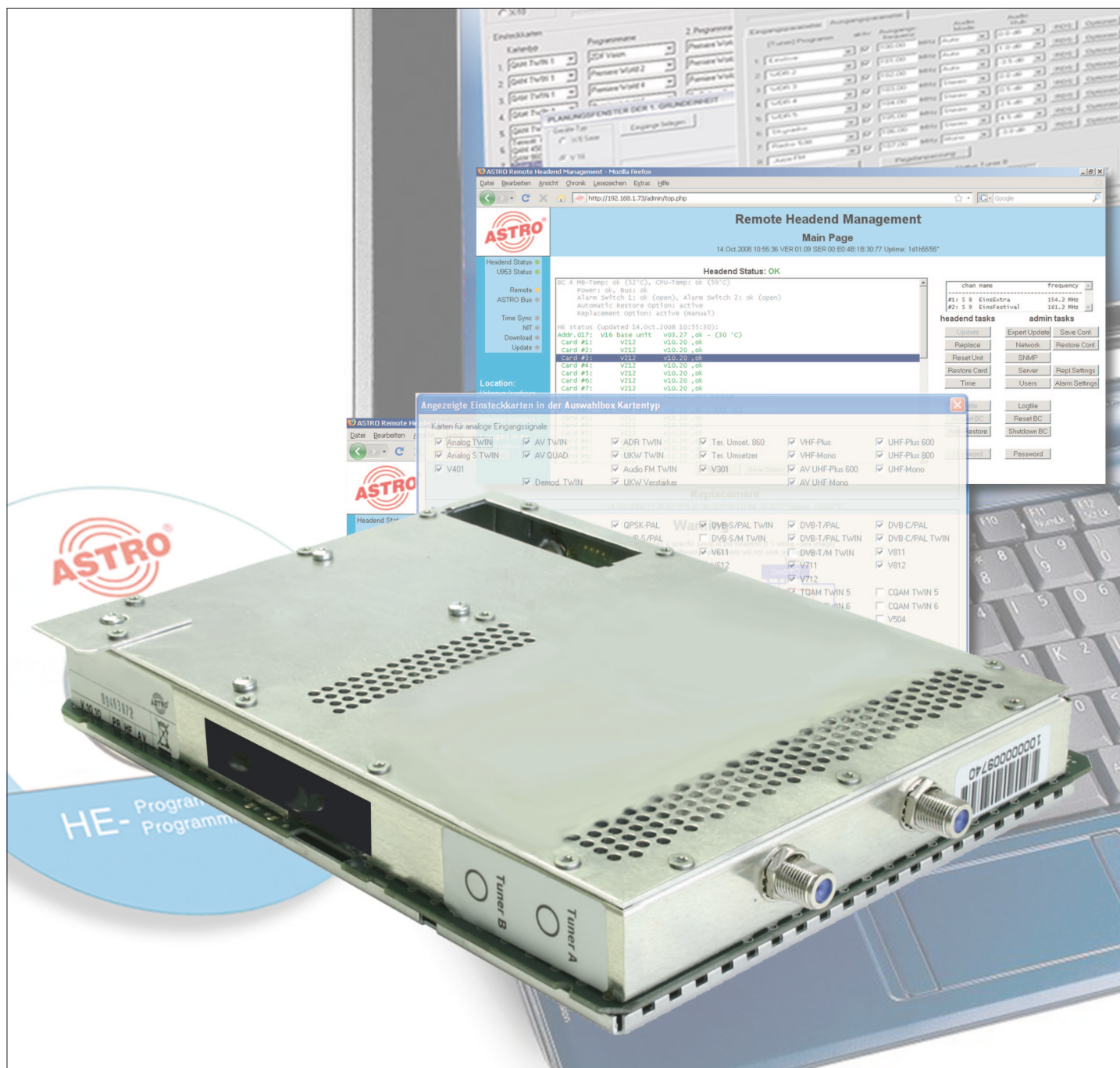


# Operating instructions V 512 / X-QAM duo 7 S2



**2-fold  
DVB-S2 / QAM Transmodulator  
with Service Filter**

## Pictograms and safety instructions

Pictograms are visual symbols with specific meanings. You will encounter the following pictograms in this installation and operating manual:



Warning about life-endangering situations due to dangerous electrical voltage or non-adherence to this manual.



Warning about various dangers to health, the environment and material.



Recycling: all of our packaging material (cardboard boxes, accompanying papers, plastic film and bags) is completely recyclable.



Used batteries must be disposed of at approved recycling points. Batteries must be completely discharged before being disposed of.

Electronic devices must not be disposed of with household waste, but rather – according to directive 2002/96/EG OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL from 27 January 2003, on waste electrical and electronic equipment – must be properly disposed of. When they are no longer of use, please bring these devices for disposal to one of the public collection points for this purpose.

