

# Contents

# Contents

Cor	ntents	5
	Pictu	re Page 2
	Picto	graphs Page 4
1	Desc	ription Page 4
2	Pre -	- configuration / Cabling Page 5
3	Prog	ramming with the HE programming software Page 5
	3.1	$\ensuremath{Pre}\xspace - \ensuremath{configuration}\xspace$ of the HE programming software . Page 5
	3.2	Activating the NIT processing Page 6
	3.3	Programming the card parameters Page 6
	3.4	Testing the input signal quality Page 7
	3.5	Level adjustment Page 7
	3.6	Setting the PID filter Page 8
	3.7	PID remapping Page 8
	3.8	Error messages Page 8
	3.9	Changing the Operator – ID Page 9
4	Basi	cs of programming with the KC 3 Page10
	4.1	Basics Page10
	4.2	Order of programming Page10
	4.3	StorePage10

5	Prog	ramming with the KC 3 Page11
	5.1	Parameters of the base unit /
		Choosing a slot Page11
		5.1.1 Adjusting the bus address Page11
		5.1.2 Choosing the slot Page11
	5.2	Adjusting the SAT input parameters Page11
		5.2.1 Adjusting the SAT – IF input frequency $\ . Page11$
		5.2.2 Choosing the input Page11
		5.2.3 Adjusting the symbol ratio Page12
		5.2.4 Adjusting the Viterbi ratio $\ldots \ldots \ldots$ Page12
	5.3	Setting the RF output parameters $\hdots$ Page12
		5.3.1 Setting the RF output frequency Page12
		5.3.2 Adjusting the output data ratio $\ldots \ldots \ldots$ Page12
		5.3.3 Setting the type of modulation $\dots \dots$ Page13
		5.3.4 Switching – off the output signal Page13
		5.3.5 Inverting the output spectrum Page13
		5.3.6 Error messages Page13
		5.3.7 Level adjustment of the V 501-card Page13
6	Techr	nical data Page14
7	Short	overview of KC 3 programming steps Page15

## Pictographs

### Pictographs and safety information



Pictographs are icons with specific meanings. The following pictographs are used in the installation and operating instructions:



Warns about situations in which there is danger of lethal injury due to hazardous electrical voltage and non-compliance with these instructions.



Recycling: All of our packaging materials (packaging, identification sheet, plastic foil and bag) are fully recyclable.

#### English:



Electronic equipment is not household waste – in accordance with directive 200/96/EC OF THE EUROPEAN PARLIAMENT AND THE COUNCIL of 27<sup>th</sup> January 2003 on used electrical and electronic equipment, it must be disposed of properly. At the end of its service life, take this unit for disposal at a relevant official collection point.

#### Francaise:

Les appareils électroniques doivent pas être mis dans la poubelle de la maison, mais doivent être recycles correctement selon la directive 200/96/EG DU PARLAMENT ET DU CONSEIL EUROPEEN du 27 janvier 2003 concernant les appareils électroniques et électriques usages. Nous vous prions de metre cet appareil á la fin de son utilisation dans un emlacement prévu pour son recyclage.

#### Nederlands:

Elektronische apparaten horen - volgens richtlijn 2002/96EG van het Europese Parlement d.d. 27 januari 2003 - niet thuis bij het gewone huisvuil maar, moeten gescheiden ingezameld worden. Lever daarom gebruikte elektrische en elektronische apparatuur aan het eind van hun levensduur in bij de daarvoor bedoelde verzamelpunten.

# 1 Description

# Description

The V 501– card is used for processing of two QPSK – modulated SAT – IF – signals into two QAM – modulated adjacent channels in the frequency range from 47 to 862 MHz. The signal processing of the V 501 – modules is realized with the **Direct Digital ® - technology**. The two output channels can be switched on and off separately from one another. Each board has a level control for level matching of the individual plug-in boards to the same output level via KC 3 or HE programming software.

The V 501– card equipped with the possibility to program PID filters and PID remapping as well as an optional NIT processing. There is also implemented an optional editing function for the Operator – ID.

If the output data ratio is undervalued, the V501-card adapts the data ratio on the minimum requested value.

