

# Signal Processing systems for analogue and digital TV and radio

KATHREIN  
**SatAn**  
KATHREIN



# Contents

---

With the UFO<sup>®</sup>*compact*, UFO<sup>®</sup>*DIGIplus* and UFO<sup>®</sup>*plus* signal processing systems, Kathrein offers three technically proven head-ends to process analogue and digital TV and radio programmes. The modular structure of all three systems offers a maximum in flexibility.



## **UFO<sup>®</sup>*compact* headend**

**Pages 3–10**

The cost-optimised solution to process terrestrial and satellite TV programmes.



## **UFO<sup>®</sup>*DIGIplus* headend**

**Pages 11–20**

The complete solution to process terrestrial and satellite TV and radio programmes.



## **UFO<sup>®</sup>*plus* headend**

**Pages 21–30**

The proven solution to process terrestrial and satellite TV and radio programmes.



## **Accessories for 19" installation, Sample systems, Planning data**

**Pages 31–39**

# UFO<sup>®</sup>compact Headend

---

The base units for wall mounting and 19" installation, together with the extension unit, provide space for 8 or 12 cassettes, respectively, and are completely pre-assembled and cabled.

The appropriate channel modules only have to be inserted, connected and programmed.  
Installation is so simple because the whole headend can be completely configured and pre-programmed by the specialist.

All tuning parameters are programmed in using the control unit.  
The control unit is connected to each cassette to be tuned per cable

The built-in power supply provides all the supply voltages necessary. Current supply to the individual cassettes is by flexible bus cable. The LNB supply is via a built-in remote power diplexer.

UFO<sup>®</sup>compact fulfils EN 50083-2/A1 and EN 60065 requirements, and is CE and Class A approved.



Base Units and Extension Unit

Page  
4

Technical Data,  
Input Splitter

5

Twin-Sat TV Channel Module

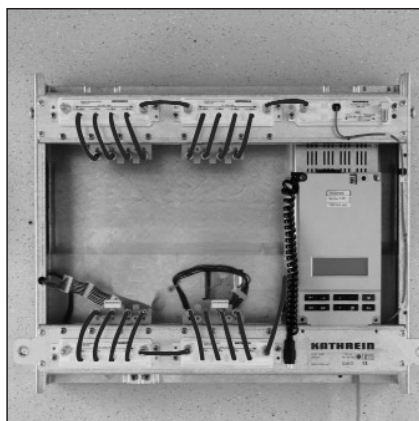
6

DVB Transcoder,  
Common-Interface Add-on Kit

7

DVB Transmodulator,  
Twin DVB Transmodulator

8



DVB-T Converter,  
DVB-T Transcoder

9

FM-Range Amplifier,  
TV Converter

10



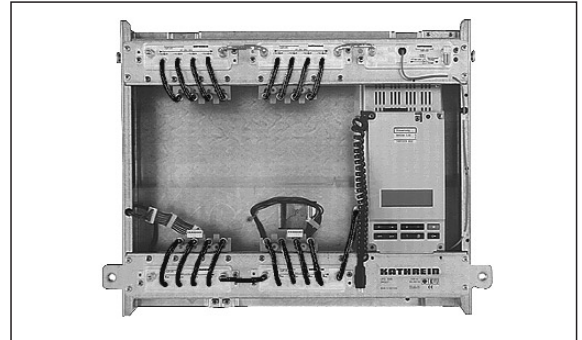
# UFO® compact Base Units, Extension Unit

## Base Units

**UFG 308**    20610001    CE    A

Base unit with 8 insert positions

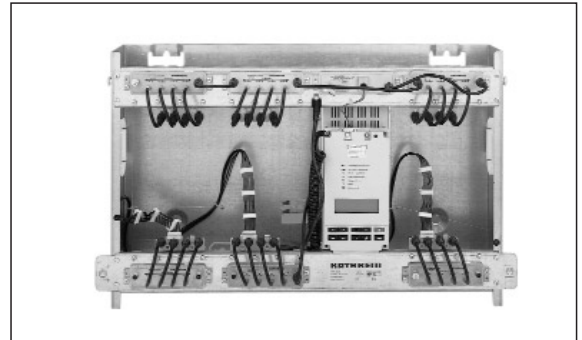
- Completely pre-assembled, with power supply, control unit, output coupler, input splitter, remote power diplexer, output amplifier and cabling
- Housing of galvanised steel with removable, lockable front cover of coated aluminium
- For indoor mounting
- Dimensions (mm): 550 x 430 x 280
- Packaging unit / Weight (pcs./kg): 1/12.5



**UFG 312**    20610002    CE    A

Base unit with 12 insert positions

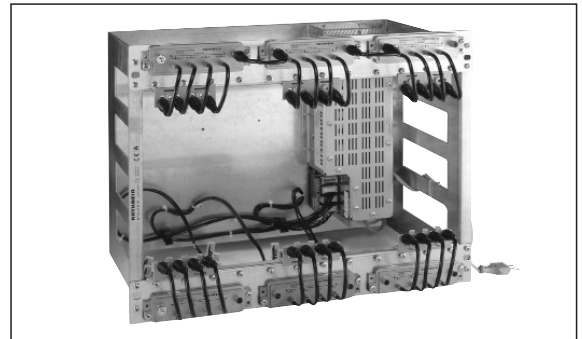
- Completely pre-assembled, with power supply, control unit, output coupler, input splitter, remote power diplexer, output amplifier and cabling
- Housing of galvanised steel with removable, locking front cover of coated aluminium
- For indoor mounting
- Dimensions (mm): 700 x 430 x 280
- Packaging unit / Weight (pcs./kg): 1/14.4



**UFG 311/19"**    20610046    CE    A

Base unit with 12 insert positions for installation in 19" cabinets (e.g. Kathrein TUG 100, see Page 32)

- Completely pre-assembled, with power supply, control unit, output coupler, input splitter and cabling.
- Module carrier in galvanised steel sheet
- Height: 8 UH
- For indoor mounting
- Dimensions (mm): 483 x 355 x 240
- Packaging unit / Weight (pcs./kg): 1/8.2

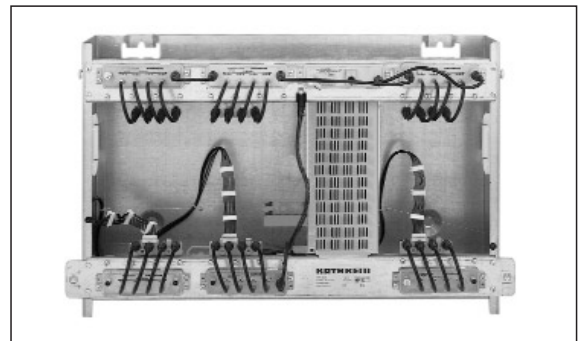


## Extension Unit

**UFG 313**    20610004    CE    A

Extension unit with 12 insert positions

- As UFG 312, but without control unit
- Completely pre-assembled, with power supply, control unit, output coupler, input splitter, remote power diplexer, output amplifier and cabling
- Housing of galvanised steel with removable, locking front cover of coated aluminium
- For indoor mounting
- Dimensions (mm): 700 x 430 x 280
- Packaging unit / Weight (pcs./kg): 1/13.9



### Notes:

When upgrading or extending a system, please note the following:

- Some of the new channel modules may have higher power consumption. Please observe the maximum permitted load of the power supply (see data on the label of the unit).
- Some of the new channel modules also require a new control software. Control units with V 6.xx level software can be upgraded to the higher software levels. Control units with software level 5.xx or lower must be replaced (available through ESC Grassau; see address on the back page).
- To achieve an operating level of 100 dBµV on the base units, when using the Twin-Sat module UFO 340, on the output of older base units, which are fitted with the Kathrein output amplifier 1681330, please exchange the output amplifier for the newer version available under (available under Order No. 1681918 through ESC Grassau; see address on the back page).
- The UFO 340, UFO 383, UFO 384 and UFO 390 channel modules are deeper. An add-on kit for older base or extension units (with six-digit Order Nos.) is available under Order No. 09901395 through ESC Grassau.

