

## Illustrations



V 502 with channel filter



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## Pictograms

#### Pictograms and safety information

Pictograms are symbols which have a defined meaning. You will encounter the following pictograms in these operating and installation instructions:



This symbol is used to **warn** about situations in which there is **a risk of fatal injury** due to dangerous electrical voltages or as a result of failure to comply with these instructions.



This symbol is used to warn about various risks to health, equipment/materials or the environment.



Recycling symbol: all of our packaging materials (cardboard packaging, package inserts, plastic film and plastic bags) can be fully recycled.



Electrical waste must not be disposed of as standard domestic waste. Instead, it must be properly disposed of in accordance with directive 2002/96EC of the European Parliament and Council dated January 27, 2003 on waste electrical and electronic equipment. At the end of its service life, please dispose of the unit through the approved waste disposal channels.. 1 Description

## Description

The X-QAM twin x S2 and V 502 cards are used to convert two DVB-S modulated SAT IF signals into two QAM modulated neighboring channels in the frequency range from 47 to 862 MHz. They can process both HDTV signals and SDTV signals. The signal conversion of the X-QAM twin x cards is realized with **Direct Digital ® - technology.** Both output channels can be switched on or off independently of each other. The level equalization of the individual plug-in cards to the same output level is performed via an electronic level equalization control either via the HE programming software or via the KC 3.

The cards are equipped with an option for inputting PID filters, PID remapping and optional NIT generation. The **X-QAM twin 6 S2** and **V 502** also have OP-ID input. The V 502 also has a channel output filter for improved performance of the output signal.

If the programmed output data rate is too low then all cards will adjust to the minimum required output data rate.

Another feature is the automatic level equalization for the selection of different QAM modulation processes, irrespective of whether both output channels are set to the same process or to different processes (see "Level equalization").



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#### Please note:

The modules must only be replaced or exchanged by an authorized specialist who has been certified by the Chamber of Commerce and Industry (master workshop). The hazard warnings and safety precautions contained in the operating instructions of the base unit and the relevant safety regulations according to DIN VDE regulation 0701, part 1 and 200, must be followed. **Programmierung mit HE-Programmiersoftware** 

## 2 Pre-configuration

2

# Pre-configuration / wiring of the X-QAM twin x S2 and V 502



Tuner A and tuner B connected individually to SAT IF

## 3 Programming with the HE programming software

## 3.1 Pre-configuration of the HE programming software

Once the X-QAM twin x S2 and V 502 cards have been installed in the base unit they can be programmed with the HE programming software. If you wish to activate the NIT processing or the PID filters then you will need to do this via the programming software. If it is not possible to select the cards in the HE programming software then check the settings under "Options" -> "Preferred card types". The checkbox next to the card needs to be ticked to activate the card type and make it visible in the selection displayed in the overview window of the base unit.

Angezeigte Einsteckk	arten in der Auswahib	lox Kartentyp			2
Katenfür analoge Einge	ingooignale				
Analog TWIN	AV TWIN	ADR TWIN	Tex Univer SEQ	T VHE-Plut	UHF-Plux 600
C Analog S TWIN	C AN QUAD	IT UKW TWIN	Tet Unsetzer	T VHF-Mano	UHF-Plus 800
F V401		Audio FM TWIN	F V301	AV UHF-Plue 600	T UHE-Mano
	E Derod Tw/N	🕅 UKW Verstärker		C AV UHF-Mono	
Katenfür digitale Eingar	quignale				
QAM TWIN 1	C DAM 660	C OPSK-PAL	DVB-S/PAL TWIN	DVB-T/PAL	V DVB-C/PAL
E GAM TWIN 1 OP	T DAN 450 A	P DVB-5/PAL	FT V611	DVB-T/PAL TWIN	F V811
E Q4M TWIN 1 P	C DAN Frendprodukt	F V601	F V612		
C QAM TWIN 3					
C QAM TWIN 4.1				C Scan Tw1N 1	
R Q4M Tw/IN 4.2	IT DAN TWIN 4 92	P OPSK-BKW	DVB-S/FN TWIN		T DVB-C/FN TWIN
P GENTWIN E	P DAN TWIN 5 S2				
C QAM TWIN 5	F DAM TWINES2				
T V901	F V502				
	IT ∀522				
Katentypen des aktuel	len Projektes können nicht d	leaktiviert werden.			
Einstellungen speichen	n	Se	hielen		Envieiteite Kartenhanktionen

After the base unit has been read out the overview window of the base unit will show the card on the slot in which it is fitted.