A further feature is the automatically level adjustment, if different kinds of modulation are chosen, independent from the kind of modulation (chapter "Level adjustment").

It is possible to plug in channel selective output filters (V-KF...) to keep the outstanding signal quality after combining.



1

The operation of the V 611 card is only possible in the V 16 base unit.

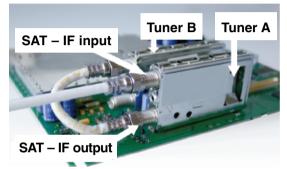
#### Please note:

Authorized and qualified personnel only, is allowed to change the plug-in modules. Before this, the operating instructions, and especially the security advises, of the V16 base unit have to be read and followed. All works have to be done according to the security standards DIN VDE 0701, part 1 and 200.

# 2 Pre – configuration

## Pre – configuration / Cabling of the V 501

The V 501 – card can be operated with bridged input signals. This means the SAT – IF is taken from the loop-through output of tuner A to the input of tuner B.



SAT - IF bridged from tuner A to tuner B



Tuner A and Tuner B connected to SAT – IF separately

## 3 Programming with HE programming software

# Programming with the HE programming software

#### 3.1

3

#### Pre – configuration of the HE programming software

The V 501 can be programmed via HE programming software after plugging them into the base unit. The activating of PID filter, NIT processing or the editing of the Operator – ID can only be done with the programming software! If it is not possible to choose the V 501 – card from the list in the "Overview of the base unit", you should check the settings at "Options" and "Favoured plug-in cards". The card must be activated as below, to appear on the list in the "Overview of the base unit".

After reading out the base unit, the V 501 - card appears on the used slot of the base unit.

Nug-in caeds for an alog. I⊽ an alog TW1N	RATWN	P ADB TWIN	P Tax Urrent, 890	R WERE	UHF-Plue 600
	P AV QUAD	E LIKW TWIN	R Tas Unverses	R VHENno	V UHE-Plue 800
VA01	14 No stran	P Audio FM TWIN	V301	AV LIHE-Plue 600	UHF-Mono
₩ V401	F TWIN Demod	UKW Anpiller	Va01	AV UHF-Mano	IV UHP-Mono
Nug-in cards for digital in	put signals				
R QAN TWIN 1	E BAM BED	P GPSK/PAL	DVB-S/PAL TWIN	P DV8-T/PAL	DVB-C/PAL
QAN TWIN 1 DP	P 84M 450 A	F DV8-S/PAL	P V611	DV8-T/RAL TWIN	IV811
R GAN TWIN 1 IP	P BAM Freindprodukt	100V V601	₩ V612		
R GAN TWIN 3	P 04M 552				
P OAN TWIN 4.1				🔽 Scan TWIN 1	
CAN TWIN 4.2	D DAM TWIN 4 52	P QPSK-UKW	DVB-S/FN TWIN		DVB-C/FM TW1
CAN TWIN 5	P DAM TWIN 5 S2				
QAN TWIN 6	P DAM TWIN 6 S2				
R V501	₽ 1902				
	P 1/522				
Plug-in colds with ASHin	put			Plug-in cardo with ASI-Ou	(put
₽ V202	P V212	P V222		17 V251	
is not possible to deactiv	ate card types of the ourien	l project.			
Save settings	1	0	lote	E	stended card functions



Please note: Requested software version

V16:	x.22
Programming software:	5.20

## 3 Programming with HE programming software

## 3 Programming with HE programming software

## 3.2 Activating the NIT processing

The NIT processing can only be activated via HE programming software. Therefore, the option "Generate CABLE – NIT" has to be chosen ("Design"  $\rightarrow$  "Network NIT"). In combination with the Buscontroller X-BC3 it is possible to create the NIT dynamically in consideration of the Service List Description (SLD).