# UFO® compact – Technical Data, Input Splitter, Plan Examples

Type	UFG 308	UFG 312	UFG 313	UFG 311/19"
Order Number	20610001	20610002	20610004	20610046
<b>CE A</b>				
Insert positions for single or twin cassettes	8	12	12	12
<b>Input data</b>				
Input frequency range	MHz 47–862/950–2 150			
Input splitter, satellite	2 x 4-way	3 x 4-way	3 x 4-way	3 x 4-way
Distribution loss, satellite				
1–4 Channels/Polarisation	dB 13			
5–8 Channels/Polarisation	dB 17			
9–12 Channels/Polarisation	dB 21			
Remote feed for LNB supply	V/mA 18/Max. 600			
<b>Output data</b>				
Output frequency range	MHz 47–862			
Output level	dBµV			
PAL	100	98	98	72
QPSK/QAM	90	88	88	62
FM	96	94	94	68
Adjustment range each output	dB -7			
<b>Power supply</b>				
Mains voltage	V/Hz 198–253/50/60			
Max. power consumption	W 170			
Secondary voltage/current (possible load distribution)				
	Sample load 1	Sample load 2	Sample load 3	
5 V	10.400	13.000	14.500	
12,5 V	6.600	5.000	5.000	
18 V	200	600	200	
31 V	110	110	110	
<b>General</b>				
Ambient temperature range	°C -20 to +50			-5 to +45

## Input Splitter 2 x 2

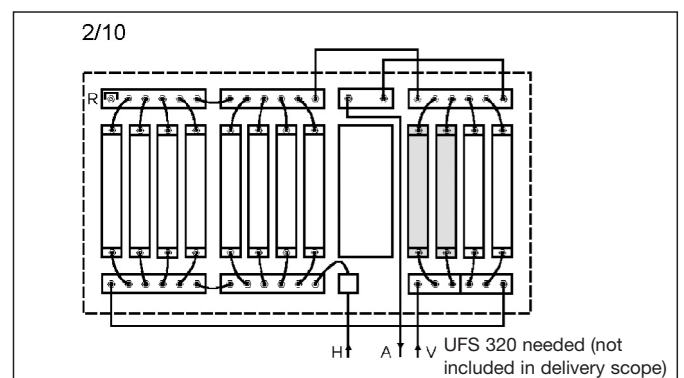
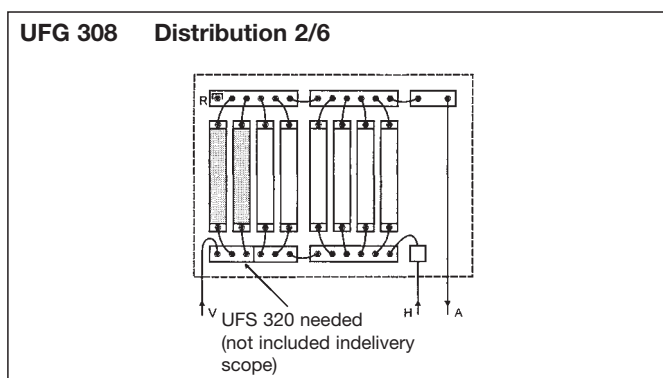
**UFS 320** 260322 **CE A**

- Required only when the following H/V (V/H) splitting is required:  
6/2 with UFG 308  
10/2 or 6/6 with UFG 312, UFG 313 or UFG 311/19"
- Must be ordered separately, and is simply installed of the place installed input (1681331)
- Dimensions (mm): 40 x 142 x 30 (without cable)
- Packaging unit / weight (pcs./kg): 1/0.2



Symbol		Frequency range (MHz)	Isolation (dB)
	2 Inputs 2 Outputs Distribution loss (dB)	920–2150	920–2150
		2	2
		< 12	< 12

## Plan Example

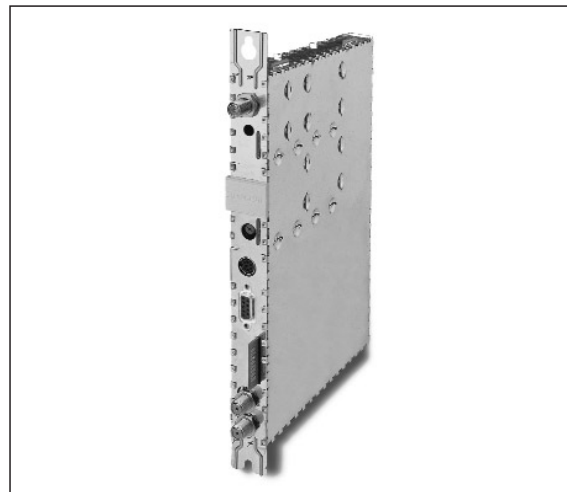


# UFO<sup>®</sup> compact – Twin-Sat TV Channel Module

## Twin-Sat TV Channel Module

**UFO 340**    20610007    **CE**    **A**

- For reception of two satellite programs in PAL with analogue sound sub-carrier
- Two channel units integrated in one module
- Optionally one or two inputs (set via central control)
- The two output channels are fixed adjacent channels
- All essential parameters can be set via central control
- One channel (Channel A) with connection for external decoder
- Adjacent-channel capable
- TV sound in stereo. Built-in data-line decoder for automatic recognition and switch-over for mono, 2-tone or stereo transmissions
- One channel (Channel A) with black screen allowing transfer of radio programs in a TV channel  
(sat signal for black-screen generation required)
- TV standard B/G, D/K or I selectable via central control
- C-Band-capable (selectable via central control)
- Required software level of central control: V 6.70 or higher
- Dimensions (mm): 263 x 27 x 156
- Packaging unit / weight (pcs./kg): 1/0.8



Type Order No.	Frequency range (MHz)		Input level <sup>1)</sup> (dBμV)	FM Threshold (static) (dB)	Signal- noise- ratio <sup>2)</sup> S/N- weighted (dB)	Sound sub- carrier frequency (MHz)	Sound IF Band- width main/sub (kHz)	Picture-/ sound- carrier ratio T1/T2 (dB)	Max. Output- level <sup>3)</sup> / adjustment range (dBμV)	Decoder interface	Current con- sumption (V/mA)
	Input 920-2150	Output 110-862									
<b>UFO 340</b> 20610007	<b>Ch</b> <b>Ch</b>	<b>Ch</b> <b>Ch</b>	43-80	7	57	5.5-9	280/110	18/22	95/ 85-95	1 x	5/1160 12.5/390 31/9

<sup>1)</sup> On channel unit input, note input splitting loss!

<sup>2)</sup> According to EN 50083-5, 54-dB-IMod. (equivalent to DIN 45004 K)

<sup>3)</sup> Own value of channel unit

# UFO® compact – DVB-Transcoder QPSK-PAL, Common Interface Add-on Kit

## DVB Transcoder for QPSK-PAL

**UFO 383**      260471      CE      A  
**UFO 384**      260470      CE      A

- To process a DVB-satellite TV programme in community antenna systems
- Transcodes a QPSK modulated satellite IF signal to an analogue PAL TV program (standard B/G, D/K or I)
- The complete channel unit is installed in one cassette
- One cassette required for each programme
- All essential transmission parameters can be set via the central controls
- Viterbi error protection (Code rates: 1/2, 2/3, 3/4, 5/6, 7/8)
- TV modulator in stereo and adjacent-channel capable
- Generation of the Videotext signals
- Common Interface (CI) can be retrofitted (UFZ 383, see below) to allow insertion of a Conditional Access (CA) module
- Required software level in central controls: V 6.60 or higher
- Dimensions (mm): 263 x 27 x 156
- Packaging unit / weight (pcs./kg): 1/0.7



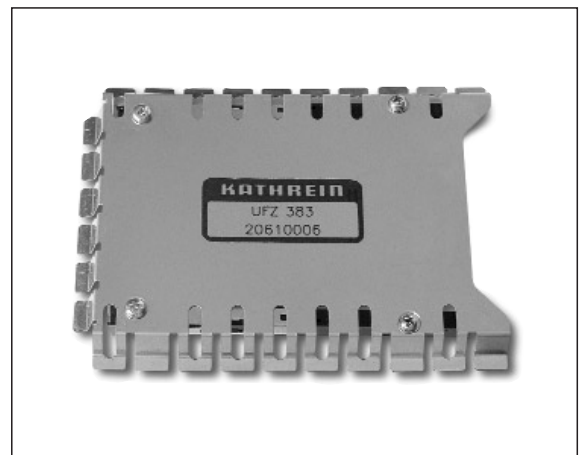
Type Order No.	Frequency range (MHz)			Input level (dBµV)	Input Data Rate (MS/s)	Signal- Noise ratio*) S/N weighted (dB)	Max. Output level/ Adjustment range (dBµV)	Picture/ Sound Carrier difference T1/T2 (dB)	Current Con- sumption (V/mA)
	Input 950–2150	Output 118–342	Output 470–862						
<b>UFO 383</b> 260471	Ch	Ch		43–80	2–35	59	95 85–95	18/20	5/520 12.5/340 31/6
<b>UFO 384</b> 260470	Ch		Ch	43–80	2–35	59	95 85–95	18/20	5/520 12.5/340 31/6

\*) Own value of channel drawer

## Common Interface (CI) Add-on Kit

**UFZ 383**      20610006

- Common Interface (CI) add-on kit for CA module
- Add-on option for DVB transcoders UFO 383 and UFO 384
- Simple retrofitting by specialist dealer

