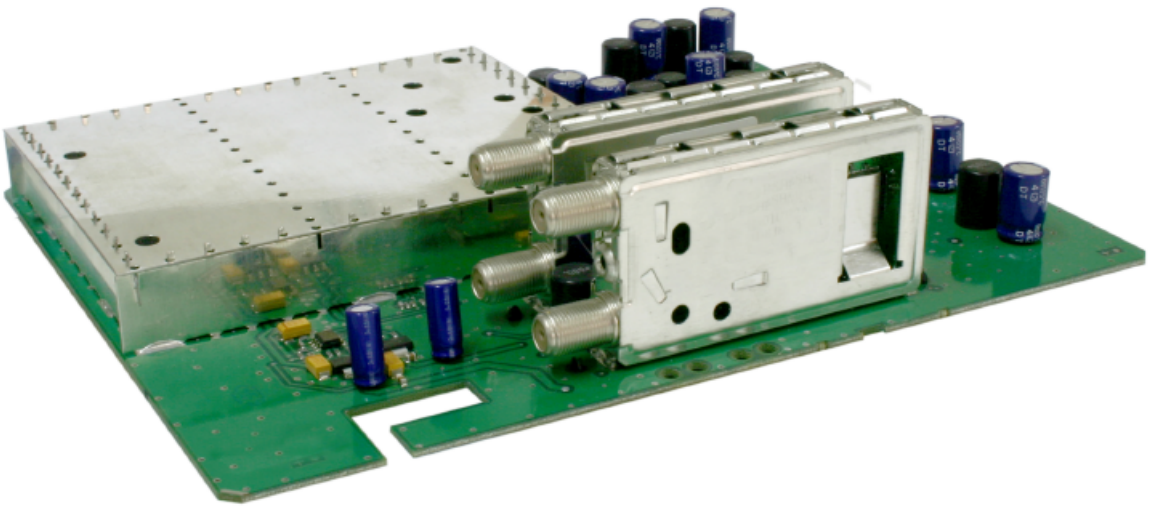
X-QAM twin 3/5/6

Operating instructions

Direct Digital by ASTRO

Picture



X-QAM twin x

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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 27th 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 200296EG van het Europese Parlement d.d. 27 januari 2003 - niet thuis bij het gewone huisvuil maar moeten gescheiden ingezameld worden. Lever gebruikte elektrische en elektronische apparatuur aan het eind van hun levensduur in bij de daarvoor bedoelde verzamelpunten.

1 Description

The X-QAM twin x – cards are 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 X-QAM twin x – 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.

Except the **X-QAM twin 3**, which converts the input signals quasi-transparent, all X-QAM twin x – cards are 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.

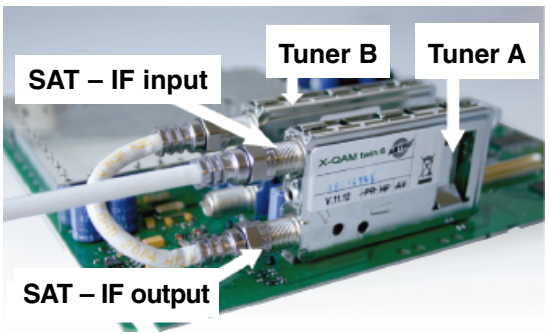
If the output data ratio is undervalued, all X-QAM twin x – cards adapt the data ratio on the minimum requested value.

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

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 / Cabling of the X-QAM twin x

The X-QAM twin x – cards 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.



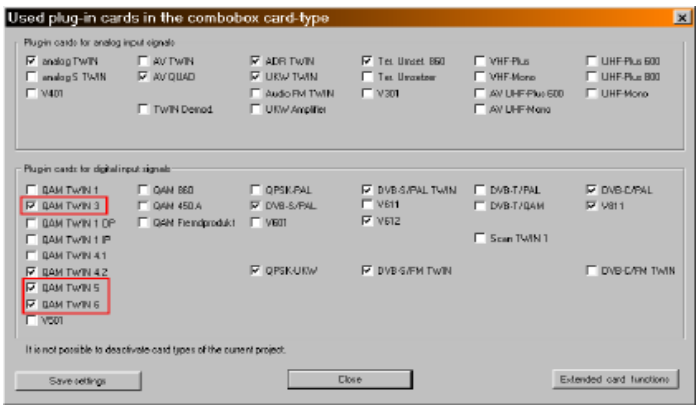
SAT – IF bridged from tuner A to tuner B

Tuner A and Tuner B connected to SAT – IF separately

3 Programming with the HE programming software

3.1 Pre – configuration of the HE programming software

The X-QAM twin x – cards 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 X-QAM twin x – 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 X-QAM twin x – card appears on the used slot of the base unit.