íG: Gen	enerate CABLE-NIT station revate dynamic CABLE-NIT Constant/CABLE-NIT from	ally Finith the X-8 (12) - Conspo	ndar APS		y Pit	: 0000 he	
Gen	isvale dynamic DABLE-NIT Treasure CABLE NIT from	nith the X4	ndar APS	(TP087)	y Pit	e <u>0000</u> he	
Gen	isvale dynamic DABLE-NIT Treasure CABLE NIT from	nith the X4	ndar APS	(TP087)	y Pit	: 0000 he	
	Trendre GABLE VIT from	Rip (ranspo	ndar APS	(TP087)	y Pit	: 0000 he	
				(TP087)	<u> </u>	: <u>10000</u> he	806 806
100		n al hessea	aciena				
	Generate GABLE-VIT inst						
		1 MILLION			10 C L	1. 254 B (27)	
_	Penchill Geriquet	on n 200 a		Her. MI	Geniguetun	OF STREET	
verv	iew of the CABLE-NIT:						
°05	Pogram packst	T5-ID	ON-ID	BE-Frea	Data rats	Modulation	•
				[MHz]	[MS/x]	TTUUGGOOD	-
	Pogram packet	[hex]			6,900	64 D//M	-
		[hex] 0021	[hex] 0085	050.5			
1	APS Pro 7  TP104  ARD Digital (TP71)			050.5	6,900	54 Q4M	
1	APS Pro 7  TP1 04	0021	0085			54 DAM 64 DAM	
1 2 3	APS Pro 7  TP104  ARD Digital1 (TP71)	0021 0440	0085	058,5	6,900		
1 2 3 4	APS Pro 7  TP104  ARD Digital1 (TP71  20F Vision (TP77)	0021 044D 0437	0085 0001 0001	058,5 064,5	6,900	64 DAM	
1 2 3 4 5	APS Pro 7 [TP104] ARD Digital1 (TP71] 20F Vision [TP77] Premiere World 1(67]	0021 0440 0437 0011	0085 0001 0001 0085	058,5 064,5 072,5	6,900 6,900 6,900	64 DAM 64 DAM	
1 2 3 4 5 5	APS Pro 7 [TP104] ARD Digitall (TP71] 20F Vision [TP77] Premiere World 1(67) RTL Group (TP069)	0021 044D 0437 0011 0441	0085 0001 0001 0085 0001	058,5 064,5 072,5 121,0	6,900 6,900 6,900 6,900	64 DAM 64 DAM 64 DAM	
1 2 3 4 5 5 7	APS Pro 7 [TP104] ARD Digitall (TP71] 2DF Vision (TP77) Premiere World 1(57) RTL Group (TP059) UPC Direct (TP055)	0021 044D 0437 0011 0441 0441	0085 0001 0001 0001 0001 0001	058,5 064,5 072,5 121,0 129,0	6,900 6,900 6,900 6,900 6,900	64 DAM 54 DAM 64 DAM 54 DAM	
1 2 3 4 5 5 7 8	APS Pro 7 [TP104] ARD Digitall (TP71] ZDF Vision [TP77] Premiere World 1(57) RTL Group (TP069) UPC Direct (TP055) T-Systems (TP113)	0021 044D 0437 0011 0441 0441 0447 0459	0085 0001 0001 0085 0001 0001 0001	058,5 064,5 072,5 121,0 129,0 135,5	6,900 6,900 6,900 6,900 6,900	64 DAM 64 DAM 64 DAM 64 DAM 64 DAM	
1 2 3 4 5 6 7 8	APS Pro 7 [TP104] ARD Digital (TP71] 20F Virien [TP77] Premiere World 1(67] RTL Group (TP069] UPC Direct (TP166) T-Systeme (TP113) Salyme (TP120)	0021 044D 0437 0011 0441 0447 0459 0000	0085 0001 0001 0085 0001 0001 0001 0001	058,5 064,5 072,5 121,0 125,0 135,5 143,5	6,900 6,900 6,900 6,900 6,900 6,900 6,900 6,900	64 DAM 64 DAM 64 DAM 64 DAM 64 DAM 64 DAM	
1 2 3 4 5 5 7 8 9	APS Pro 7 [TP104] APD Digitall (TP71] 2DF Vision (TP77) Premiere World (IG7) RTL Group (TP069) UPC Direct (TP105) UPC Direct (TP105) Selyme (TP120) Viacom MTV (TP065)	0021 044D 0437 0011 0441 0447 0459 0000 042A	0085 0001 0001 0005 0001 0001 0001 0000 0000	058,5 064,5 072,5 121,0 129,0 135,5 143,5 143,5 149,5	6,900 6,900 6,900 6,900 6,900 6,900 6,900 6,900	54 DAM 54 DAM 54 DAM 54 DAM 54 DAM 54 DAM 54 DAM	

If you activate the NIT processing, the V 501 creates the NIT in each channel fed by this type of card. This NIT includes every QAM channel of the local network. At "NIT – information" the parameters of the chosen QAM bouquet are displayed.