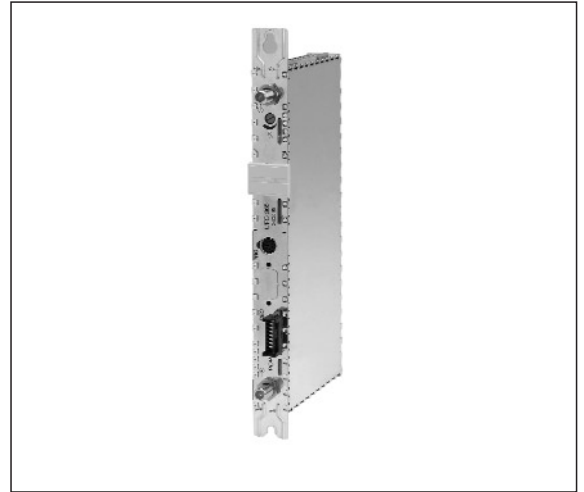


# UFO<sup>®</sup> compact – DVB Transmodulators QPSK-QAM

## DVB Transmodulators QPSK-QAM

**UFO 385**      260455      **CE** **A**  
**UFO 387**      260490      **CE** **A**

- To process a DVB satellite program in community antenna systems
- Transmodulates a QPSK-modulated satellite IF signal to a QAM-modulated output signal
- The complete channel unit is contained in one cassette
- One cassette is needed per transponder
- All essential transmission parameters can be set via the central controls
- Adjacent-channel capable
- Viterbi error protection (code rates: 1/2, 2/3, 3/4, 5/6, 7/8)
- Transparent transmodulation
- QAM modulator for 16/32/64/128/256 QAM (factory setting: 64 QAM)
- Required software level for central controls: V 6.20 or higher
- Dimensions (mm): 263 x 27 x 106
- Packaging unit / weight (pcs./kg): 1/0.5

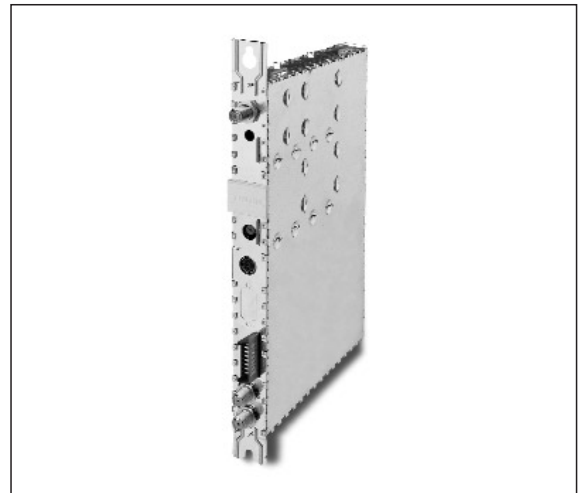


Type Order No.	Frequency range (MHz)			Input level (dBμV)	Input Data Rate (MS/s)	Modulation Error Rate MER (dB)	Max. Output level (dBμV)	Adjustment Range/ Output Level (dBμV)	Current Con- sumption (V/mA)
	Input 950–2150	Output 110–302   302–606							
<b>UFO 385</b> 260455	<b>Ch</b>		<b>Ch</b>	43–80	4–35	37	90	80–90	5/800 12.5/320 31/9
<b>UFO 387</b> 260490	<b>Ch</b>	<b>Ch</b>		43–80	4–35	37	90	80–90	5/800 12.5/320 31/9

## Twin DVB Transmodulator QPSK-QAM

**UFO 390**      20610008      **CE** **A**

- To process two DVB satellite programs in community antenna systems
- Transmodulates QPSK-modulated satellite IF signals to QAM-modulated output signals
- Two complete channel units are contained in one cassette
- Optionally one or two inputs (selectable via central controls)
- Only one cassette is needed for two transponders
- All essential transmission parameters can be set via the central controls
- Adjacent-channel capable
- Viterbi error protection (code rates: 1/2, 2/3, 3/4, 5/6, 7/8)
- Transparent transmodulation
- QAM modulator for 16/32/64/128/256 QAM (factory setting: 64 QAM)
- Required software level for central controls: V 6.70 or higher
- Dimensions (mm): 263 x 27 x 156
- Packaging unit / weight (pcs./kg): 1/0.7



Type Order No.	Frequency range (MHz)		Input level (dBμV)	Input Data Rate (MS/s)	Modulation Error Rate MER (dB)	Max. Output level (dBμV)	Adjustment Range/ Output Level (dBμV)	Current Con- sumption (V/mA)
	Input 950–2150	Output 110–862						
<b>UFO 390</b> 20610008	<b>Ch Ch</b>	<b>Ch Ch</b>	45–80	4–35	37	85	75–85	5/800 12.5/500 31/8

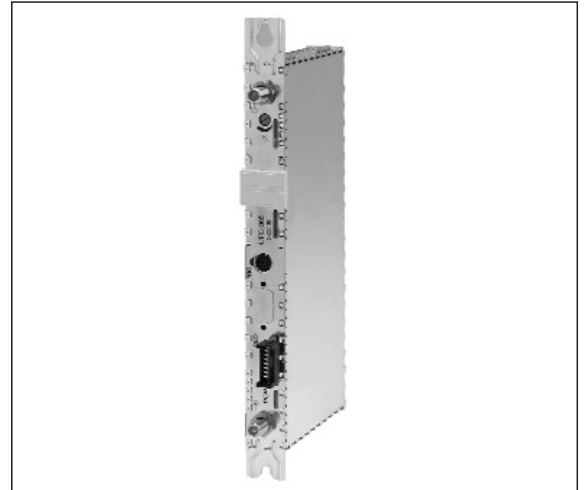


# UFO® compact – DVB T-Converter, DVB T-Transcoder

## DVB T-Converter

**UFO 350**    260514    **CE** **A**

- For conversion of terrestrial DVB-T programs
- Input and output channel are set by the central controls
- High selection through conversion via IF
- Any combination of channels possible (including same-channel conversion)
- Adjacent-channel capable
- AGC for automatic input-level control
- Required software level for central controls: V 6.50 or higher
- Dimensions (mm): 263 x 27 x 106
- Packaging unit / weight (pcs./kg): 1/0.5



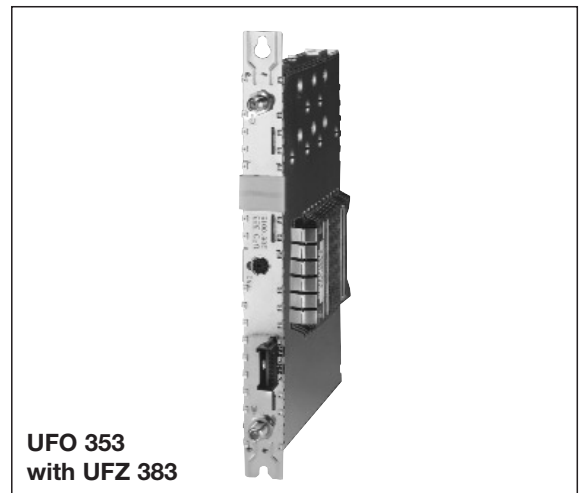
Type Order No.	Frequency range (MHz)		Input level  (dBμV)	Output level  (dBμV)	Noise Factor <sup>1)</sup>  (dB)	Current Consumption  (V/mA)
	Input 470–862	Output 470–862				
<b>UFO 350</b> 260514	<b>Ch</b>	<b>Ch</b>	37–85	70–85	< 7	5/180 12.5/350 31/8

<sup>1)</sup> At maximum amplification

## DVB-T-Transcoder COFDM-PAL

**UFO 353**    20610015    **CE** **A**

- To process a DVB-T TV program in community antenna systems
- Transcodes a COFDM-modulated DVB-T signal to an analogue PAL TV program (Standard B/G, D/K or I)
- The complete channel unit is contained in one cassette
- One cassette is needed per programme
- All essential transmission parameters can be set via the central controls
- Adjacent-channel capable
- Television sound in stereo
- Generation of Videotext signals
- Common Interface (CI) retrofit possible (UFZ 383, see Page 7) to accept a CA module for encoded programs
- Required software level for central controls: V 6.80 or higher
- Dimensions (mm): 263 x 27 x 156
- Packaging unit / weight (pcs./kg): 1/0.7



Type Order No.	Frequency range (MHz)		Input level  (dBμV)	Signal- Noise ratio*) S/N weighted  (dB)	Picture/Sound Carrier difference T1/T2 (dB)	Max. Output level/ Adjustment range  (dBμV)	Current Consumption  (V/mA)
	Input 174–230/470–862	Output 110–862					
<b>UFO 353</b> 20610015	<b>Ch</b>	<b>Ch</b>	30–85	59	18/22	95 85–95	5/620 12.5/380 31/6

<sup>\*)</sup> Own value of channel unit

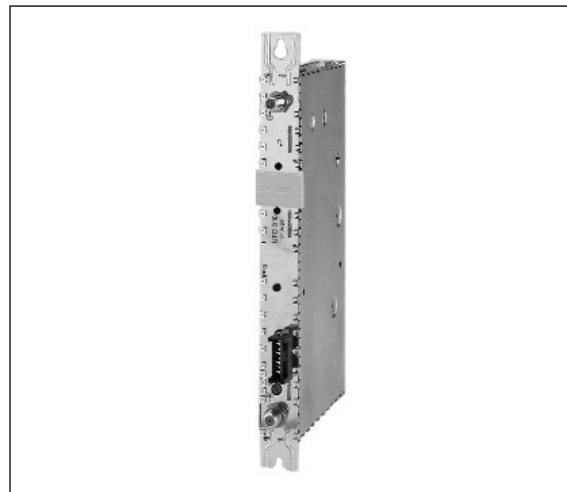
● Provisional data; technical changes may be made