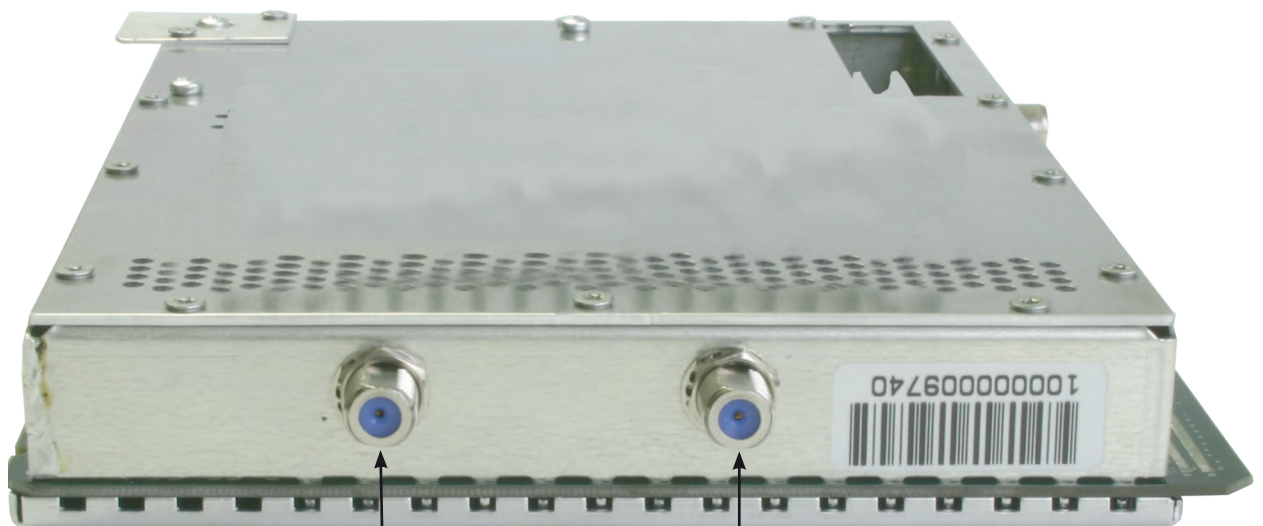
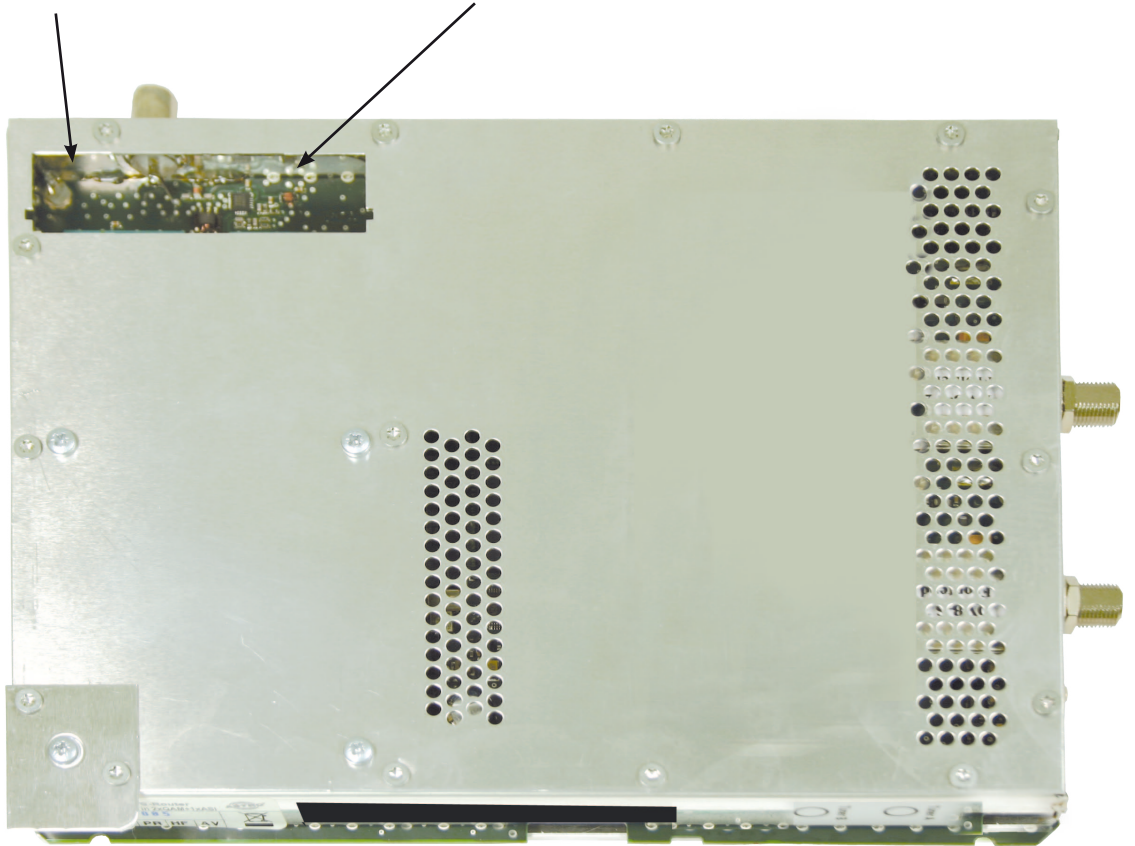
# Table of contents