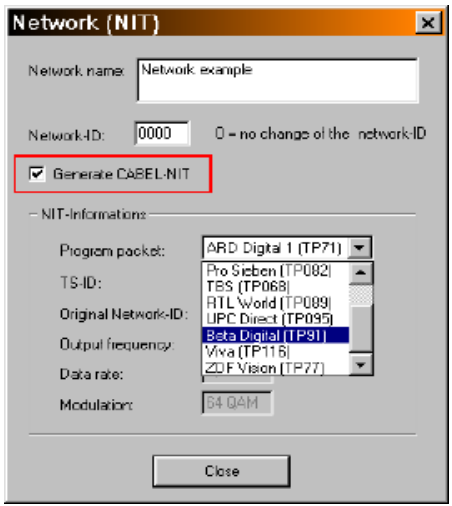


Please note: Requested software version

X-5 Basis twin:	4.01
X-8 Basis twin:	x.22
V16:	x.22
Programming software:	5.00

3.2 Activating the NIT processing

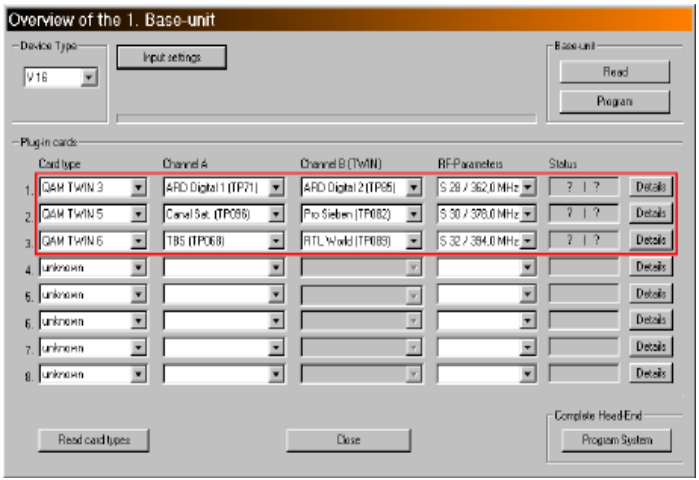
The NIT processing can only be activated via HE programming software. Therefore, the option “Generate CABLE – NIT” has to be chosen (“Design” → “Network NIT”)



The **X-QAM twin 3** has no possibility to create the NIT, the input NIT is transferred to the output. If you activate the NIT processing, the **X-QAM twin 5** and **X-QAM twin 6** create 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 Programming with HE programming software

3.3 Programming the card parameters



In the overview of the base unit, the output channels of the X-QAM twin x – cards are 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.

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, all X-QAM twin x – cards adapt the data ratio on the minimum requested value.

In the output you can set the type of modulation. The view of the parameters of the **X-QAM twin 3** differs in the nonexistent “Options of channel A + B” – window.

3 Programming with HE programming software

3.4 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.

3.5 Level adjustment

The level adjustment of the X-QAM twin x – 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:
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“.

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.

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 dBµV for QAM 64.

Examples:

Channel A: Channel B:
QAM 64; level 90 dBµV → QAM 128; level 93 dBµV

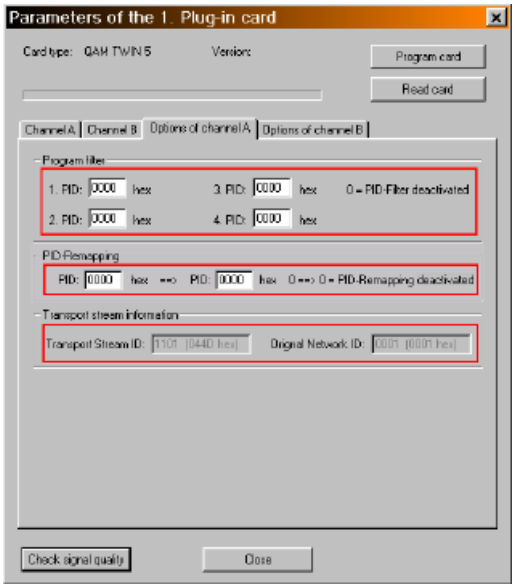
Channel A: Channel B:
QAM 64; level 90 dBµV → QAM 256; level 96 dBµV

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

3.6 Setting the PID filter

The setting of PID filter is not supported by the **X-QAM twin 3**. This function is only possible with the X-QAM twin 5 and X-QAM twin 6. 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