# UFO<sup>®</sup> compact – FM Range Amplifier, TV Converter

## FM Range Amplifier

**UFO 310**    260479    **CE** **A**

- For wide-band reception of FM-band radio programmes
- Four individually adjustable trapping filters to suppress interfering signals
- Dimensions (mm): 263 x 27 x 106
- Packaging unit / weight (pcs./kg): 1/0.4



Type Order No.	Frequency range (MHz)	Amplification (dB)	Adjustment Range of amplification (dB)	Suppression per trap filter <sup>1)</sup> (dB)	Max. Output Level <sup>1)</sup> (dB $\mu$ V)	Noise Factor (dB)	Current Consumption (V/mA)
<b>UFO 310</b> 260479	87,5–108	36	18–36	20	110	< 5	12,5/200

<sup>1)</sup> Acc. to EN 50083-5, 66-dB-KMA (corresponds to DIN 45004-B)

## TV Converter

**UFO 320**    260500    **CE** **A**

**UFO 321**    260501    **CE** **A**

- To convert terrestrial TV programs, B/G Standard
- Input and output channel can be set via the central controls
- High selection through conversion via IF
- Any combination except same-channel conversion possible
- Adjacent-channel capable
- AGC for automatic input-level control
- Required software level for central controls: V 6.40 or higher
- Dimensions (mm): 263 x 27 x 106
- Packaging unit / weight (pcs./kg): 1/0.5



Type Order No.	Frequency Range (MHz)			Input Level (dB $\mu$ V)	Signal-Noise ratio <sup>2)</sup> S/N-weighted (dB)	Output Level <sup>1)</sup> (dB $\mu$ V)	Noise <sup>2)</sup> Factor (dB)	Current Consumption (V/mA)
	Input 174–230	Input 470–862	Output 118–342					
<b>UFO 320</b> 260500		<b>Ch</b>	<b>Ch</b>	55–85	52	85–95	8	5/320 12,5/110 31/5
<b>UFO 321</b> 260501	<b>Ch</b>		<b>Ch</b>	55–85	55	85–95	8	5/320 12,5/110 31/5

<sup>1)</sup> Acc. to EN 50083-5/Pt. 3.1, 54-dB-IMod. (DIN 45004 K)

<sup>2)</sup> At maximum amplification

<sup>3)</sup> For input level  $\geq$  80 dB $\mu$ V

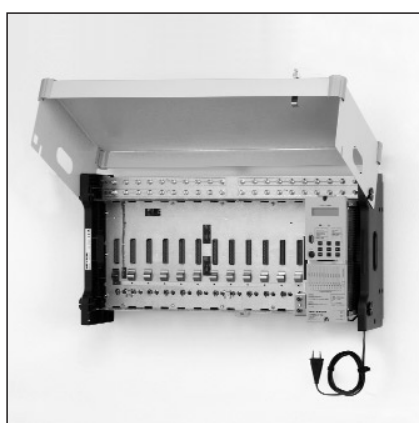
# UFO®DIGIplus Conditioning

Complete pre-assembled base units for wall and 19" rack mounting make the specialist technician's selection easier, as only the base and the necessary channel units must be ordered.

All variable parameters for the cassettes are set using the controller that is integrated in the base units.  
A two-line display shows the parameters set.  
The controller is connected to the cassette via I<sup>2</sup>C-Bus cables.

The built-in switching power supply generates all necessary supply voltages.  
The individual cassette positions are supplied in parallel through a contact rail. The LNB supply is available over each of the four input splitter inputs.

UFO®DIGIplus fulfils the requirements of EN 50083-1, EN 50083-2/A1 and EN 60065, and is CE and Class A approved.



Detail photos

Page  
12

Base units

13

Twin-Sat TV channel units,  
Decoder interface

14

Sat-audio channel unit,  
DVB transcoder

15

DVB transmodulators,  
NIT module

16



Twin-DVB transmodulators

17

Twin-TV converter,  
FM-band range amplifier

18

FM-band quadruple converter,  
DVB-T transcoder

19

Multi-range amplifier

20



# UFO®DIGIplus – Detailed Photos



Unlock the cover of the UFO®DIGIplus unit by pressing the black locking button on the left side of the unit.

The cover of the UFG 712 base unit can be fixed in the open position with a screwdriver or similar object, allowing convenient access to the headend.



In the case of satellite cassettes, guide rails, control rod and cable are included in the scope of delivery (terrestrial cassettes without cable).



The channel units are simply inserted in the black guide rails that are clipped into the top and bottom of the base unit, and click into place in the base unit.



Completely pre-assembled 19" rack with 8 channel units, power supply, controller, input splitter and output coupler.



To prevent unwanted tampering, the UFO®DIGIplus unit can be locked.

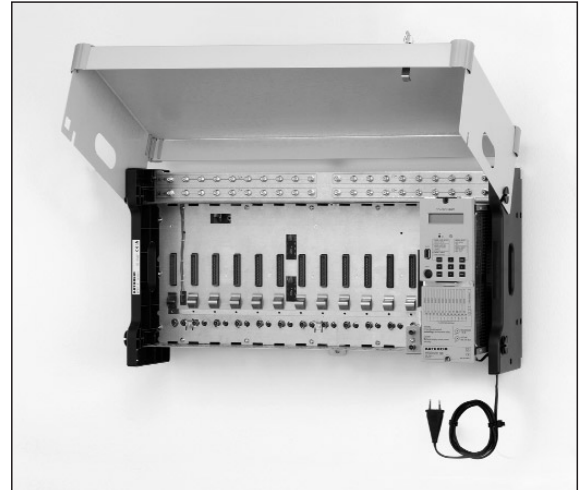
# UFO® DIGIplus – Base Units

## Base Units

**UFG 712**    20610016    CE    A

Base unit with 12 insert positions

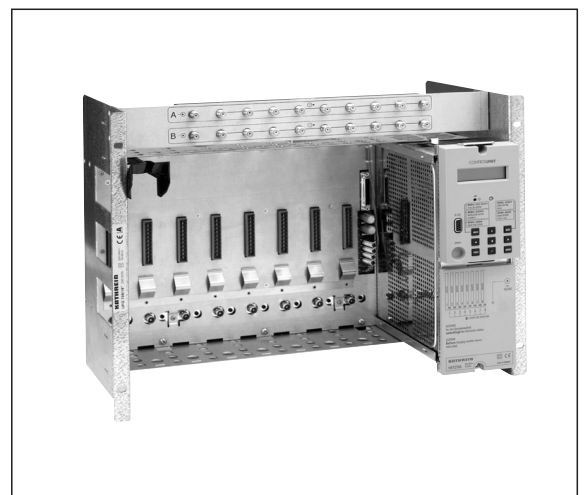
- Complete with power supply, controller, input splitter, output coupler and amplifier
- Housing in galvanised sheet steel with removable, locking front cover
- Simple adaptation of control software possible via RS 232 interface
- For indoor mounting



**UFG 708/19"**    20610039    CE    A

Base unit with 8 insert positions for installation in 19" cabinets (e.g. Kathrein TUG 100, see Page 32)

- Complete with coupler, power supply, controller, input splitter and output coupler
- Carrier in galvanised sheet steel
- Simple adaptation of control software possible via RS 232 interface
- Height: 8 UH (with input splitter)
- For indoor mounting



Type	UFG 712		UFG 708/19"	
Order Number	20610016		20610039	
	CE    A			
Insert positions for single or twin cassettes	12		8	
Adjacent-channel capable	Yes		Yes	
<b>Input Data</b>				
Input frequency	MHz	47–862, 950–2150		
Input splitter, satellite		4 x 9-way	2 x 9-way	
Distribution loss, satellite	dB	16		
Remote power for LNB supply	V/mA	18/1000		
<b>Output Data</b>				
Output frequency	MHz	47–862		
Output level	dBµV	PAL 106* QPSK/QAM 96* FM 96*		PAL 78 QPSK/QAM 68 FM 74
Test output	dB	-20		
Adjustment range per output	dB	-20		
<b>Power supply</b>				
Mains voltage	V/Hz	195–260/50/60		
Max. power consumption	W	180	120	
Output voltage/current	V/mA	5/12000 12/6000 18/1000 24/300 33/300 45/400		
<b>General</b>				
Ambient temperature range	°C	-10 to +50		-5 to +45
Dimensions (W x H x D)	mm	715 x 385 x 295		483 x 355 x 261
Packaging unit/weight	pcs./kg	1/19.5		1/14.5

\*) At 60-dB-CTB/CSO

# UFO® DIGIplus – Twin-Sat-TV-Channel Units, Decoder Interface

## Twin-Sat-TV-Channel Units, Decoder Interface

<b>UFO 741</b>	20610025	CE	A
<b>UFO 743</b>	20610026	CE	A
<b>UFO 744</b>	20610027	CE	A
<b>UFO 745</b>	20610028	CE	A