Those information are TS-ID, ONID, output frequency, data ratio and type of modulation.

## 3.3 Programming the card parameters

Overview of th - Device Type V16	_	tse-unit						Base-unit Rea Progr	
Plug-in carde									
Card type		ChannelA	_	Channel B (TWIN)	_	RF-Parameters	_	Status	
1. V501	•	APS Pro 7 (TP104)	•	ARD Digital (TP71)	7	K 2 / 50.5 MHz	•	DK I OK	Details
2. unknoein	۲		۳		Ŧ		۳		Details
g, Junknowin	¥		¥		v		۳		Details
4, unknown	•		•		Ŧ		•		Defails
5, Junknowin	•		•		Ŧ		٠		Details
6. unknown	•		•		$\overline{\gamma}$		•		Details
7. unknown	۲		۳		Ŧ		۳		Details
g, Junknowin	۷		¥		v		٣		Details
Read card	upe:		1	Dose				- Complete Head Program	

In the overview of the base unit, the output channels of the V 501 – card is chosen at "RF parameters". In those channels, the former QPSK bouquets are fed in as QAM bouquets. The chosen channel is always channel A. Channel B is automatically determined as adjacent channel of channel A.

If you now click on the "Details" button, a window opens for configuring the card details. Here you can make the relevant settings for the operation.

## 3 Programming with HE programming software

ditype: V501	Version	:	Prog	ram card
			Re	ad card
annelA Channel	B Dptions of channel A	Dptions of channel B	1	
SAT-Input paramet	lers -	- RF-Oulput parameter	re-	
Program packet	APS Plo 7	Output channel:	ĸΖ	🔽 activ
SAT-Frequency.	1880 MHz	Ouput frequency.	050,5	MHz
Input:	12 -	Channel grid:	8,00	• MHz
Symbol rate:	27.50 NS/s	RF-Filter:	Yes	-
Viterbi rate:	3/4 💌	Spectrum:	🛈 nom	C in
Search mode:	DVB-S 💌	Symbol rate:	6,900 -	MS2s
		Modulation	64 QAM	-
		Level	control	
Card status				
Enor code				
	,			

At the area "Input parameters" those data are displayed, which are stored in the SAT data base for the concerned transponder. At the area "RF output parameters" all relevant settings for the output signal can be done. You can activate or deactivate the output signal, determine the output channel grid (2, 4, 6 or 8 MHz), invert the spectrum and adapt the output data ratio (1.725; 3.450; 5.175 and 6.900 MS/s).



If the output data ratio is undervalued, the V 501 - card adapts the data ratio on the minimum requested value.

In the output you can set the type of modulation. In the details of channel A, the output channel filter can be (de-) activated. A not plugged but activated filter leads to an error message.

## 3 Programming with HE programming software

#### 3.4

3.5

#### Testing the input signal quality

If you use the button "Check signal quality", the C/N and the Bit error ratio of the input signal of the card will be displayed.

Signal	quality
C/N:	15.2 dB
V-BER:	< 1.0E-00B
Stop	measurement

#### Level adjustment

The level adjustment of the V 501–card can also be done via HE-programming software. For this you just have to click on "Level control" in the window "Parameters of the Plug-in card". The following window appears:

Level control	×
RF-Level Channel A+B: 35 dB	
Chennel A IF-Pagel 05	Channel B IF-Pegel +0.8 💌
Parameter read	Parameter write

First of all you should push the button "Parameter read", to read out the already programmed state of attenuation.