	Pictograms and safety instructions .....	2
	Illustrations .....	4
1	Description .....	5
2	Preferred card types.....	6
3	Basic unit planning screen.....	7
4	Testing input parameters / signal quality	
4.1	Manual transponder selection.....	9
4.2	(De-)activating the front end .....	10
4.3	Lock on TS-/ON-ID.....	10
4.4	Testing signal quality.....	10
5	Output parameters / level adjustment.....	11
5.1	Output parameters .....	11
5.2	Level adjustment.....	11
6	SI-/PSI configuration .....	12
6.1	Drop filter or pass filter.....	12
6.2	Transmitting unreferenced PIDs .....	13
6.3	Editing CAT .....	13
6.4	PID remapping .....	13
7	Online service filter.....	13
8	Technical data.....	14

Illustrations:

Slot for channel filter (in V 512)  
Channel B

Slot for channel filter (in V 512)  
Channel A



Tuner B

Tuner A

# 1 Description

The V 512 / X-QAM duo 7 S2 plug-in board is used to convert two independent DVB-S(2) into two independent & DVB-conformant QAM-output channels. It can process both HDTV signals as well as SDTV signals.

The plug-in board is capable of eliminating services from the transport stream of the bearer channel (by editing the DVB tables) in compliance with standards. The V 512 also features two channel output filters available 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 have been adapted to existing units, when applicable.

The delivery package contains 2 cables for connecting the SAT-tuners.

Note:

The V 512 is only to be used in the V16 base unit!

The V16 base unit may only be equipped with a maximum of 8 V 512 units!

The X-8 base unit may only be equipped with a maximum of 8 X-QAM duo 7 S2 units!



Please observe the following:

Exchange or replacement of the modules may only be carried out by technical personnel tested and authorised by IHK (certified specialist). When doing so, the danger and safety warnings listed in the operating instructions for the V16 base units, together with the relevant safety guidelines described DIN VDE Regulation 0701, Part 1 and 200, must be observed.





## 2 Preferred card types

After installation in the base unit, the V 512 / X-QAM duo 7 S2 board can be programmed with the HE-programming software. If it is not possible to select the board in the HE programming software, select the menu item "Options - preferred board types" and check the settings here. 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 512 board appears in the planning screen of the basic unit on the plug-in slot that was used.

Plug-in cards for analog input signals					
<input type="checkbox"/> analog TWIN	<input type="checkbox"/> AV TWIN	<input type="checkbox"/> ADR TWIN	<input type="checkbox"/> Ter. Umset. 860	<input type="checkbox"/> VHF-Plus	<input type="checkbox"/> UHF-Plus 600
<input checked="" type="checkbox"/> analog S TWIN	<input checked="" type="checkbox"/> AV M TWIN	<input type="checkbox"/> UKW TWIN	<input type="checkbox"/> Ter. Umsetzer	<input type="checkbox"/> VHF-Mono	<input type="checkbox"/> UHF-Plus 800
<input type="checkbox"/> V401	<input checked="" type="checkbox"/> V112	<input type="checkbox"/> Audio FM TWIN	<input checked="" type="checkbox"/> V301	<input type="checkbox"/> AV UHF-Plus 600	<input type="checkbox"/> UHF-Mono
	<input type="checkbox"/> AV QUAD	<input type="checkbox"/> UKW Amplifier	<input type="checkbox"/> TWIN Demod.	<input type="checkbox"/> AV UHF-Mono	