Please note:	Recommended software version			
	X-8 twin base unit:	xx.23		
	V16:	xx.23		
	Programming software:	5.00		

The Basis X-5 base unit does not support the cards X-QAM twin x S2 or V 502.

The V 502 can only be used with the V 16 base unit.

## 3.2 Activation of the NIT generation

The Nit generation can only be activated via the HE programming software. To do this, the option "Generate CABLE-NIT" needs to be checked in the software under "Planning" -> "Network (NIT)".

renk-ID:	00F5 hex	0 = kein Ta	ausch der N	eizweik-ID			
ABELINIT	statisch generie	ren					
FUNIT	- American mit X-B	Classie					
CC-NIT C	August 100.000	ici geleler				10000	
SABEL:	MT aux Transpor	oder überne	oner: Pro7	YS ACT HD  TP	102) <u>–</u> HD	λ <u>10000</u> he	
				MT-Key			
IT-Konfig	aration in XBC3	programnie	en .	NIT-Kar	rigunation aux2	GBC3 lesen	
IT-Korfig	aration in X-BC3	programni e	en.	NT-Kar	riguration aux2	GICS (esen	
IT-Korfg	puration in X-903	programnie	en .	NT-Kor	riguration aux2	GBC3 lesen	
l Korfi; bersicht	austion in X-BC3 bei statischer Erze	programmi e eugung:	en	NT-Kor	ingunation aux2	GIC3 (esen	
IT-Konfig bersicht   Pog	puration in X-903 bei statischer Erze nammpalket	engung TS-ID Iberl	ON-ID	NT-Kor	Datenrate	GIC3 Teses	
H Korfs bersicht   Pog	auration in X-9023 bei statischer Erze rammpak et ed HD: (TP1 021	evgung: TS-ID [hex]	ON-ID [hes]	HF-Freq. [MH2] \$20.0	Operation cases Distemante [MS/2] 8 900	(IIC) Issen	
H Korfs bersicht   Pog Pio7/Se Pionier	areton nX9C3 bei statischer Erzt rammpaket sti HD (TP102) e HD1 (TP102)	sugung: TS-ID [hex] 0010 0005	ON-ID [hex] 0065 0065	NIT-Kor HF-Freq. [MH2] 370.0 378.0	Datenrate [HS/2] 6.900 5.900	Hodulation	
Pro7/Sa Pro7/Sa Pro7/Sa	areton nX9C3 bei statischer Erzt rammpaket et HD (TP102) e HD1 (TP1075)	sugung: TS-ID [hex] 0010 0005	ON-ID [hex] 0065 0065	NT-Kor HF-Freq. [MH2] 370.0 378,0	figuration aux> Datemrate [MS7a] 6.900 6.900	Hindulation 296 DAM 296 DAM	
H Korfs bersicht i Pro7/Se Pro7/Se	bei statischer Erzi rammpak.et et HD (TP102) e HD1 (TP1075)	sugung: TS-ID [hex] 0010 0005	ON-ID [hex] 0065 0065	NT-Kor HF-Freq. [NH2] 320.0 328,0	Datenrate [HS/2] 6.900 6.900	Hodulation 256 DAM 255 DAM	
H Korfs bersicht I Pro7/Se Pien ien	bei statischer Erz rammpaket ert HD (TP102) e HD1 (TP102)	programmi e eugung: TS-ID [hex] 0010 0005	ON-ID [hex] 0085 0085	NT-Kor HF-Freq. [MH2] 320.0 328,0	Datenrate [HS/2] 6.900 6.900	Modulation 256 DAM 256 DAM	
H Korf; bersicht I Pro7/Sz Prenier	bei statischer Erz rammpaket et HD (TP102) et HD1 (TP025)	eugung: TS-ID [hex] 0010 0005	0N-10 [hex] 0065 0065	NT-Kor HF-Freq. [MH2] 320.0 328,0	Datenrate (MS/z) 6.300 6.300	Modulation 256 DAM 255 DAM	
H Korfs bersicht i Pro7/5a Pro7/5a	bei statischer Erz nammpak et ert HD (TP102) e HD1 (TP025)	programmi s eviguing: TS-IID [hex] 0010 0005	0N-1D [hex] 0065 0065	NT-Kor HF-Freq. [MH2] 320.0 328,0	Datenrate [MS/2] 6.900 6.900	Modulation 256 DAM 255 DAM	
Hisonia bersicht i Pro7/Se Pienier	bei statischer Erz nammpaket eti HD (TP102) e HD1 (TP102)	programmi s sugung: TS-ID [hex] 0010 0005	0N-1D [hes] 0065 0065	NT-Kor HE-Freq. [MH2] 370.0 378.0	Datenrate [MS2e] 6.900 6.900	Modulation 256 DAM 255 DAM	
H Konfg bersicht I Pro7/5a Pro7/5a Preniew	oration in X-9C3 bei istatischer Erz rammpaket et HD (TP102) e HD1 (TP1075)	programmi is s.g. ng: TS-ID [hex] 0010 0005	ON-ID [hes] 0005 0005	NT-Kor  HF-Freq.  MH2  370.0 328,0	Datenrate [HS/a] 6.900 6.900	Modulation 256 DAM 255 DAM	
Pro7/5a Pro7/5a	bei statischer Erz rammpaket et HD (TP102) et HD (TP025)	programmi s skigung: TS-ID (hex) 0010 0005	ON-10 [hes] 0065 0065	MT-Ker HF-Freq [MH2] 370,0 378,0	Datenrate [MS/z] 6.900 6.900	Modulation 256 DAM 256 DAM	