The next step is the correction of the attenuation in 0.5 dB – steps in a range between 0 and 15.5 dB. To store the changed values press "Parameter write".

## 3 Programming with HE programming software

If the output level of the adjacent channels is different, each level can be adapted on the IF in a range between -1 dB to +1 dB (0.1 dB - steps). This function is supported only via HE programming software and not possible with the KC 3.



3.6

If different types of modulation are chosen for channel A and B, an automatically level adjustment is made for each channel separately, based on 90 dB $\mu$ V for QAM 64.

#### Examples:

Channel A: Channel B: QAM 64; level 90 dB $\mu$ V  $\rightarrow$  QAM 128; level 93 dB $\mu$ V

The level will also be adapted automatically if the bandwidth of the output signal has been changed.

#### Setting the PID filter

The setting of the PID filter makes possible the blocking of up to four services from the processed transport stream. You can filter out for example Audio or Video PIDs of some programs. If you filter out a Video PID, the Set-Top-Box will find the program, but it can not show the picture. In the field "Transport Stream Information" the TS-ID and ON-ID of the chosen transponder is displayed.

## 3 Programming with HE programming software

Parameters of the 1. Plug-in card	×
Card type: V501 Versions	Program card
	Read card
Channel A Channel B Options of channel A Options of channel B	
/ Program filter	
1. PID: 0000 hes 3. PID: 0000 hes 0 - PID-Filter de	activated
2 PID: 0000 hes 4. PID: 0000 hes	
PID-Remapping	
1. PID: 0000 hex> PID: 0000 hex 0> 0 - PID-F	emapping deactivated
2. PID: 0000 hex> PID: 0000 hex	
3 PID: 0000 hex> PID: 0000 hex	
4 PID: 0000 hex> PID: 0000 hex	
Transport stream information	
Transport Stream ID: 0033 (0021 hex) Orignal Network ID:	0133 (0085 hex)
-	
Check signal quality Close	

#### 3.7

#### **PID** remapping

The V 501 offers the option to remap PIDs, this means to change the "name" of the PID. The PIDs have to be inserted hexadecimal. If you type in a "0000", the PID remapping is deactivated.

#### 3.8 Error messages

If errors appear during the operation of the plug-in card, the error code is displayed in the field "card status"

8

	3	Programming	with HE	programming	software
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arameters of	the 1. Plug-in ca	ird		×
Card type: V501	Version:		Program card	
			Read card	
Channel A Channel	IB Options of channel A	Options of channel B	1	
SAT-Input parame	tera	- RF-Dutput parameter	18	7
Program packet:	APS Pio 7	Output channel:	K2 🔽 activ	
SAT-Frequency.	1880 MHz	Ouput frequency:	050,5 MHz	
Input	12 Error info (0x00/0	0x04) 💌	8.00 • MHz	
Symbol rate:	🗵 🪺 Modulato	r Software version	Yes 💌	
Viterbi rate:	36		€ norm ⊂ inv	
Search mode:		<u></u>	6.900 • MS/s	
		Modulation	64 QAM 💌	
		Level	control	
Card status				1
Enor code	Hardware error!			
12 Error info	There is a device error!			
Check signal quality	0.0	ite		_

With the button "Error info" you can display the meaning of the error code. If a hardware error is displayed, please contact our customer service.

#### Changing the Operator-ID

3.9

The V 501-card offers the option to change the Operator-ID. Therefore you have to choose "Options"  $\rightarrow$  "Favoured plug-in cards" and then click on "Extended card functions". The following window opens:

Extended	card function	• <u>×</u>
🔽 OP-ID	Processing	
	<u>C</u> lose	

After activating the OP-ID processing, the view of the parameters of the plug-in card will change as below:

Parameters of the 1. Plug-in card		
Card type: V501 Version: Program card		
Read card		
Channel A Channel B Options of channel A Options of channel B		
- Program filter		
1. PID: 0000 hex 3. PID: 0000 hex 0 = PID-Filter deactivated		
2. PID: 0000 hex 4. PID: 0000 hex		
- PID-Remapping		
1. PID: 0000 hes> PID: 0000 hes 0> 0 - PID-Remapping deactivated		
2. PID: 0000 hex> PID: 0000 hex		
3. PID: 0000 hes> PID: 0000 hes		
4. PID: 0000 hex ==> PID: 0000 hex		
- Transport stream information		
Transport Steam ID: 0033 (0021 here) Drignal Network ID: 0133 (0085 here)		
- Parameter of the processed CA_descriptor()-		
EAT processing		
CA_system_ID: 0000 hex Operato_ID: 0000 hex		
Check signal quality Close		

Now you have the option to process the CAT with the insertion of a CA – system – ID and an Operator – ID.