Plug-in cards for digital input signals					
<input type="checkbox"/> QAM TWIN 1	<input type="checkbox"/> QAM TWIN 4 S2	<input type="checkbox"/> QAM QUAD	<input checked="" type="checkbox"/> DVB-S/PAL PAL	<input type="checkbox"/> DVB-T/PAL	<input type="checkbox"/> DVB-C/PAL
<input type="checkbox"/> QAM TWIN 1 OP	<input checked="" type="checkbox"/> QAM TWIN 5 S2	<input checked="" type="checkbox"/> V514	<input type="checkbox"/> DVB-S/PAL TDD	<input checked="" type="checkbox"/> DVB-T/PAL TWIN	<input checked="" type="checkbox"/> DVB-C/PAL TWIN
<input type="checkbox"/> QAM TWIN 1 IP	<input checked="" type="checkbox"/> QAM TWIN 6 S2		<input checked="" type="checkbox"/> DVB-S/PAL DUO	<input checked="" type="checkbox"/> DVB-S/M TWIN	<input checked="" type="checkbox"/> DVB-T/M TWIN
<input checked="" type="checkbox"/> QAM TWIN 3	<input checked="" type="checkbox"/> QAM DUO 7 S2		<input checked="" type="checkbox"/> DVB-S/M TWIN	<input checked="" type="checkbox"/> DVB-T/M TWIN	
<input type="checkbox"/> QAM TWIN 4.1	<input checked="" type="checkbox"/> V502	<input checked="" type="checkbox"/> COFDM DUO S2	<input type="checkbox"/> V611	<input checked="" type="checkbox"/> V711	<input checked="" type="checkbox"/> V811
<input type="checkbox"/> QAM TWIN 4.2	<input checked="" type="checkbox"/> V512	<input checked="" type="checkbox"/> V912	<input checked="" type="checkbox"/> V612	<input checked="" type="checkbox"/> V712	<input type="checkbox"/> V812
<input checked="" type="checkbox"/> QAM TWIN 5	<input type="checkbox"/> V522				
<input checked="" type="checkbox"/> QAM TWIN 6		<input type="checkbox"/> QAM 860	<input type="checkbox"/> DVB-S/PAL	<input checked="" type="checkbox"/> TQAM TWIN 5	<input checked="" type="checkbox"/> CQAM TWIN 5
<input type="checkbox"/> QAM TWIN 6 IP	<input type="checkbox"/> QAM ROUTER	<input type="checkbox"/> QAM 450 A	<input checked="" type="checkbox"/> V601	<input checked="" type="checkbox"/> TQAM TWIN 6	<input checked="" type="checkbox"/> CQAM TWIN 6
<input checked="" type="checkbox"/> V501	<input type="checkbox"/> V534	<input checked="" type="checkbox"/> QAM External product		<input checked="" type="checkbox"/> V503	<input checked="" type="checkbox"/> V504
<input type="checkbox"/> Scan TWIN 1	<input checked="" type="checkbox"/> V532	<input checked="" type="checkbox"/> QAM 5 S2	<input type="checkbox"/> DVB-S/FM TWIN	<input type="checkbox"/> DTU	<input type="checkbox"/> DVB-C/FM TWIN
			<input type="checkbox"/> DVB-S/FM DUO	<input checked="" type="checkbox"/> V311	<input type="checkbox"/> QPSK-PAL
			<input checked="" type="checkbox"/> DVB-S/FM Octopus	<input checked="" type="checkbox"/> DTU DUO	<input type="checkbox"/> QPSK-UKW

Plug-in cards with ASI-Input			Plug-in cards with ASI-Output		
<input checked="" type="checkbox"/> V202	<input checked="" type="checkbox"/> V212	<input checked="" type="checkbox"/> V222	<input checked="" type="checkbox"/> V251	<input checked="" type="checkbox"/> V241	<input checked="" type="checkbox"/> V231
		<input checked="" type="checkbox"/> V228	<input checked="" type="checkbox"/> V252		

It is not possible to deactivate card types of the current project.

Please observe the following:

Recommended software version

V16: xx.28

X-8: xx.28

Programming software: 5.41

### 3 Basic unit planning screen

After selecting the basic unit, the V 512 / X-QAM duo 7 S2 is displayed on the planning screen of the basic unit.

Card type	Channel A	Channel B (TWIN)	RF-Parameters A	RF-Parameter B	Status
1. V512			K 2 / 50,5 MHz	K 3 / 57,5 MHz	?   ?
2. QAM DUO 7 S2			K 4 / 64,5 MHz	D 73 / 73,0 MHz	?   ?
3. unknown					
4. unknown					
5. unknown					
6. unknown					
7. unknown					
8. unknown					

To select the transponders to be received from, you must first define in the basic unit which satellite levels are connected. This is done under “Occupy inputs”.

Satellite	Polarisation / Band	LNC-Frequency
1: open	horizontal / Low	9750 MHz
2: open	horizontal / Low	9750 MHz
3: open	horizontal / Low	9750 MHz
4: open	horizontal / Low	9750 MHz
5: open	horizontal / Low	9750 MHz
6: open	horizontal / Low	9750 MHz
7: open	horizontal / Low	9750 MHz

Input	Satellite	Polarisation / Band	LNC-Frequency
11: Astra_19,2G0	horizontal / High	10600 MHz	
12: Astra_19,2G0	vertical / High	10600 MHz	
13: open	horizontal / Low	9750 MHz	
14: open	horizontal / Low	9750 MHz	
15: open	horizontal / Low	9750 MHz	
16: open	horizontal / Low	9750 MHz	

Now, under “Channel A” and “Channel B”, you can set the transponders that are to be received by the board.