- For reception of two analogue satellite programmes in PAL with analogue sound sub-carrier
- Twin cassette with one satellite input and one output (second satellite input can be retrofitted if desired)
- All essential parameters can be set via controller
- External decoder can be connected via retrofitted decoder interface UFZ 740 (one for each channel unit required, not included in scope of delivery, see below)
- Adjacent-channel capable
- TV standard B/G
- TV sound in stereo
- Built-in data line decoder for automatic recognition and switch-over for mono, 2-tone or stereo transmissions
- 3-stage IF band-width reduction (threshold) for unfavourable reception conditions
- Black screen generating for radio on a TV channel (e.g. in hotel systems, by re-soldering internal chip bridges)
- C-Band reception through re-soldering of internal chip bridges
- Required software level for central controls: V 18 or higher
- Dimensions (mm): 281 x 32 x 191
- Packaging unit / weight (pcs./kg): 1/1.5



Type Order Number	Frequency Range (MHz)					Input-Level <sup>1)</sup> (dBµV)	Signal-Noise ratio <sup>2)</sup> S/N-weighted (dB)	Sound-Subcarrier Frequency (MHz)	Sound IF Band-width main/sub (kHz)	Video/Audio Carrier difference T1/T2 (dB)	Output-Level (dBµV)	Current Consumption (V/mA)
	Input 950–2150	Output 47–68	Output 118–334	Output 302–470	Output 470–862							
<b>UFO 741</b> 20610025	Ch Ch	Ch	Ch			65–80	56	5–9	280/ 130	16/20	101	5/950 12/430 33/< 20
<b>UFO 743</b> 20610026	Ch Ch		Ch Ch			65–80	56	5–9	280/ 130	16/20	101	5/950 12/430 33/< 20
<b>UFO 744</b> 20610027	Ch Ch			Ch Ch		65–80	56	5–9	280/ 130	16/20	101	5/950 12/430 33/< 20
<b>UFO 745</b> 20610028	Ch Ch				Ch Ch	65–80	56	5–9	280/ 130	16/20	101	5/950 12/340 33/< 20

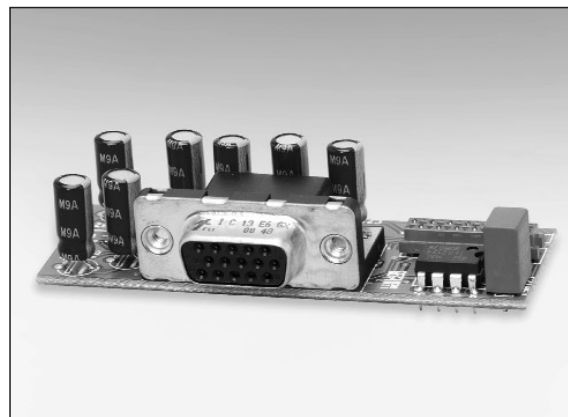
<sup>1)</sup> On input to channel unit; note input splitting loss!

<sup>2)</sup> Own value of channel unit

## Decoder Interface

**UFZ 740** 20610029

- Decoder interface to connect external decoders or feed-in of video signals
- Retro-fit option for Twin-Sat-TV channel units UFO 741/743/744/745
- Separate unit required for each channel unit
- Complete with adapter cable SubMin-D to Euro-AV
- Simple retrofitting by specialist dealer possible



# UFO®DIGIplus – Sat-Sound Channel Unit, DVB Transcoder QPSK-PAL

## Sat-Sound Channel Unit

**UFO 715**      20610019    **CE**    **A**

- To process two satellite radio programmes to standardised FM stereo radio signals
- Twin cassette with two satellite inputs and one output
- For Sat-audio sub-carriers (Wegener Panda I) and unencrypted ADR sub-carriers
- Audio input socket (cinch) for external LF signals (used as FM modulator) for two programmes
- RDS transmitter recognition for display of transmitter name in RDS-capable FM receivers (standardised conversion of ADR signals or manual input)
- All essential parameters can be set via the controller
- Software download via RS 232 interface
- Required software level for controller: V 18 or higher
- Dimensions (mm): 281 x 32 x 191
- Packaging unit / weight (pcs./kg): 1/1.5



Type Order No.	Frequency Range (MHz)		Input Level <sup>1)</sup> (dBµV)	Audio Subcarrier (MHz)	Sum distortion (dB)	Noise-Voltage ratio (dB)	Crosstalk Damping (dB)	Output Level- (dBµV)	Current Consumption (V/mA)
	Input 950–2150	Output 87,5–108							
<b>UFO 715</b> 20610019	<b>Ch</b>	<b>Ch</b>	57–80	Panda I 6–9 ADR 0.18–9	> 46	60	40	93	5/340 12/380 45/10

<sup>1)</sup> At input to channel unit; note input splitter loss!

## DVB Transcoder QPSK-PAL

**UFO 773**      20610030    **CE**    **A**

**UFO 775**      20610031    **CE**    **A**

- To process one DVB-Sat TV or radio programme from a transponder
- Transcodes a QPSK-modulated satellite IF signal to an analogue PAL TV program (standard B/G). For radio programmes, an external FM modulator and internal modification unit are necessary
- All essential parameters can be set via the controller
- With Common Interface (CI) for a CA module for encrypted programmes
- Viterbi error protection (FEC), Auto, 1/2, 2/3, 3/4, 5/6, 7/8
- Adjacent-channel capable
- TV sound in stereo
- Generation of Videotext signals
- 14/18 V and 0/22 kHz switchable to input to control switching matrices
- Software download via RS 232 interface
- Required software level for operating unit: V 18 or higher
- Dimensions (mm): 281 x 32 x 191
- Packaging unit / weight (pcs./kg): 1/1.5



Type Order No.	Frequency Range (MHz)			Input Level <sup>1)</sup> (dBµV)	Input Data Rate (MS/s)	Signal-Noise ratio <sup>2)</sup> S/N-weighted (dB)	Video/Audio Carrier level difference T1/T2 (dB)	Output Level (dBµV)	Current Consumption (V/mA)
	Input 950–2150	Output 118–334	Output 470–862						
<b>UFO 773</b> 20610030	<b>Ch</b>	<b>Ch</b>		40–83	2–30	55	16/20	102	5/710 12/480 45/10
<b>UFO 775</b> 20610031	<b>Ch</b>		<b>Ch</b>	40–83	2–30	55	16/20	102	5/710 12/480 45/10

<sup>1)</sup> At input to channel unit; note input splitting loss!    <sup>2)</sup> Own value of channel unit

# UFO® DIGIplus – DVB Transmodulators QPSK-QAM, NIT-Module

## DVB Transmodulators QPSK-QAM

**UFO 784**      20610032    **CE**    **A**  
**UFO 785**      20610033    **CE**    **A**

- To process DVB-Sat programmes from a transponder
- Transmodulates a QPSK-modulated Sat-IF signal to a QAM-modulated output signal
- All essential parameters can be set via the controller
- Transparent transmodulation
- NIT adaptation (Cable NIT) via retrofitted NIT-Module UFZ 780 (see below, not included in scope of delivery)
- Viterbi error protection (FEC) Auto, 1/2, 2/3, 3/4, 5/6, 7/8
- Adjacent-channel capable
- QAM modulator for 4, 16, 32, 64, 128 and 256 QAM
- Required software level for controller: V 18 or higher
- Dimensions (mm): 281 x 32 x 191
- Packaging unit / weight (pcs./kg): 1/1.5



Type Order No.	Frequency Range (MHz)			Input Level <sup>1)</sup> (dBμV)	Input Data Rate (MS/s)	Modulation Error Rate MER (dB)	Output Level (dBμV)	Current Consumption (V/mA)
	Input 950–2150	Output 302–470	Output 470–862					
<b>UFO 784</b> 20610032	Ch	Ch		35–80	3–30	37	95	5/660 12/190 45/25
<b>UFO 785</b> 20610033	Ch		Ch	35–80	3–30	37	95	5/660 12/190 45/25

<sup>1)</sup> At input to channel unit; note input splitting loss!

## NIT-Module

**UFZ 780**      20610034

- Retro-fit module to adapt NIT (Network Information Table) to cable system
- Retro-fit option for the DVB transmodulators QPSK-QAM UFO 784/785
- Simple retrofit possible through specialist dealer





# UFO® DIGIplus – Twin-DVB Transmodulators QPSK-QAM

## Twin-DVB Transmodulator QPSK-QAM

<b>UFO 794</b>	20610035	CE	A
<b>UFO 794/TP</b>	20610044	CE	A
<b>UFO 795</b>	20610036	CE	A
<b>UFO 795/TP</b>	20610045	CE	A

- Twin cassette to process DVB-Sat programmes from two transponders
- Transmodulates a QPSK-modulated Sat-IF signal to a QAM-modulated output signal
- Twin cassette with two satellite inputs and one output
- All essential parameters can be set via the controller
- **UFO 794** and **UFO 795** with transparent transmodulation
- **UFO 794/TP** and **UFO 795/TP** with MPEG 2 transport-stream processor for NIT adaptation (Cable NIT), for stuffing to provide a constant output data rate, or to filter out individual TV or radio programmes
- Viterbi error protection (FEC) Auto, 1/2, 2/3, 3/4, 5/6, 7/8
- Adjacent-channel capable
- QAM modulator for 4, 16, 32, 64, 128 and 256 QAM
- Required software level for controller: V 21 or higher
- Dimensions (mm): 281 x 32 x 191
- Packaging unit / weight (pcs./kg): 1/1.4



Type Order No.	Frequency Range (MHz)			Input Level <sup>1)</sup> (dBμV)	Input Data Rate (MS/s)	Transport- Stream Processor	Modulation Error Rate MER (dB)	Output Level (dBμV)	Current Consumption (V/mA)
	Input 950–2150	Output 302–470	Output 470–862						
<b>UFO 794</b> 20610035	Ch Ch	Ch Ch		35–80	1–30	–	37	90	5/800 12/340 45/10
<b>UFO 794/TP</b> 20610044 <sup>2)</sup>	Ch Ch	Ch Ch		35–80	1–30	•	37	90	5/860 12/500 45/10
<b>UFO 795</b> 20610036	Ch Ch		Ch Ch	35–80	1–30	–	37	90	5/800 12/340 45/10
<b>UFO 795/TP</b> 20610045 <sup>2)</sup>	Ch Ch		Ch Ch	35–80	1–30	•	37	90	5/860 12/500 45/10

<sup>1)</sup> At input to channel unit; note input splitting loss!