# Basics of programming with the KC 3

## Basics

After plugging the KC 3 handheld on the base unit, the start menu appears. The software version is displayed. Please give this number to our customer service if you have questions regarding the plug-in card. To see this menu later once again, you have to plug the KC 3 out and in again. By pressing the cursor keys  $\leftarrow$  or  $\rightarrow$  you get into the menu for adjusting the parameters of the base unit, and then to the

### Programming of the specific parameters of the card

which consists of 4 lines. You can switch between these lines with the  $\uparrow$  and  $\downarrow$  keys.

- Line 1: Type of card, here V 501 A/B Status OK
- Line 2: Choosing the input parameters
- Line 3 / 4: RF output parameters

The programming of the parameters is made via key-pad or as stepwise change of pre-defined parameters with the cursor keys  $\uparrow$  and  $\downarrow$ .



### Please note:

Input values must be complete!

### 4.2 Order of programming

- 1. Choose the Plug-in card (line 1)
- 2. Type in the output parameters of the Plug-in card (line 3/4)
- 3. Adjust the input parameters
- 4. Store the settings by pressing the "OK/Store" button

#### 4.3 Store

After finishing the data input, the new parameters have to be stored by pushing the "OK/Store" button. After pushing this button, the parameters are saved.

# Programming with the KC 3



### Please note:

With the KC 3 it is not possible to set PID filter, Operator – IDs or to remap PIDs. After choosing the slot (chapter 4), the programming of

the Plug-in card can begin.

### 5.1 Choosing parameters of the base unit / slot

### 5.1.1 Adjusting the bus address of the base unit

If you connect several base units with the ASTRO bus system, you have to make sure, that the connected base units are adjusted on different bus addresses (delivery state 241).



- Select line 3 with the cursor keys  $\uparrow$  and  $\downarrow$
- Adjust the bus address with the cursor keys
- $\leftarrow$  or  $\rightarrow$  in a range between 001 020, 241
- Store changed addresses with "OK / Store"

View on KC 3 with V16

## 5.1.2 Choosing the slot



- Select line 1 with the cursor keys  $\uparrow$  and  $\downarrow$
- Choose the required slot with the cursor keys  $\leftarrow$  or  $\rightarrow$

View on KC 3 with V 501 5 Programming with KC 3

### Adjusting the SAT input parameters

By pressing the cursor keys  $\uparrow$  and  $\downarrow$  you get to the **second line**. Here you can type in the requested SAT – IF – input parameters.

### 5.2.1 Adjusting the SAT – IF – input frequency

#### Line 2:

Type in the SAT – IF via keypad or change the frequency in 1 MHz steps with the cursor keys  $\leftarrow$  or  $\rightarrow$ . Store the changes with the "OK / Store" – button.



5.2

Please Note: Frequency range of the tuner between 950 MHz and 2150 MHz

The wrong input of the input frequency does not lead to an error message. The frequency will be written in the plug-in module after pressing the "OK/Store" button.

Then the tuner locks at the highest or lowest possible frequency, which definitely leads to a malfunction of the module.

Change to the next submenu with "Menü / Read" - button

### 5.2.2 Choosing the input

By pressing the cursor keys  $\uparrow$  and  $\downarrow$  you get to the second line. With the "Menü / Read" – button you jump to the submenu "SAT – input". Here you can choose the requested SAT – input with the cursor keys  $\leftarrow$  or  $\rightarrow$ . By pressing the "Menü / Read" – button you change to the next submenu.