Overview of the 1. Base-unit

Device Type: V 16

Hardware configuration | Input settings | Output segments

Base-unit: Read | Program

Plug-in cards

Card type	Channel A	Channel B (TWIN)	RF-Parameters A	RF-Parameter B	Status	Details
1. V512	MTV Networks (TP078)	Pro Sieben (TP082)	K 2 / 50,5 MHz	K 3 / 57,5 MHz	?   ?	Details
2. QAM DUO 7 S2	ARD Digital1 (TP71)	ZDF Vision (TP77)	K 4 / 64,5 MHz	D 73 / 73,0 MHz	?   ?	Details
3. unknown						Details
4. unknown						Details
5. unknown						Details
6. unknown						Details
7. unknown						Details
8. unknown						Details

Read card types | Close | Complete Head-End: Read System | Program System

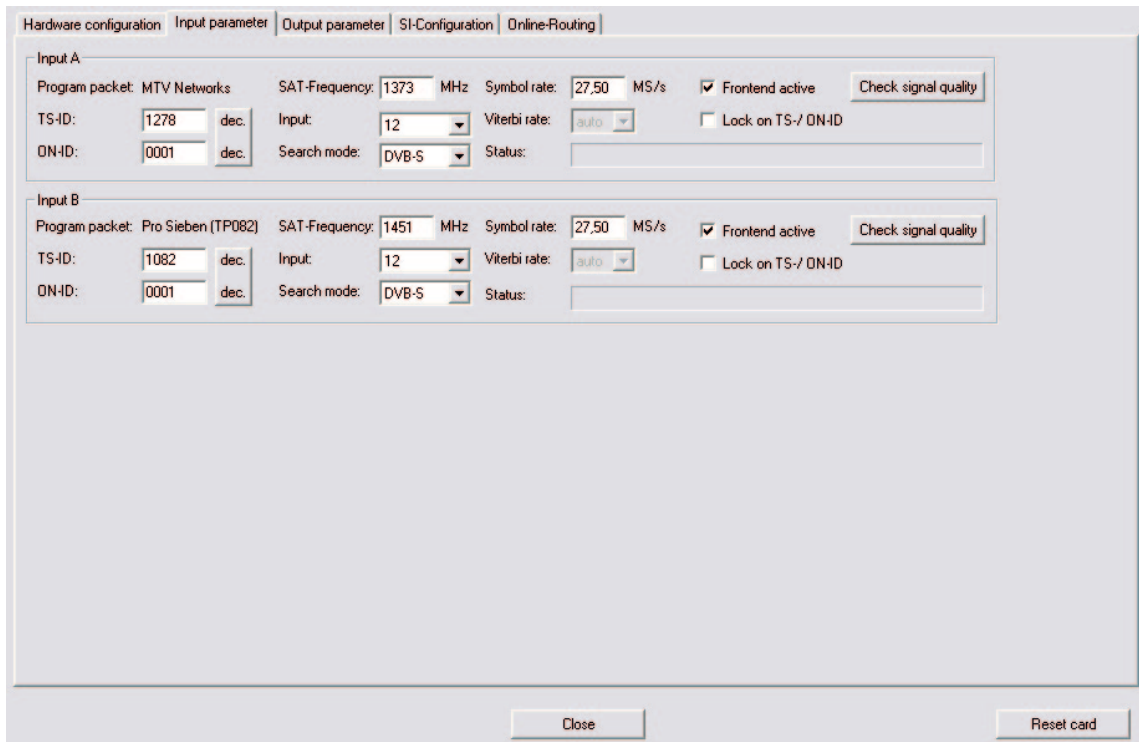
The output channels of the V 512 / X-QAM duo 7 S2 board, that is, the channels in which the QAM channels assembled from the DVB-S(2) are to be fed into the cable, can be selected under "HF parameter A" and "HF parameter B" in the planning screen of the basic unit.

If the user now clicks the "Details" button, the screen with the board details will open. All relevant settings for operation of the device are made here.



## 4 Testing 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.



The screenshot shows a software interface with the following configuration details:

Section	Program packet	SAT-Frequency	Symbol rate	Frontend active	Check signal quality
Input A	MTV Networks	1373 MHz	27.50 MS/s	<input checked="" type="checkbox"/>	<input type="button" value="Check signal quality"/>
Input A	TS-ID: 1278 dec.	Input: 12	Viterbi rate: auto	<input type="checkbox"/> Lock on TS-/ ON-ID	
Input A	ON-ID: 0001 dec.	Search mode: DVB-S	Status:		
Input B	Pro Sieben (TP082)	1451 MHz	27.50 MS/s	<input checked="" type="checkbox"/>	<input type="button" value="Check signal quality"/>
Input B	TS-ID: 1082 dec.	Input: 12	Viterbi rate: auto	<input type="checkbox"/> Lock on TS-/ ON-ID	
Input B	ON-ID: 0001 dec.	Search mode: DVB-S	Status:		

Buttons at the bottom:

### 4.1 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 make sure the input is correct, otherwise the signals cannot be processed.