## With the X-QAM twin 5 S2, X-QAM twin 6 S2 and the V 502,

the process of activating the NIT generation generates the complete NIT of all QAM channels contained in the network in every channel fed by this card type.

The parameters belonging to the selected program packet are displayed under "NIT information" (TS-ID, ONID, output frequency, data rate and modulation type).

## 3 Programming with the HE programming software

## 3.3 Programming the card parameters

ан. X4	ate-Typ	Eng	inge beløgen			Founderinheit Aust Program	even nmieren
ins	ileckkarlen Karteniyo		Kanal A	Kanal B (TwiN)	HF-Paraneler	Status	
1	QAM TWIN 552	•	Premiere HD1 (TP075)	Pie7/Sak1 HD (TPI 02) +	5 23 / 322,0 MHz 💌	217	Detail
2	DAM TWIN 652	-	Pro7/Set1 HD (TP102) -	Premisre HD1 (TP075)	5 29 / 370.0 MHz -	217	Detail
3	unbekannt	-		-		[	Detai
¢	unbekannt	-				1	Deta
5	unbekannt			<u>·</u>		-	Dea
6.	unbekannt	•		· ·		1	Dea
1	unbekannt	-		-		1	Detai
8.	unbekannt	-				-	Detai
	Katerkypen leve	n		Schließen		- Gesamle Kop System pro	iste le grammiere

The output channels of the X-QAM twin x S2 and V 502 cards, i.e. the channels in which the DVB-S bouquets are fed in as QAM bouquets, are selected under "RF-Parameters" in the overview window of the base unit. The selected channel is always the output channel A. Channel B is automatically defined as the neighboring channel of channel A.

Click on the "Details" button to open up a window with the card details. All of the settings relevant for operation are made in this window.

iteniya V502 Verzi	inc .	Kerte programmisten
		Karte auslesen
nul A   Kanal B   Optionen Kanal A   Opt	ionen Kanal B	
SAT-Eingangsparameter	HF Ausgangsparamet	ei
Programmpakat	Aurgangskanat	K.2 📝 aktiv
SAT-Frequenz 0000 MHz	Ausgangsfrequenz	1750,5 NH2
Eingang 1 💌	Kanahastar.	8.00 ¥ NH2
Symboliate: 00000 NS/s	Ausgangskanaliter	* eL
Vierbrate stort	Spektrum	C nom C inv
Sucharder TOR 5	Sandrahatar	E and - MS/s
outoidas. Joona 🔄	Webb Const	
	Modulatorizarc	lea don 🔺
	Pegelan	aasung
Karberetistue		
Fehleicode		

The data saved in the database for the selected transponder are displayed in the "SAT input parameters" field. If no satisfactory signal is found in DVB-S search mode then please repeat the search in automatic mode. The field "RF output parameters" is used to configure all relevant parameters for the output signal. The output signal is activated or deactivated here, the channel configuration is defined (2, 4, 6 and 8 MHz), the spectrum is inverted and the data rate is adapted (1.725, 3.450, 5.175 and 6.900 MS/s).