### 5.2.3 Adjusting the symbol ratio

By pressing the cursor keys  $\uparrow$  and  $\downarrow$  you get to the **second line**. With the "Menü / Read" – button you jump to the submenu "symbol ratio". Type in the transponder symbol ratio via numerical keypad, or change the symbol ratio with cursor keys  $\leftarrow$  or  $\rightarrow$  in 0,01 MS steps. If the symbol ratio is indicated with 3 decimal places, please round off or round up mathematically.

#### Example:

5,996 MS  $\rightarrow$  6,00 MS or 5,994 MS  $\rightarrow$  5,99 MS

The demodulator itself corrects this small difference.

#### 5.2.4 Adjusting the Viterbi ratio

By pressing the cursor keys  $\uparrow$  and  $\downarrow$  you get to the **second line**. With the "Menü / Read" – button you jump to the submenu "Viterbi". Adjust the Viterbi ratio with the cursor keys  $\leftarrow$  or  $\rightarrow$ . By setting the Viterbi ratio on "Auto", the transmitted Viterbi ratio will be detected and adjusted automatically.

### 5.3 Adjusting the RF output parameters

By pressing the cursor keys  $\uparrow$  and  $\downarrow$  you get to the **third / fourth line**. Here you can set the requested RF output parameters.

### 5.3.1 Adjusting the RF output frequency

The RF-output frequency can be adjusted in line three with the input of the frequency value by keypad or with the stepwise change by cursor keys  $\leftarrow$  or  $\rightarrow$  (100-kHz-steps).



#### Please note:

The adjusting of the output frequency should always be done by choosing the channel in **line 4**. This makes sure that the frequency is according to the corresponding channel grid. Therefore the frequency in line 3 is changed automatically with the changed output channel. The output channel can be changed with the cursor keys  $\leftarrow$  or  $\rightarrow$ . The input will not be checked, this means that a wrong input is stored after pushing the "OK/Store" button without warning!

After finishing the data input, the new parameters have to be stored by pushing the "OK/Store" button. After pushing this button, the parameters are saved.

### 5.3.2 Adjusting the output data ratio

By pressing the cursor keys  $\uparrow$  and  $\downarrow$ you get to the third line. With the "Menü / Read" – button you jump to the submenu "DatRate". Type in the QAM output data ratio via numerical keypad. With the cursor keys  $\leftarrow$  or  $\rightarrow$  you can choose the following pre-programmed data ratios:

6,900 MS compliant to 8 MHz channel bandwidth 5,175 MS compliant to 6 MHz channel bandwidth 3,450 MS compliant to 4 MHz channel bandwidth 1,725 MS compliant to 2 MHz channel bandwidth

If the chosen data ratio is too low, the output data ratio adapts automatically on the lowest for the transmission requested data ratio. By pressing the "Menü / Read" – button you change to the next submenu.

### 5.3.3 Adjusting the type of modulation

By pressing the cursor keys  $\uparrow$  and  $\downarrow$  you get to the **third line**. With the "Menü / Read" – button you jump to the submenu "Modulat.". Adjusting of the type of modulation is done with the cursor keys  $\leftarrow$  or  $\rightarrow$ . The following types of modulation are possible:

16 QAM / 32 QAM / 64 QAM / 128 QAM / 256 QAM

If different types of modulation are chosen for channel A and B, an automatically level adjustment is made for each channel separately, based on 90 dB $\mu$ V for QAM 64.

### 5.3.4 Switching-off the output signal

By pressing the cursor keys  $\uparrow$  and  $\downarrow$  you get to the **third line**. With the "Menü / Read" – button you get to the submenu "Output On / Off".

Output Off: Modulator of the card is switched off Output On: Modulator of the card is switched on

Switch the output signal with cursor keys  $\leftarrow$  or  $\rightarrow$ . To save the settings press the "OK / Store" – button. By pressing the "Menü / Read" – button you change to the next submenu.

### 5.3.5 Inverting the output spectrum

By pressing the cursor keys  $\uparrow$  and  $\downarrow$  you get to the **third line**. With the "Menü / Read" – button you get to the submenu "Spectrum normal / invers".