#### 4.2 (De-)activating the front end

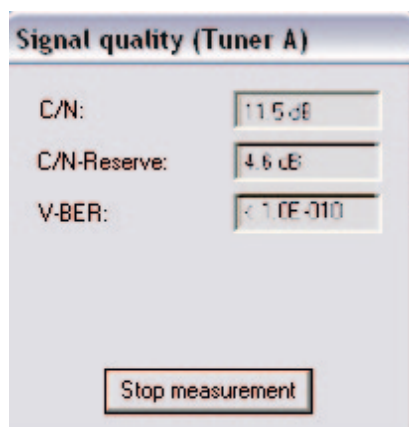
By clicking on the "Front end active" selection box, the front end of the respective input can be either activated or deactivated.

#### 4.3 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.

#### 4.4 Testing signal quality

The "Test signal quality" button is used to open the screen with the current signal parameters. The values displayed will differ according to input signal:

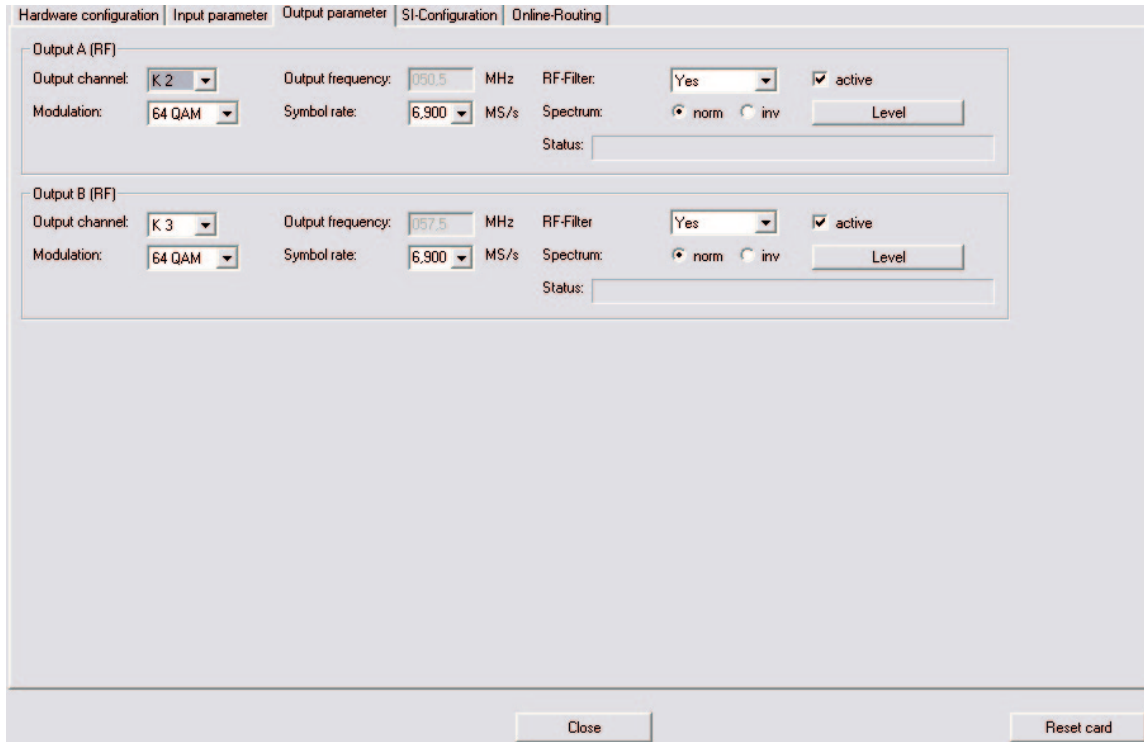


## 5 Output parameters / level adjustment

### 5.1 Output parameters

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

The respective output channel filter can be activated or deactivated in the view for output A and output B. A channel filter which has not been plugged but has been activated in the software will result in an error message.



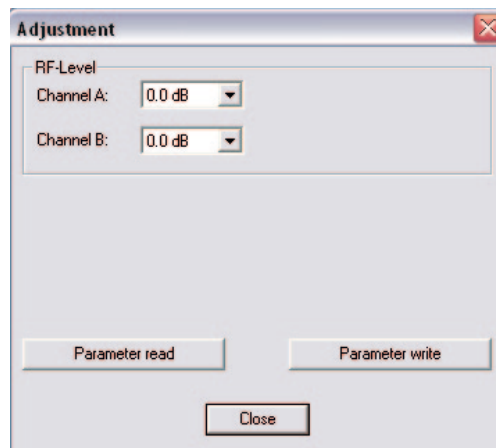
The screenshot shows the 'Output parameter' configuration window with the following settings:

Output Channel	Output Frequency (MHz)	Modulation	Symbol Rate (MS/s)	RF-Filter	Spectrum	Status
K 2	090.5	64 QAM	6,900	Yes	norm	active
K 3	057.5	64 QAM	6,900	Yes	norm	active