If the chosen data rate is too low then the output data rate is automatically matched to the minimum data rate required for transmission.

The modulation type can be specified in the output.

## 3 Programming with the HE programming software

## Checking the input signal quality

Click on the button "Check signal quality" in the detail settings for the plug-in card to display the C/N and the bit error rate of the card input signal.

Signalqualität						
C/N:	15.2 dB					
V-BER:	< 1.0E-008					
Messing beenden						

## Level equalization

3.4

3.5

Level equalization for the X-QAM twin x S2 and V 502 cards is also performed via the HE programming software. Click on "Level control" in the detail settings of the plug-in card and then on the button "Read parameters" to open the level control (equalization) window. The screenshot below shows an example of this window:

Pegelanpassung	×			
- Ausgangspegel				
Kanal A+B 35 dB	×			
Kenel A ZF-Pegel 10.5 💌	Kanal 8 ZF-Pegel •0.8 x			
Parameter lesen	Parameter schreiben			
Schließen				

The two output channels of the plug-in card can be adjusted in increments of 0.5 dB in the range from 0 to 15.5 dB.

If the levels of the output channels are different then you can increase or decrease each level individually to the IF level by  $\pm$  1 dB in increments of 0.1 dB. This function is only supported by the HE programming software and is not possible with the KC 3.



If other modulation processes are used for output channels A and B, then automatic level equalization is performed separately for each individual channel (based on 90 dB $\mu$ V for QAM 64).

#### Examples:

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

Channel A: Channel B: QAM 64: 90 dB $\mu$ V level  $\rightarrow$  QAM 256: 96 dB $\mu$ V level

Level equalization is also performed automatically if the bandwidth of the output channel is modified.

## 3.6 Setting the PID filters

Setting the PID filters allows you to block up to four PIDs in the transport stream which is to be processed. For example, you can filter the audio (or video) PIDs of programs. If a video PID is blocked then the QAM receiver will be able to find the program but will not be able to display video content.

The TS-ID and ON-ID of the selected transponder are displayed in the field "Transport Stream Information".

## 3 Programming with the HE programming software

Detaileinstellungen der 2. Einsteckkarte	×
Katerijp: QAN TWIN 5 Vesion: Kate program	nieren
Kate auk	1000
Kanalé   Kanalé   Optonen Kanalé   Optonen Kanalé	
Programmfilter	
1. PID: 0000 her 3. PID: 0000 her 0 = PID-Filter de aktiv	int
2. PID: 0000 her 4. PID: 0000 her	
PID-Remapping	
PID: 0000 hex> PID: 0000 hex 0> 0 - PID-Renapping dea	liviat
- Transport Stee an Information	
Transport Stream ID: 0033 (0021 hex) Orignal Network ID: 0133 (0005 h	80
Signakpualität prüfen Sichleißen	

#### 3.7 PID remapping

The X-QAM twin x S2 and V 502 cards also offer the option of "remapping" PIDs, i.e. renaming the PIDs. In order to do this the PIDs need to be entered in hexadecimal. Entering "0000" deactivates the PID remapping function.

#### 3.8 Error messages

If any errors occur during operation of the plug-in card then they are indicated in the "Card status" field together with a fault code.

etaileinstellungen d	ler 3. Einsteckkarte		×
Kaitentyp: 9501	Version	1.0.2.6	Karte grogrammieren
			Karte auxjesen
Kanal A Kanal B	Optionen Kanal A 🗍 Optio	nen Kanal B	
SATEingangspara	meter	HF-Ausgangsparame	ter
Programmpaket	Premiere World 2	Ausgangskanal:	§ 21 🔽 aktiv
SAT-Frequenz	1120 MHz	Ausgangstrequenz:	306.0 MHz
Eingang	X Feblerinfo (0x0	0/0×04) 💌	8.00 • MHz
Symbolitate:	Z. (i) Modu	lator Softwareversion	Nein 💌
Viterbirate:	3/4		€gam Cjav
		<u>10K3</u>	6.900 - MS/s
		Modulationsart	64 QAM 💌
		Pegelar	passung
Kartenstatus			
Fehleroode	Hardwarefehler!		
12 Fehlerinfo	Es liegt ein Gerätefehler	how	
Signalqualität piùfen	Sc	hleßen	

You can display the meaning of the error code by clicking on the "Error info" button. Please contact our customer service department in the event of any hardware faults.