<sup>2)</sup> Provisional data; technical changes reserved

# UFO® DIGIplus – Twin-TV Converter, FM Range Amplifier

## Twin-TV Converter

<b>UFO 721</b>	20610021	CE	A
<b>UFO 723</b>	20610022	CE	A
<b>UFO 724</b>	20610023	CE	A
<b>UFO 725</b>	20610024	CE	A

- To convert two terrestrial programs
- Twin cassette with two inputs and one output
- TV standard: B/G
- Input and output channels can be set via the controller
- High selectivity through conversion via IF
- Adjacent-channel capable
- Any conversion combination possible
- AGC for automatic regulation of input level
- Required software level for controller: V 18 or higher
- Dimensions (mm): 281 x 32 x 191
- Packaging unit / weight (pcs./kg): 1/1.5



Type Order No.	Frequency Range (MHz)					Input Level (dBμV)	Signal-Noise ratio S/N-weighted (dB)	Output level (dBμV)	Current Consumption (V/mA)
	Input 47-862	Output 47-68	Output 118-334	Output 302-470	Output 470-862				
<b>UFO 721</b> 20610021	Ch Ch	Ch	Ch			75-85	53	98	5/650 12/250 45/8
<b>UFO 723</b> 20610022	Ch Ch		Ch Ch			75-85	53	98	5/650 12/250 45/8
<b>UFO 724</b> 20610023	Ch Ch			Ch Ch		75-85	53	98	5/650 12/250 45/8
<b>UFO 725</b> 20610024	Ch Ch				Ch Ch	75-85	53	98	5/650 12/250 45/8

## FM-band Range Amplifier

<b>UFO 710</b>	20610017	CE	A
----------------	----------	----	---

- For wide-band reception in the FM range
- Six individually adjustable trapping filters to suppress powerful FM transmitters
- Required software level for controller: V 18 or higher
- Dimensions (mm): 281 x 32 x 191
- Packaging unit / weight (pcs./kg): 1/1.2



Type Order No.	Frequency Range (MHz)	Amplification (dB)	Input Level Adjustment Range (dB)	Noise Factor (dB)	Suppression per Filter Circuit (dB)	Output Level (dBμV)	Current Consumption (V/mA)
<b>UFO 710</b> 20610017		43	9-20	6-9	Typ. 15	100	5/1 12/155

# UFO® DIGIplus – FM Quadruple Converter, DVB-T Transcoder

## FM Quadruple Converter

**UFO 711**    20610018    **CE**    **A**

- For selective conversion of four FM programmes
- Quadruple cassette with one input and one output
- Input and output channels can be set via the controller
- Frequency raster:     Input    25 kHz  
                                  Output  50 kHz
- Conversion via IF 10.7 MHz
- Any conversion combination possible
- Required software level for controller: V 18 or higher
- Dimensions (mm): 281 x 32 x 191
- Packaging unit / weight (pcs./kg): 1/1.5



Type Order No.	Frequency Range (MHz)		Input Level (dBµV)	Total distortion (dB)	Noise- Voltage ratio (dB)	Min. Channel increment at Output (kHz)	Output Level (dBµV)	Current Consumption (V/mA)
	Input 87,5–108	Output 87,5–108						
<b>UFO 711</b> 20610018	Ch Ch Ch Ch	Ch Ch Ch Ch	10–95	> 46	56	300	98	5/310 12/300

## DVB-T Transcoder COFDM-PAL

**UFO 753**    20610042    **CE**    **A**

**UFO 755**    20610043    **CE**    **A**

- To process a DVB-T TV or radio programme from one DVB-T channel
- Transcodes a COFDM-modulated DVB-T signal to an analogue PAL-TV program (Standard B/G). For radio programmes, an additional external FM modulator and internal unit modification are necessary
- All essential parameters can be set via the controller
- With Common Interface (CI) to receive a CA module for encrypted programmes
- Adjacent-channel capable
- TV sound in stereo
- Generation of Videotext signals
- Software download via RS 232 interface
- Required software level for operating unit: V 21 or higher
- Dimensions (mm): 281 x 32 x 191
- Packaging unit / weight (pcs./kg): 1/1.5



Type Order No.	Frequency Range (MHz)			Input Level (dBµV)	Signal- Noise- ratio*) S/N-weighted (dB)	Video/Audio Carrier- level difference T1/T2 (dB)	Output Level (dBµV)	Current Consumption (V/mA)
	Input 174–230/ 470–862	Output 118–334	Output 470–862					
<b>UFO 753</b> 20610042	Ch	Ch		40–83	55	16/20	102	5/710 12/480 45/10
<b>UFO 755</b> 20610043	Ch		Ch	40–83	55	16/20	102	5/710 12/480 45/10

\*) Own value of channel unit

● Provisional data; technical changes reserved.

# UFO® DIGIplus – Multi-range Amplifier

## Multi-range Amplifier

**UFO 720** 20610020 **CE** **A**

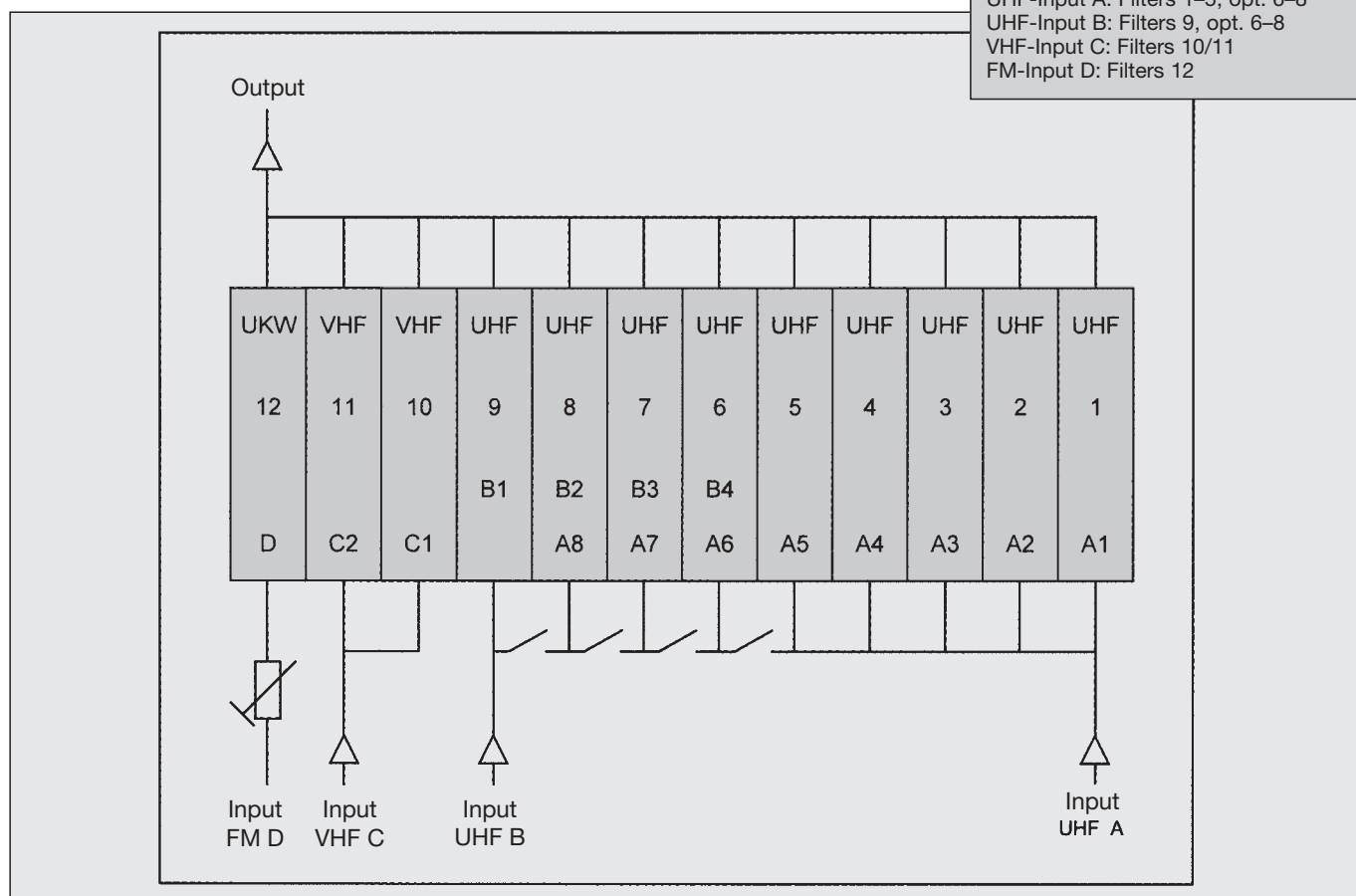
- Selective multi-range amplifier for reception of terrestrial TV and radio programmes
- Economical solution for smaller systems
- Selective amplification and individual level adjustment for each individual TV programme
- Amplifier cassette with two UHF inputs, one VHF and one FM input and one output
- Channel filter for 9 UHF channels, 2 VHF channels and FM range
- UHF antenna inputs:  
Input A: channel filters 1-5, optionally channel filters 6-8  
Input B: channel filter 9, optionally channel filters 6-8
- All essential parameters can be set via the controller
- Software download via RS 232 interface
- Required software level for controller: V 18 or higher
- Dimensions (mm): 281 x 32 x 191
- Packaging unit / weight (pcs./kg): 1/1.5