Buttons at the bottom: Close, Reset card

### 5.2 Level adjustment

The output level for the individual output channels is adapted electronically using the HE programming software. Clicking on the "Level adjustment" button opens the following screen:



The 'Adjustment' dialog box shows the following settings:

Channel	RF-Level (dB)
Channel A	0.0
Channel B	0.0

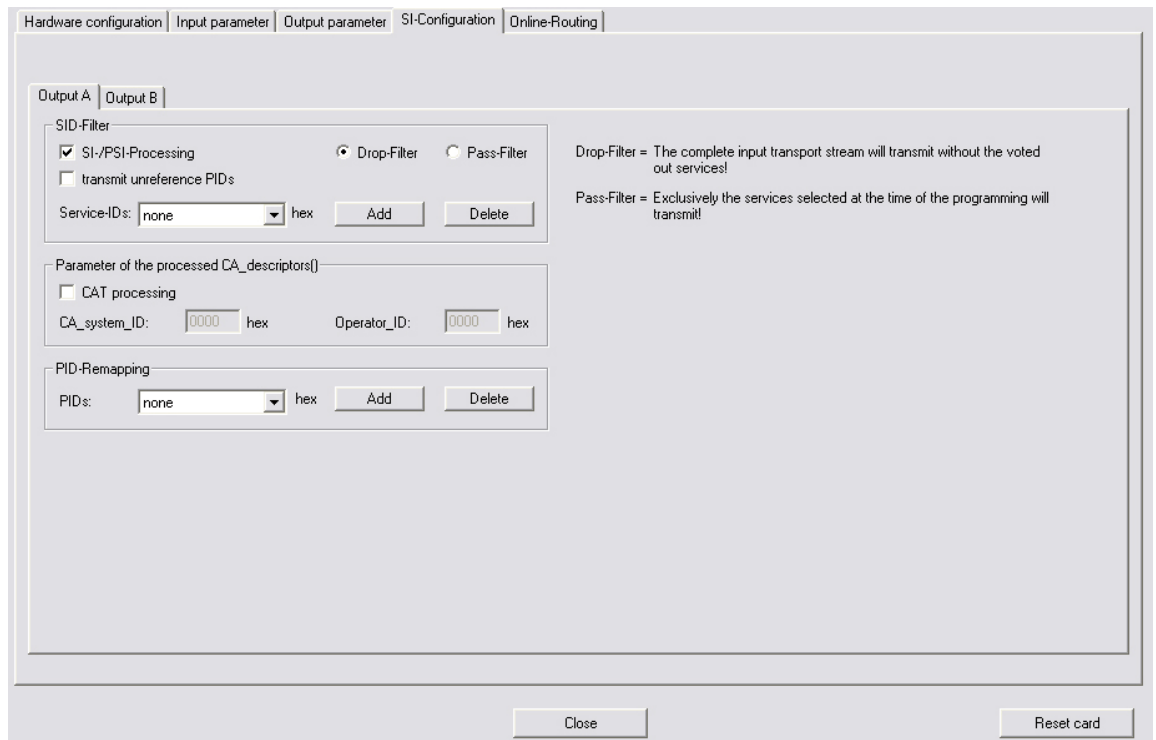
Buttons: Parameter read, Parameter write, Close

The values currently stored are read from the board first when the “Read parameters” button is clicked. Any modifications made will only be written onto the board and activated when the "Write parameters" button is clicked.

## 6 SI-PSI configuration

The service filter configuration field is the same for both outputs A and B. This configuration is therefore explained using output A:

In order to activate the option to eliminate individual services from the data stream, the function "SI-/PSI processing" must be activated. Without this setting, the board functions as a standard transmodulator, which allows all services present in the input data stream to pass through unfiltered.



### 6.1 Drop filter or pass filter

The V512 / X-QAM duo 7 S2 supports the two different service filtering modes:

#### Drop filter:

In this case, the input data stream is transferred completely, only the selected service IDs are actively removed. This means all services, including any that may also be transferred at a later time, are allowed through and can be found in the output data stream.

#### Pass filter:

In this case, only the services selected at the time of programming are transferred, or any services that are added later, if applicable.

## 6.2 Transmitting unreferenced PIDs

The V512 / X-QAM duo 7 S2 uses this function to decide whether unreferenced PIDs, i.e. those not belonging to a service, are transferred or blocked. As these PIDs could be used to control any special functions, e.g. for set-top boxes, in some cases blocking them can have adverse effects.