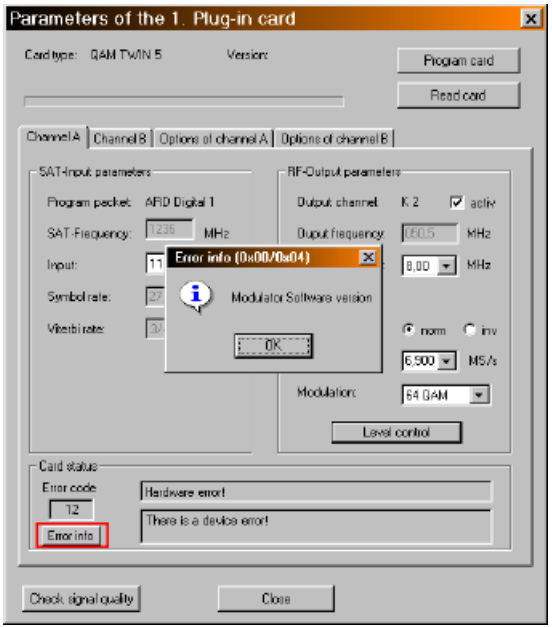


3.7 PID remapping

The X-QAM twin 5 and X-QAM twin 6 offer 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”



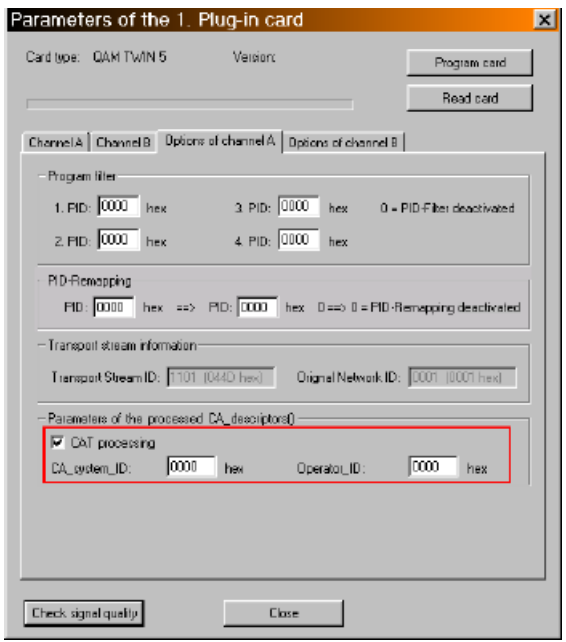
With the button “Error info” you can display the meaning of the error code. If a hardware error is displayed, please contact our customer service.

3.9 Changing the Operator-ID

The X-QAM twin 5 and X-QAM twin 6 offer the option to change the Operator-ID. Therefore you have to choose “Options” → “Favoured plug-in cards” and then click on “Extended card functions”. The following window opens:

3 Programming with HE programming software

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



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

4 Basics of programming with the KC 3

4.1 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 ← or → 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 ↑ and ↓ keys.

Line 1:	Type of card, here X-QAM twin A/B Status OK
Line 2:	Choosing the input parameters
Line 3 / 4:	RF – output parameters

4 Basics of programming with KC 3

The programming of the parameters is made via key-pad or as stepwise change of pre-defined parameters with the cursor keys ↑ and ↓.

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.

5 Programming with the KC 3

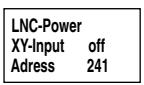
Please note:
With the KC 3 it is not possible to set PID filter, Operator – IDs or to remap PIDs.
After choosing the slot (chapter 4), the programming of the Plug-in card can begin.

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).

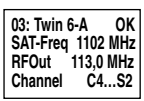
- Select **line 3** with the cursor keys ↑ and ↓
- Adjust the bus address with the cursor keys ← or → in a range between 001 – 020, 241
- Store changed addresses with „OK / Store“



View on KC 3
with X-5 twin

5.1.2 Choosing the slot

- Select line 1 with the cursor keys ↑ and ↓
- Choose the required slot with the cursor keys ← or →



View on KC 3
with X-QAM twin 6

5 Programming with KC 3

5.2 Adjusting the SAT input parameters

By pressing the cursor keys ↑ and ↓ 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 ← or →. Store the changes with the “OK / Store” – button.

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 ↑ and ↓ 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 ← or → . By pressing the “Menü / Read” – button you change to the next submenu.

5.2.3 Adjusting the symbol ratio

By pressing the cursor keys ↑ and ↓ 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 ← or → 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 → 6,00 MS or 5,994 MS → 5,99 MS

The demodulator itself corrects this small difference.

5.2.4 Adjusting the Viterbi ratio

By pressing the cursor keys ↑ and ↓ 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 ← or →. 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 ↑ and ↓ you get to the **third / fourth line**. Here you can set the requested RF output parameters.

5 Programming with KC 3

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 step-wise change by cursor keys ← or → (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 ← or →. 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 ↑ and ↓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 ← or → 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 ↑ and ↓ 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 ← or →. 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 dBµV for QAM 64.