## 3.9 Inputting the Operator ID

The X-QAM twin x S2 and V 502 allow you to change the Operator ID. To do this, go to "Options", "Preferred card types" and click on the button "Extended card functions".

The following window will then open:

## 3 Programming with the HE programming software

Erweiterte Kartenfunktionen	×
DP-ID Processing	
<u>Schliessen</u>	

If you tick the checkbox next to OP-ID Processing then the displayed options for the plug-in card change as follows:

Detaileinstellungen der 1. Einsteckkarte 🛛 🔀								
Karlenivo QAM TWIN 6 Version:								
Kane programmeten								
Kate auteren								
Kanal A   Kanal B   Optonen Kanal A   Optonen Kanal B								
Programmfiker								
1. PID: 0000 hex 3. PID: 0000 hex 0 = PID Filter deaktiviet								
2. PID: 0000 hex 4. PID: 0000 hex								
PD-flemapping								
PID: 0000 hex> PID: 0000 hex 0> 0 - PID:Remapping deaktiviert								
Transport Stream Information								
Transport Stream ID: 0000 (0000 hex) Orignal Network ID: 0000 (0000 hex)								
Parameter des zu bearbeitenden CA_descriptors()								
IFI CAT beabelen								
CA_system_ID: 0000 hex Operator_ID: 0000 hex								
Signalqualität prüfen Schließen								

You can now edit the CAT and input a CA System ID and an Operator ID.

# 4 Fundamentals for programming with the KC 3

Basic programming can be carried out with the KC 3. However, the extended card functions can only be accessed with the HE programming software.

## Structure

When you plug in the KC 3 unit, the Start menu is displayed first. The software number is displayed. Please quote this number whenever contacting our customer service department. The Start menu can only be accessed again later on by unplugging and replugging the KC 3.

Pressing the cursor keys  $\leftarrow$  or  $\rightarrow$  will initially take you to the menu for adjusting the base unit parameters, and from there on to the menu for

#### Programming the card-specific parameters

which comprises 4 lines. Use the  $\uparrow$  and  $\downarrow$  arrow keys to change between lines.

- Line 1: Card type. Here: X-QAM twin ... A/B status OK
- Line 2: Selection of the input of the input parameters
- Line 3/4: RF output data

The parameters can be input by entering values directly using the keypad or by increasing or decreasing the preset parameter values in steps with the  $\uparrow$  and  $\downarrow$  cursor keys.



#### Important:

The numerical values must be entered in full.

## 4.2

#### Programming sequence

- Selection of the plug-in card (line 1)
- Entry of the output parameters for the plug-in card (line 3/4)
- · Entry of the input parameters
- Saving

## 4.3 Saving

Once all entries are complete the parameters need to be saved by pressing the "OK Store" button so that they are adopted by the card and are protected against data loss in the event of a power failure.

	5 Programming with the KC 3	5 Programming with the KC 3		
5	Programming with the KC 3	5.2	Setting the SAT input parameters	
R <sup>3</sup>	Please note: The KC 3 cannot be used to program PID filters or Operator IDs or for PID remapping.		Press the $\uparrow$ and $\downarrow$ cursor keys to go to the second line, where you can adjust the required SAT IF input parameters.	
	Once you have selected the plug-in slot in the base unit (sec- tion 3), you can start programming.	5.2.1	Setting the SAT IF input frequency	
5.1	Parameters of the base unit / selecting a slot		Line 2: Enter the SAT IF input frequency directly via the keypad, or Increase/decrease the preset value in 1 MHz increments	
5.1.1	Setting the bus address of the base unit		using the $\leftarrow$ or $\rightarrow$ cursor keys. Press the "OK/Store" button to save the changed settings.	
	If several base units are connected by the bus system then it must be ensured that all connected units are set to different bus addresses (default on delivery: 241).	R S	Important: The frequency range of the tuner is 920 MHz to 2150 MHz.	
LNC Power XY input OFF	Select <b>line 3</b> with the $\uparrow$ and $\downarrow$ cursor keys.		No error message is displayed if incorrect values are entered, e.g. 5865 MHz or 0010 MHz. The entered value is accepted	
Bus address 241 View of the KC 3 display	Use the $\leftarrow$ or $\rightarrow$ cursor keys to select a bus address in the range 001-020, 241.		when the "OK/Store" button is pressed. The tuner adjusts its- elf to the highest or lowest operating frequency, which inva- riably results in a fault	
	Press the "OK/Store" button to save the settings.		Press the "Menu/Read" button to go the next menu point.	
		5.2.2	Selecting the input	
5.1.2	Selecting the slot		Prose the <b>A</b> and L surger keys to go to the second line. Then	
	Use the 1 and 1 cursor keys to select line 1.		press the "Menu/Read" button to jump to the menu point	
SAT-freq 1102 MHz Outp.freq 113.0 MHz Channel C4S2	Use the $\leftarrow$ or $\rightarrow$ cursor keys to jump to the required slot/channel group.		"SAT input". Here you can use the $\leftarrow$ or $\rightarrow$ cursor keys to select the required SAT input. Press the "Menu/Read" button to go the next menu point.	

