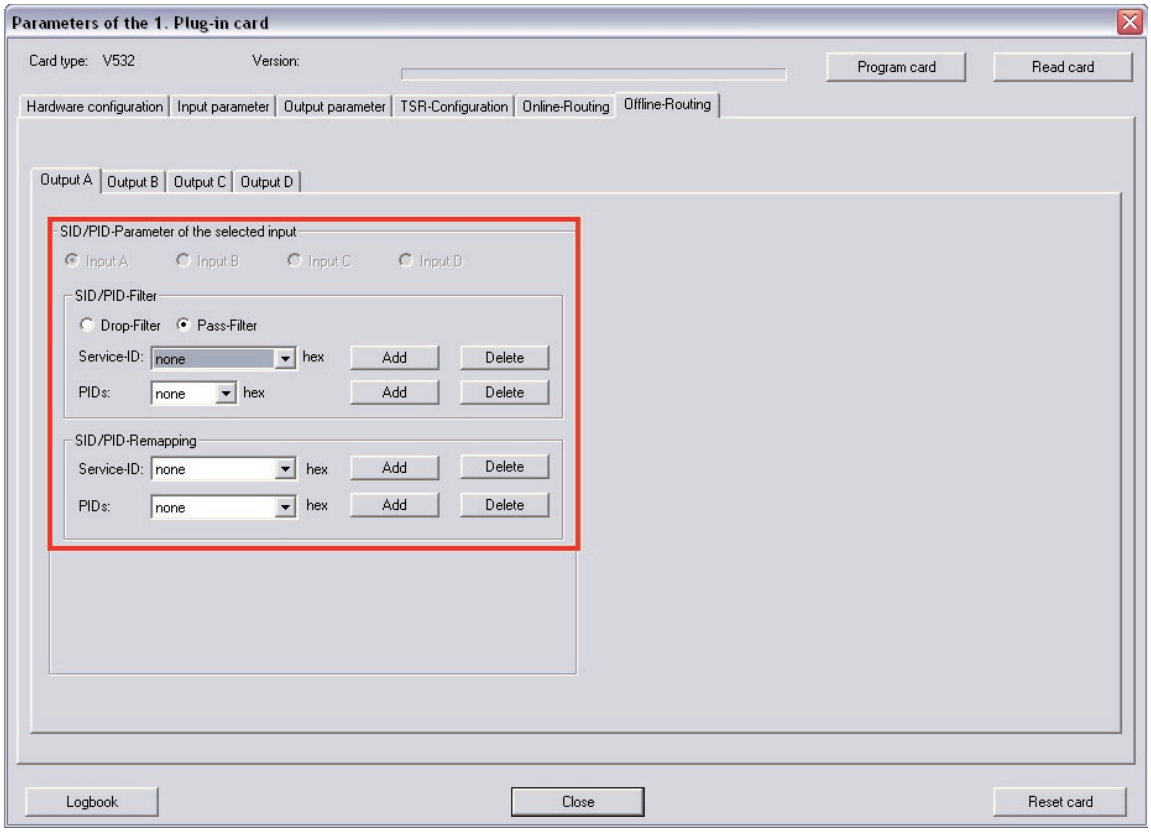
Depending on the application it can be useful to switch between the Service and PID view. This is done by clicking on "PID-View“ or "Service view“.



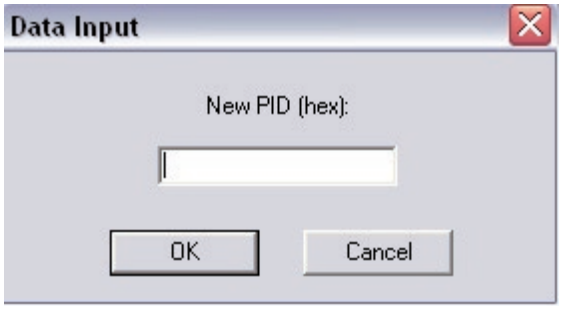
The above example shows the PID-View of the selected input and the PID-View of the output stream. The data rate of each individual PID is shown.

10 Offline Routing / manual entry of ID-Filtering and -Remapping

In Offline Routing mode all IDs must be entered manually. To do this it must be ensured that the IDs are correctly entered, as otherwise malfunctions can occur. Invoking the "Offline-Routing“ function brings up the following example screen (in this case, output A with 4 possible inputs):



The filters can be entered as drop filters (IDs entered are disabled), or as pass filters (IDs entered are passed through). Service-IDs and individual IDs can be filtered. Service-IDs and individual IDs can also be remapped. The input masks for the ID-Filters appear as follows:

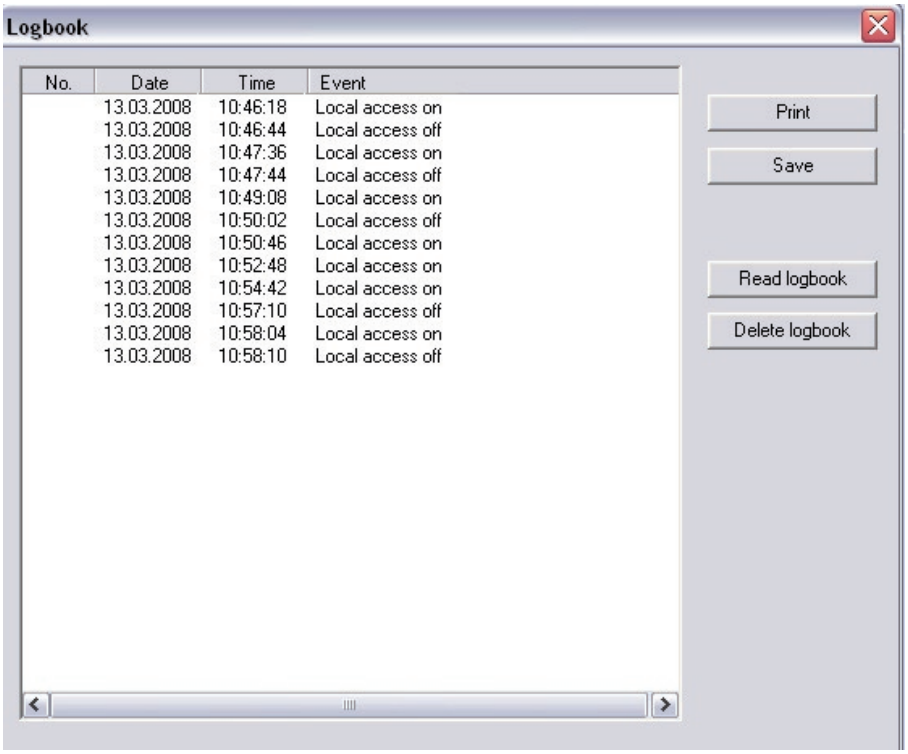


For ID Remapping the difference is in the entry of the ID to be remapped and the entry of the new ID of the service.

11 Logbook

The V 532 has a logbook, which lists all processes relevant to its operation in chronological order.

After activating the "Read logbook“ button a window appears as in the following example:



If the logbook is deleted, then this process automatically becomes the first entry in the logbook. The logbook can be printed out, or stored as a *.txt file.

12 Technical data

Type		V 532
Order number		380 505
QPSK demodulator		
Input frequency range	[MHz]	950 - 2150
Input level	[dBµV]	40 - 80
SAT IF input	[Ω]	F jack, 75
Return loss	[dB]	≥ 10
AFC-catch range		automatically adjusted
SAT IF bandwidth	[MHz]	36
Spectrum shape	[%]	35 (cos-roll-off)
Input data rate	[Mbaud]	2 - 35, adjustable
Viterbi-Decoding according DVB		1/2, 2/3, 3/4, 5/6, 7/8, auto
ASI input		
Inputs		2 x DVB ASI
Connectors	[Ω]	BNC, 75 at the chassis
Bitrate	[MBit/s]	Burst 270 / constant 75
Transmission mode		Packet burst / continuous
Packet length		188, 204
Reed-Solomon Decoding		DVB at packet length 204
QAM modulator		
Modulation		16-, 32-, 64-, 128-, 256-QAM
Signal processing		according DVB standard
Spectrum shape	[%]	15 (cos-roll-off)
FEC		Reed-Solomon (204,188)-Code
Data rate adaption (stuffing unit)		☑
PCR correction, PID filter		☑
NID handling		☑
Output symbol rate	[Mbaud]	3,45 - 6,9
Bandwidth	[MHz]	4 - 8, depending on symbol data rate
Brutto data rate	[MBit/s]	ca. 13.8…55.2
RF output		
Connectors	[Ω]	IEC jack, 75
Frequency range	[MHz]	47 - 862 (C2 - C69)
Output level	[dBµV]	80…90, adjustable
Shoulder attenuation	[dB]	typ. 58
MER (Equalizer, 64 QAM)	[dB]	typ. 45
Spurious frequency distance 40 - 862 MHz	[dB]	> 60 discrete interferences / > 57 noise interferences
Common data		
Power consumption	[W]	14,5

13 Appendix / Explanations of the SI-/PSI-Tables

Abbreviation:	PID:	Explanation:
BAT	0x11	Bouquet Allocation Table Table for describing the bouquetprovided by the transmitting site
CAT	0x01 encoding	Conditional Access Table Reference for the system used
EIT	0x12	Event Information Table Supplies the data for the EPG, divided into pf (present following) and sch (scheduled) cf. Chap. 8.6
NIT	0x10	Network Information Table Table giving the frequency, symbol rate, TS- and ON-ID (Cable-NIT)
PAT	0x00	Program Association Table List of all programs contained in the TS with reference to the PID of the PMT used
PID		Packet Identification Code for identification of programs and services in the trans port stream
PMT	0xYY	Program Map Table Details of program names, Copyright, Details of the PIDs that belong to the relevant data stream
PSI		Program Specific Information MPEG2 data sent in the transport stream which enables the receiver to decode the data (PAT / PMT / CAT)
SDT	0x11	Service Description Table
SI		Service Information General term for all data that the receiver needs in order to de-multiplex the transport stream and to decode it
TDT / TOT	0x14	Time and Date Table / Time Offset Table Time reference

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