5.3.4 Switching-off the output signal

By pressing the cursor keys ↑ and ↓ 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 ← or →. 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 ↑ and ↓ 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 ← or →. 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 X-QAM x – card

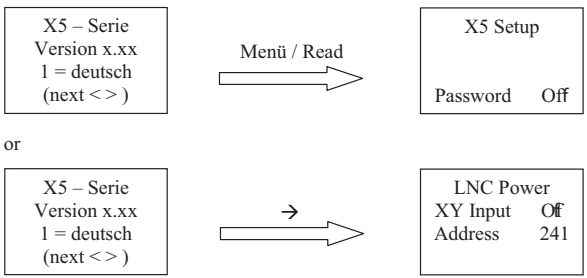
By pushing the "Menü / Read" – button in the third line of the display, you get to the level adjustment of the X-QAM twin x – card. The attenuation can be set in a range between 0 to 15.5 dB in 0.5 dB – steps for both channels with the cursor keys ← or →. The changes have to be stored by pushing the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

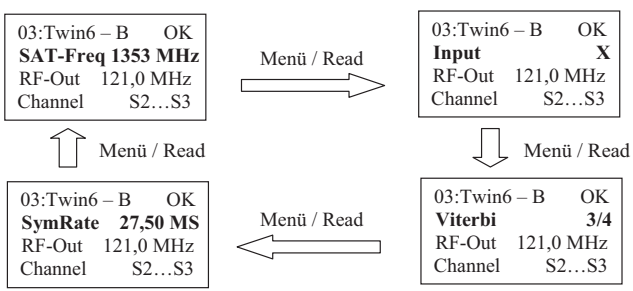
Typ		**X-QAM twin 3**	**X-QAM twin 5**	**X-QAM twin 6**
Order no.		330 581	330 584	330 585
QPSK-Demodulator:				
Input Freq.-range	[MHz]	920 – 2150		
SAT IF input	[Ω]	F-jack, 75		
Input level	[dBµV]	50 – 80		
Spectrum shape	[%]	35		
Input data rate adjustable	[MBaud]	10,0– 30,0	2,4– 30,0	
Viterbi-Decodierung (DVB-Standard)		1/2; 2/3; 3/4; 5/6; 7/8, automatic/manuel		
QAM-Modulator:				
Modulation		16-, 32-, 64-, 128-, 256-QAM (digital realization)		
Signal processing		compliant to DVB-Standard		
Spectrum shape cos-roll-off	[%]	15		
FEC		Reed-Solomon (204,188)-Code		
Data rate adjust		✔	✔	✔
PCR-Correction		✔	✔	✔
PID-Filterung		——	✔	✔
NIT-Handling		——	✔	✔
Output symbol rate	[MBaud]	dep. on input data ratio	3,45 – 6,9	
Bandwidth	[MHz]	dep. on input data ratio	4–8, depending on symbol ratio	
Brutto data rate	[MBits]	dep. on input data ratio	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	[dBµV]	80 … 96, adjustable		
MER (Equalizer, 64 QAM)	[dB]	≥ 37	≥ 40	≥ 45
Shoulder attenuation	[dB]	≥ 49	≥ 49	≥ 59
Spurios frequency distance 40–862 MHz >950 MHz	[dB]	> 60 discrete disturbancies > 57 noise similar disturbancies > 20 referred to 100 dBµV system level und 90 dBµV operation level		

Short-overview of programming steps
View of the configuration of the base unit might be different with another base unit (here: X-5 twin)

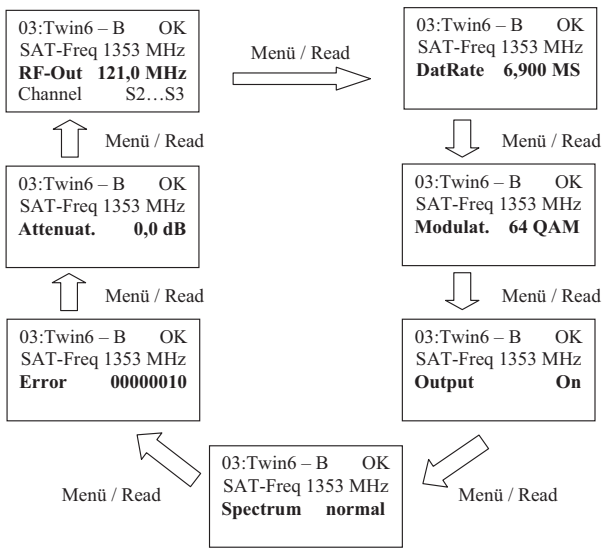
Configuration of the base unit



Configuration of the plug-in card / input parameter (line 2)
View of the plug-in card configuration might be different with another card (here: X-QAM twin 6)



Configuration of the plug-in cards / output parameters (line 3 and 4)



Change values / settings via keypad / cursor keys ← or →.

Change the line with cursor keys ↑ and ↓.

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