View of the KC 3 display with X-QAM twin 6

## 5.2.3 Setting the symbol rate

Press the  $\uparrow$  and  $\downarrow$  cursor keys to go to the second line. Then press the "Menu/Read" button to jump to the menu point "Symbol rate". You can either enter the transponder symbol rate directly via the keypad or change the preset value in 0.01 MS increments using the  $\leftarrow$  or  $\rightarrow$ cursor keys. If the symbol rate is given with 3-digit resolution after the decimal point then the third digit after the decimal point should be rounded up or down mathematically.

## Example:

5,996 MS  $\rightarrow$  6,00 MS or 5,994 MS  $\rightarrow$  5,99 MS The demodulator will correct the slight deviation automatically.

#### 5.2.4 Adjusting the DVB search mode.

Press the  $\uparrow$  and  $\downarrow$  cursor keys to go to the **second line**. Then press the "Menu/Read" button to jump to the menu point "Search mode". Then use the  $\leftarrow$  or  $\rightarrow$  cursor keys to adjust the search mode. When "auto" is selected the system automatically detects and adjusts to the operating mode on the transmission side.

## 5.3 Setting the RF output parameters

Press the  $\uparrow$  and  $\downarrow$  cursor keys to go to the **third or** fourth line, where you can adjust the required RF output parameters.

## 5.3.1 Setting the RF output frequency

The RF output frequency can be set in row 3 either by entering a value directly with the keypad or by increasing or decreasing the preset value in steps using the  $\leftarrow$  or  $\rightarrow$  cursor keys (in 100 kHz increments).



#### Please note:

The output frequency should always be adjusted via the channel selection in **line 4**. This ensures that the frequency is automatically set according to the channel configuration. To do this, use the  $\leftarrow$  or  $\rightarrow$  cursor keys to change the RF output frequency in **line 4** according to the channel configuration. The entered value is not checked, so any incorrect inputs are accepted when the "OK Store" button is pressed.

#### 5.3.2 Setting the output data rate

Press the  $\uparrow$  and  $\downarrow$  cursor keys to go to the **third line**. Then press the "Menu/Read" button to jump to the menu point "DatRate". The QAM output data rate is either entered directly, or pre–set values are adjusted with the  $\leftarrow$  or  $\rightarrow$  cursor keys.

6.900 MS corresponds to a channel bandwidth of 8 MHz. 5.175 MS corresponds to a channel bandwidth of 6 MHz. 3.450 MS corresponds to a channel bandwidth of 4 MHz. 1.725 MS corresponds to a channel bandwidth of 2 MHz.

If the selected data rate is too low then the output data rate is automatically adjusted to the minimum data rate required for transmission.

Press the "Menu/Read" button to go the next menu point.

Press the ↑ and ↓ cursor keys to go to the **third line**. Then press the "Menu/Read" button to jump to the menu point "Mod type". The modulation type is set with the aid of the ? and ? cursor keys. The following modulation types can be selected:

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

If other modulation processes are used for output channels A and B, then automatic level equalization is performed separately for each individual channel (based on 90 dB $\mu$ V for QAM 64).

## 5.3.4 Switching off the output signal

Press the "Menu/Read" button in the **third line** of the display to go to the option "Output signal ON/OFF". The output signal is switched on and off using the  $\leftarrow$  or  $\rightarrow$  cursor keys. Then press the "OK/Store" button to save and activate the settings.

#### 5.3.5 Inverting the spectrum

Press the "Menu/Read" button in the **third line** of the display to go to the option "Spectrum normal/inverted". The spectrum is selected using the  $\leftarrow$  or  $\rightarrow$  cursor keys. Then press the "OK/Store" button to save the settings.