## 6.3 Editing CAT

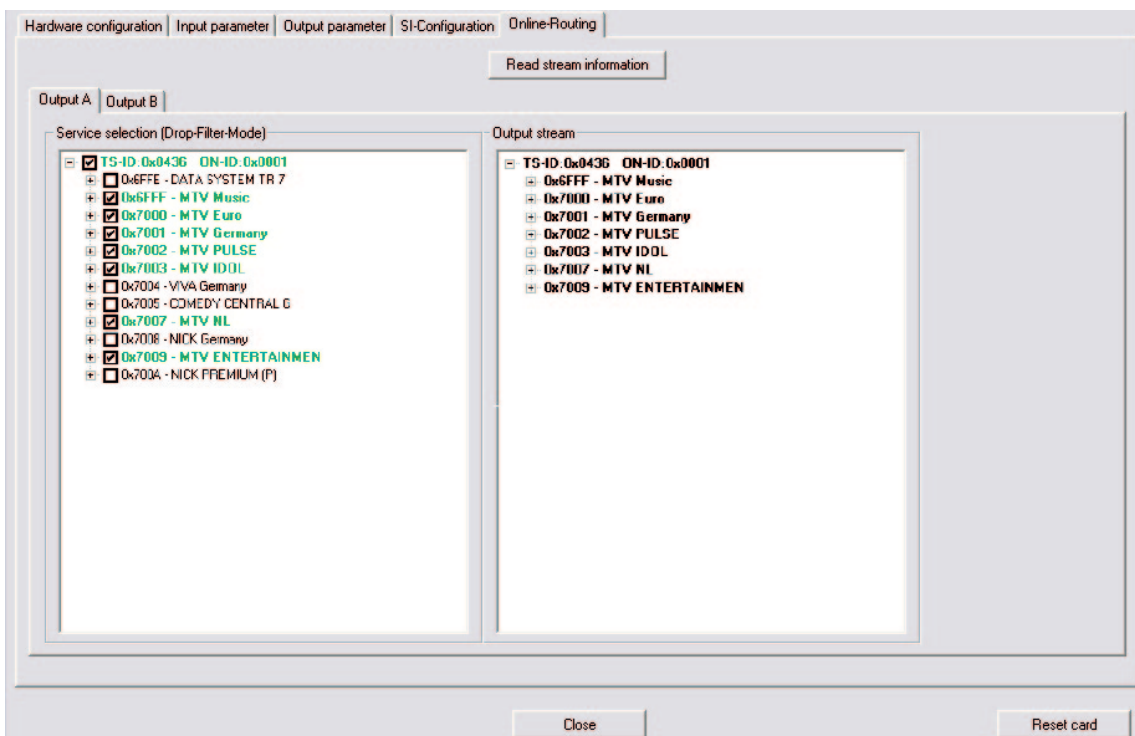
This function is used in the event that an operator ID needs to be manipulated.

## 6.4 PID remapping

At this point up to four PID remap filters can be set.

# 7 Online service filter

By selecting the preferred services (green) from the input data stream (left-hand side), the services present in the output data stream (right-hand side) are chosen. The 'Program board' button is used to transfer all settings to the V 512 / X-QAM duo 7 S2.





## 8 Technical data

Type		V 512	X-QAM duo 7 S2
Order number		380 506	330 479
EAN code		4026187630300	4026187611163
<b>DVB-S(2) demodulator</b>			
Connectors	[Ω]	F-jack, 75	
Input frequency range	[MHz]	920 - 2150	
Input level	[dBμV]	44 - 80	
Input symbol rate	[MS/s]	max. 30.0 (DVB-S); max. 45.0 (DVB-S)	
DVB-S Viterbi		1/2, 2/3, 3/4; 5/6, 6/7, 7/8	
DVB-S2 LDPC		1/4; 1/3; 2/5; 1/2; 3/5; 2/3; 3/4; 4/5; 5/6; 8/9; 9/10	
DVB-S2 roll-off factors		0.20; 0.25; 0.35	
DVB-S2 Modulation		QPSK, 8PSK	
<b>QAM modulator</b>			
Modulation		16-, 32-, 64-, 128-, 256-QAM	
Signal processing		accord. to DVB standard	
Spectrum shape (cos-roll-off)	[%]	15	
FEC		Reed-Solomon (204, 188)	
Output symbol rate	[Msym]	3.45 - 6.9	
Bandwidth	[MHz]	4 - 8.6 (depending on symbol rate)	
Brutto data rate	[MBit/s]	maximum 55.2	
<b>TS editing</b>			
Data rate adjustment		<input checked="" type="checkbox"/>	
PCR correction		<input checked="" type="checkbox"/>	
NIT handling		<input checked="" type="checkbox"/>	
PID filtering / PID remapping		PID remapping	
Service filtering		Pass filter / drop filter	
CI interface		-	
<b>RF output</b>			
Connectors	[Ω]	IEC jack, 75	
Frequency range	[MHz]	47 - 862 (K2 - K69), adjustable in steps of 0.1 MHz	
Output level	[dBμV]	80...96, adjustable	
MER (Equalizer, 64 QAM)	[dB]	typ. 45	
Spurious frequency dist. 40 - 862 MHz	[dB]	> 60 discrete interferences / > 57 noise interferences	
<b>Common data</b>			
Channel filter		optional	-
Power consumption	[W]	16.5	13.5
Ambient temperature	[°C]	0...+50	





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