Spectrum invers: output spectrum of the digital signal inverted (inverted sideband) Spectrum normal: output spectrum of the digital signal normal (erect sideband)

# 5 Programming with KC 3

Change the output spectrum with cursor keys  $\leftarrow$  or  $\rightarrow$ . Changes have to be saved by pressing the "OK / Store" – button. By pressing the "Menü / Read" – button you change to the next submenu.

### 5.3.6 Error messages

After the input of the operating parameters, and the saving of the parameters in the card with the "OK/Store" button, you can make an operation check. In line 1 on the right hand is displayed the state of the card. After choosing the **third line** and pushing the "Menü/Read" –button, the actual error state is displayed.

The error message 00000010 for example is displayed, if there is no input signal. If there is any other error message, please contact our customer service.

#### 5.3.7 Level adjustment of the V 501 – card

By pushing the "Menü / Read" – button in the third line of the display, you get to the level adjustment of the X-QAM twin x – card. The attenuation can be set in a range between 0 to 15.5 dB in 0.5 dB – steps for both channels with the cursor keys  $\leftarrow$  or  $\rightarrow$ . The changes have to be stored by pushing the "OK / Store" – button.

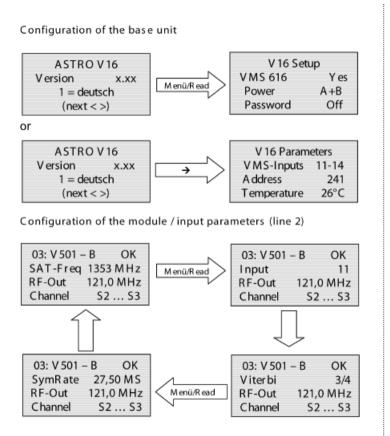


#### Important note:

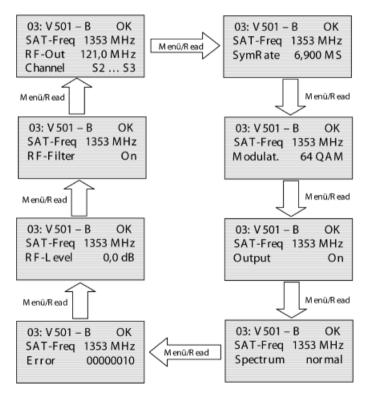
You should never compensate outgoing cable attenuation by different level adjustment of the plug-in card! To do this, use the output coupler **U-901** (order no.: 380 190) or **VZN 8** (order no.: 380 191).

# 6 Technical data

Туре		V-501	
Order no.		380 501	
QPSK-Demodulator:			
Input Freqrange	[MHz]	920-2150	
SAT IF input	[Ω]	F-Jacks, 75	
Input level	[dBµV]	50-80	
Spectrum shape (roll off)	[%]	35	
Input data rate	[MBaud]	2,4-30,0 adjustable	
Viterbi-Decodierung (according DVB-Standard)		1/2; 2/3; 3/4; 5/6; 7/8, automatically/manually	
QAM-Modulator:			
Modulation		16-, 32-, 64-, 128-, 256-QAM (digital realisation)	
Noise suppression	[dB]	≥ 58	
Signal processing		acc. DVB-Standard	
Spectrum shape cos-roll-off	[%]	15	
FEC		Reed-Solomon (204,188)-Code	
Data rate adjust		Insertion of MPEG zero packets (Stuffing unit)	
PCR-Correction		implemented	
PID-Filterung		implemented	
NIT-Handling		implemented	
Output symbol rate		3,45-6,9	
Bandwidth		4–8, depending on symbol ratio	
Brutto data rate		ca. 13,8 55,2	
HF output:			
Connections	[Ω]	IEC-Jacks, 75	
Frequency range	[MHz]	47–862 (C2–C69) (1-MHz-steps adjustable)	
Output level		80 90, adjustable	
MER (Equalizer, 64 QAM)	[dB]	≥ 45	
Spurios frequency distance 40–862 MHz	[dB]	> 60 discrete disturbancies	
>950 MHz		> 57 noise similar disturbancies > 20 related to 100 dB $\mu$ V system level and 90 dB $\mu$ V operation level	



Configuration of the module / output parameters (line 3 and 4)





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