## 5.3.6 Error messages

Press the "Menu/Read" button in the **third line** of the display to go to the error message display, where the status of the plug-in card is shown.

The error message 00000010 means e.g. that no input signal is present. Please contact our customer service department for information about any other error messages.

## 5.3.7 Equalizing the levels of the X-QAM twin x S2 and V 502 cards

Press the "Menu/Read" button in the **third line** of the display to go to the level equalization for the plug-in card. The attenuation can be set with the  $\leftarrow$  or  $\rightarrow$  cursor keys for both channels at the same time within the range from 0 dB to 15.5 dB in 0.5 dB increments. All changes must be saved by clicking the "OK/Store" button.



5.3.8

#### Note:

Never use different level settings on the plug-in cards to set a slope for equalization of outgoing cable attenuators.

For this purpose, use Switching Element U-901 (order ref. 380 190) or VZN 8 (order ref. 380 191).

#### Output channel filter (V 502) only

Press the "Menu/Read" button in the third line of the display to go to the "Output channel filter" option. The filter can be switched on or off with the  $\leftarrow$  or  $\rightarrow$  cursor keys. All changes must be saved by clicking the "OK/Store" button..

## 6 Technical data

Туре		X-QAM twin 5 S2	X-QAM twin 6 S2	V 502			
Order no.		330 476	330 478	380 504			
DVB-S(2)-Demodulator:							
Input Freqrange	[MHz]	950-2150					
SAT IF input	[Ω]	F-Jacks, 75					
Input level	[dBµV]	50-80					
Input symbol rate	[MS/s]	max. 30,0					
DVB-S Viterbi		automatic adjustment (1/2; 2/3; 3/4; 5/6; 6/7; 7/8)					
DVB-S 2 LDPC		automatic adjustment (1/2; 3/5; 2/3; 3/4; 4/5; 5/6; 8/9; 9/10)					
DVB-S 2 Roll-off-factors		0,20; 0,25; 0,35					
DVB-S 2 Modulation		QPSK, 8PSK					
QAM-Modulator:							
Modulation		16-, 32-, 64-, 128-, 256-QAM					
Signal processing		In accordance with the DVB-Standard					
Spectrum shape cos-roll-off	[%]	15					
FEC		Reed-Solomon (204,188)-Code					
Data rate adjust		<ul> <li>✓</li> </ul>	<ul> <li>✓</li> </ul>	<ul> <li>✓</li> </ul>			
PCR-Correction		<ul> <li>✓</li> </ul>	✓	<ul> <li>✓</li> </ul>			
PID-Remapping		<ul> <li>✓</li> </ul>	<ul> <li>✓</li> </ul>	<ul> <li>✓</li> </ul>			
NIT-Handling		<ul> <li>✓</li> </ul>	<ul> <li>✓</li> </ul>	<ul> <li>✓</li> </ul>			
OP-ID		<u> </u>	<ul> <li>✓</li> </ul>	✓			
Output channel filter		—		<ul> <li>✓</li> </ul>			
Output symbol rate	[MSym]	dependent upon the input data rate, 1,725 - 6,900					
Bandwidth	[MHz]	Dependent upon the input data rate, 2 – 8					
Brutto data rate	[MBits]	max. 55,2					
HF output:							
Connections	[Ω]	IEC-Jacks, 75					
Frequency range	[MHz]	47-862 (C2-C69) 1-MHz steps adjustable					
Output level	[dBµV]	80 90, adjustable					
MER (Equalizer, 64 QAM)	[dB]	≥ 40	≥ 45	≥ 45			
Shoulder attenuation	[dB]	≥ 49	≥ 58	≥ 58			
Spurios frequency distance 40–862 MHz >950 MHz	[dB]	> 60 discrete interferers / > 57 noise-like interferers > 20 in relation to a system level of 100 dB $\mu$ V and an operating level of 90 dB $\mu$ V					

## Overwiew of programming steps Information displayed depends on the base unit;

Base unit configuration



Plug-in card configuration / Input parameters (line 2) Information displayed depends on plug-in card; (example: X-QAM twin 6)



Plug-in card configuration / Output parameters (line 3 and 4)



Change values / adjustments by pressing the cursor buttons. Change line by pressing the cursor button ,,up" or ,,down".



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