Type Order No.	Frequency Range (MHz)			Input Level (dBμV)	Amplification (dB)	Adjustment Range (dB)	Noise Factor (dB)	Output Level (dBμV)	Current Consumption (V/mA)
	87,5–108 VHF	174–230 B III	470–790 UHF						
<b>UFO 720</b> 20610020	██████████	Ch Ch	Ch Ch Ch Ch Ch Ch Ch Ch Ch	TV: 56–85 H VHF: 50–70	UHF: 45 VHF: 46 VHF: 40	4–45 –8–46 20–40	7.4	TV: 100 UKW: 90	5/700 12/15 45/20

## Block Diagramme UFO 720

**Assignment of the 12 channel filters**  
 UHF-Input A: Filters 1–5, opt. 6–8  
 UHF-Input B: Filters 9, opt. 6–8  
 VHF-Input C: Filters 10/11  
 FM-Input D: Filters 12



# UFO<sup>®</sup>plus Headend

The UFG 600 base unit with power supply and controller provides space for six channel units, and can be extended to a total of 12 or 18 insert positions using all the extension units UFG 601 and UFG 602, with a further UFG 601 for 24 insert positions.

The power supply with the controller supplies the channel units with the required voltages, and allows all the essential transmission parameters to be set centrally. All the internal connections are made automatically when the cassette is inserted in the module carrier. A bus line supplies the individual channel units with power and control signals. A four-line display shows the parameter settings at a glance. The chosen channel unit is indicated by an LED.

The operating keys and the display are covered and protected by a flap that can be screwed shut. The entire channel unit for one TV or radio programme or, in the case of the QPSK-QAM transmodulator, one transponder, is accommodated in one cassette. The LNB remote power feed can be cut off by means of a switch in the input splitter.

UFO<sup>®</sup>plus fulfils the requirements of EN 50083-2/A1 and EN 60065, and is CE and Class A approved.



Base and Extension Units

Page  
22

Satellite TV channel units

23

DVB-Transcoder,  
CI Add-on Kit

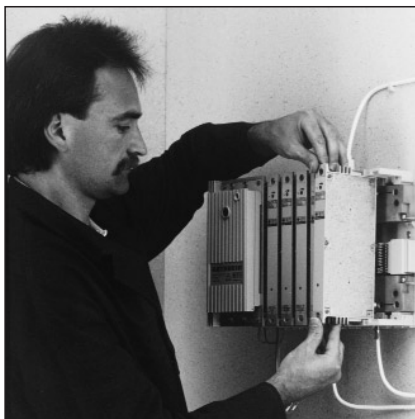
24

DVB-Transmodulators

25

TV Converter,  
DVB-T Converter

26



FM-band Range Amplifier,  
FM Converter,  
FM Modulator

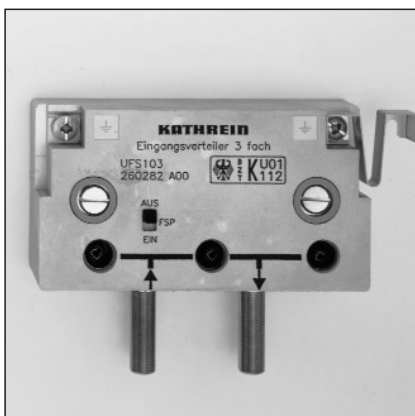
27

Module carrier,  
Mains Adapter/Controller

28

Individual Components,  
Software

29–30



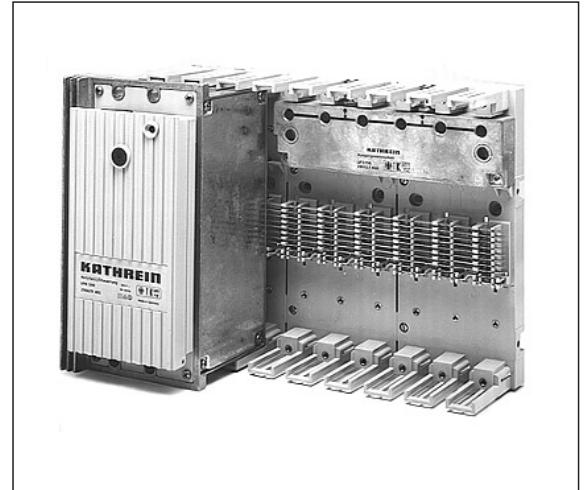
# UFO<sup>®</sup>plus – Base and Extension units

## Base Unit

**UFG 600**      260407

- Completely pre-assembled, to take six channel units
- Comprises:

Module carrier	UFG 509
Power supply/Controller	UFN 500
Output Coupler	UFS 206
- For indoor mounting
- Dimensions (mm): 365 x 265 x 200
- Packaging unit / weight (pcs./kg): 1/6.3



### Notes:

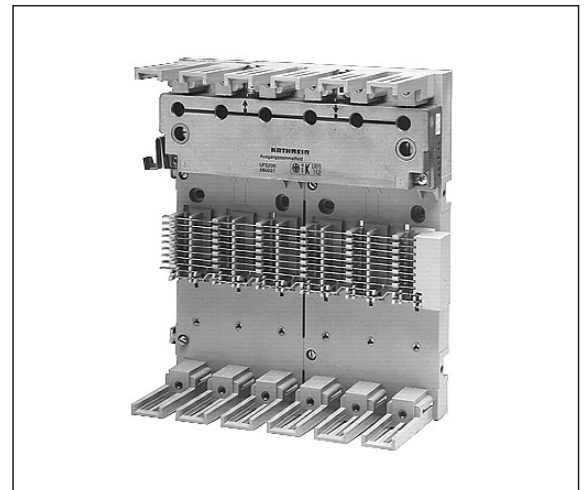
- Controller with software level  $\leq 6.06$  are downwards-compatible, and support all older channel units
- Controller with software level  $\geq 6.07$  and higher don't support the following older channel units, for capacity reasons:
  - UFO 120
  - UFO 130 and 131, all versions
  - UFO 160 and 161, all versions
  - UFO 180 (Order No.: 260336)
- Some channel units have a higher current consumption. Please check the maximum permitted load on the power supply

## Extension Unit

**UFG 601**      260309

- To extend a base unit UFG 600 or an extension unit UFG 602 to a total of 12 insert positions
- Completely pre-assembled, comprising:

Module carrier	UFG 506
Output coupler	UFS 206
RF connecting cable	
- For indoor mounting
- Dimensions (mm): 222 x 260 x 100
- Packaging unit / weight (pcs./kg): 1/2.0

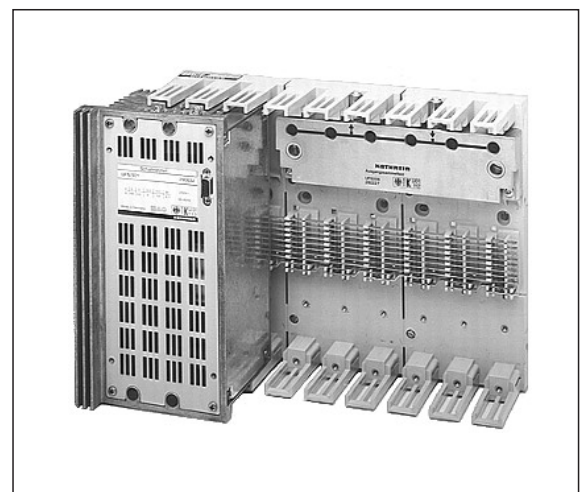


## Extension Unit

**UFG 602**      260310

- To extend a 12-position unit to 18 positions and, with a further UFG 601, to 24 channel units
- Completely pre-assembled, comprising:

Module carrier	UFG 509
Power supply (w/o controls)	UFN 501
Output coupler	UFS 206
RF connecting cable	
- To adjust the channel units either use the controller of the base unit UFG 600 (remove the controller from the UFG 600 and put them on the UFG 602) or connect the UFG 600 and UFG 602 using with the bus-connection cable LSO 78 (see Page 30; not included in scope of delivery)
- For indoor mounting
- Dimensions (mm): 365 x 265 x 200
- Packaging unit / weight (pcs./kg): 1/6.0



# UFO<sup>®</sup>plus – Sat-TV-Channel Units

## Sat-TV Channel Units

**UFO 135**      260459      CE      A

**UFO 175**      260460      CE      A

- For reception of satellite programs in PAL with analogue sound sub-carrier
- Satellite demodulator and modulator, standard B/G, D/K or I in one cassette
- Adjacent-channel capable
- TV sound in stereo
- Output level close-down (for systems with "n + 1 spare unit")
- All essential parameters can be set via the controller
- Connection for external decoder
- Control signal for automatic H/V switchover of input splitter UFS 166
- Black screen signal for radio programmes in a TV channel (satellite signal for black picture generation required)
- Small dimensions due to SMD design
- C-Band reception (inverse-video) using of internal plugging bridges
- Required software level for central controller: V 6.04 or higher
- Dimensions (mm): 260 x 27 x 147
- Packaging unit / weight (pcs./kg): 1/1.7



Type Order No.	Frequency Range (MHz)			Input Level (dBμV)	FM- Threshold (static) (dB)	Signal- Noise ratio* S/N- weighted (dB)	Audio Subcarrier Frequency (MHz)	Audio- IF- Band- width main/ sub (kHz)	Video/ Audio level difference T1/T2 (dB)	Max. Output Level/ Adjustment Range (dBμV)	Decoder Interface	Current Con- sumption (V/mA)
	Input 950–2150	Output 47–68 118–470	Output 470–862									
<b>UFO 135</b> 260459	Ch	Ch		43–80	7	53	5,5–9	280/ 110	16/20	95 87–95	•	5/550 12.5/340 33/9
<b>UFO 175</b> 260460	Ch		Ch	43–80	7	53	5,5–9	280/ 110	16/20	95 87–95	•	5/550 12.5/340 33/9

\*) Own value of channel unit

# UFO<sup>®</sup>plus – DVB Transcoder QPSK-PAL, CI Add-on Kit

## DVB Transcoder QPSK-PAL

**UFO 183** 260510 **CE** **A**

**UFO 184** 260509 **CE** **A**

- To process a DVB satellite TV or radio programmes in community antenna systems
- Transcodes a QPSK modulated satellite IF signal to an analogue PAL-TV programme (standard B/G, D/K or I). External FM modulator required for radio programmes
- The complete channel unit is accommodated in one cassette
- One cassette is required per programme
- All essential parameters can be set via the central controller
- Viterbi error protection (Code rates: 1/2, 2/3, 3/4, 5/6, 7/8)
- TV modulator in stereo and adjacent-channel capable
- Generation of Videotext signals
- Common Interface (CI) can be retrofitted (UFZ 183) to take a CA module
- Required software level for central controller: V 6.20 or higher
- Dimensions (mm): 260 x 27 x 147
- Packaging unit / weight (pcs./kg): 1/1.6



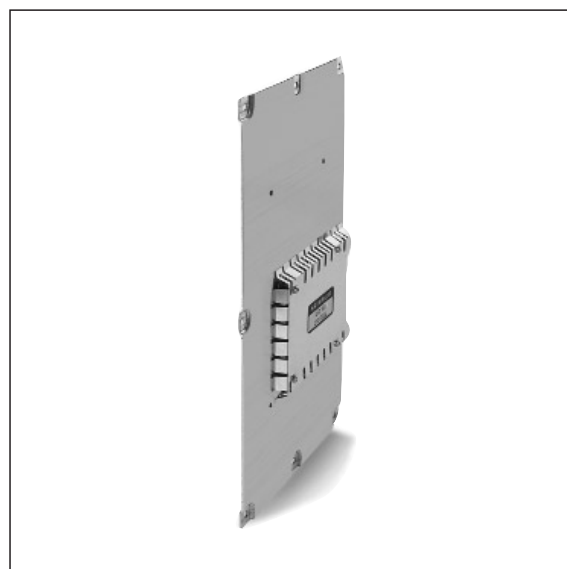
Type Order No.	Frequency Range (MHz)			Input Level (dBµV)	Input Data Rate (MS/s)	Signal-Noise ratio* S/N-weighted (dB)	Audio/Video Interface	Max. Output Level/Adjustment Range (dBµV)	Video/Audio Level difference T1/T2 (dB)	Current Consumption (V/mA)
	Input 950–2150	Output 47–68 118–470	Output 470–862							
<b>UFO 183</b> 260510	<b>Ch</b>	<b>Ch</b>		43–80	2–35	59	•	95 87–95	16/20	5/500 12,5/440 33/6
<b>UFO 184</b> 260509	<b>Ch</b>		<b>Ch</b>	43–80	2–35	59	•	94 86–94	16/20	5/500 12,5/480 33/6

\*) Own value of channel drawer

## Common Interface (CI) Add-on Kit

**UFZ 183** 21010006

- Common Interface (CI) add-on kit to take one CA module
- Retro-fit option for DVB transcoders UFO 183 (260510) and UFO 184 (260509)
- Simple retrofit possible through specialist dealer





# UFO<sup>®</sup>plus – DVB Transmodulators QPSK-QAM

## DVB-Transmodulators QPSK-QAM

<b>UFO 185</b>	260369	CE	A
<b>UFO 185/TP</b>	260513	CE	A
<b>UFO 187</b>	260488	CE	A
<b>UFO 187/TP</b>	260511	CE	A

- To process DVB satellite TV programmes in community antenna systems
- Transmodulator QPSK-modulated satellite IF signal to a QAM-modulated output signal
- The complete channel unit is accommodated in one cassette
- One cassette is required per programme
- All essential parameters can be set via the central controller
- Adjacent-channel capable
- Viterbi error protection (Code rates: 1/2, 2/3, 3/4, 5/6, 7/8)
- UFO 185 and UFO 187 with transparent transmodulation
- UFO 185/TP and UFO 187/TP with MPEG 2 Transport stream processor for NIT adaptation (Cable NIT) for stuffing to give a constant output data rate or to filter out individual TV or radio programmes
- QAM modulator for 16/32/64/128/256 QAM (factory setting: 64 QAM)
- Required software level for central controller: V 6.05 or higher (UFO 18x/TP, V 6.07 or higher)
- Dimensions (mm): 260 x 27 x 147
- Packaging unit / weight (pcs./kg): 1/1.7



Type Order No.	Frequency Range (MHz)			Input Level (dBμV)	Input Data Rate (MS/s)	Modulation Error Rate MER (dB)	Transport Stream Processor	Max. Output Level/ Adjustment Range (dBμV)	Current Consumption (V/mA)
	Input 950–2150	Output 110–302	Output 302–606						
<b>UFO 185</b> 260369	Ch		Ch	43–80	16–35	37	–	85 75–85	5/850 12.5/280 33/9
<b>UFO 185/TP</b> 260513	Ch		Ch	43–80	4–35	37	•	85 75–85	5/800 12.5/420 33/9
<b>UFO 187</b> 260488	Ch	Ch		43–80	4–35	37	–	85 75–85	5/800 12.5/360 33/9
<b>UFO 187/TP</b> 260511	Ch	Ch		43–80	4–35	37	•	85 75–85	5/800 12.5/420 33/9

# UFO<sup>®</sup>plus – TV Converter, DVB-T Converter, TV Converter Standard D/I

## TV Converter

<b>UFO 220</b>	260138	CE	A
<b>UFO 221</b>	260139	CE	A
<b>UFO 222</b>	260284	CE	A
<b>UFO 230</b>	260409	CE	A

- To convert terrestrial TV programs standard B and G, UFO 230 for standard G, I, K
- Input and output channels can be set via the central controls
- High selectivity through conversion via standard IF
- Any combination except same-channel conversion possible
- Adjacent-channel capable
- AGC for automatic input level control
- Mono connection block UFS 101 included in scope of delivery
- Required software level for central controller: V 1.30; UFO 230, V 6.04 or higher
- Dimensions (mm): 260 x 112 x 27
- Packaging unit / weight (pcs./kg):  
1/1.6 - UFO 220/230                      1/1.2 - UFO 222    1/1.8 - UFO 221



## DVB-T Converter

<b>UFO 250</b>	260508	CE	A
----------------	--------	----	---

- To convert terrestrial DVB-T and analogue PAL programmes (standard G, I, K)
- Other points as above:
- Required software level for central controller: V 6.08 or higher
- Dimensions (mm): 260 x 147 x 27
- Packaging unit / weight (pcs./kg): 1/1.7

### Note:

TV converters have a higher current consumption. Please note the maximum permitted load on the power supply!

Type Order No.-	Frequency Range (MHz)					Input Level (dBμV)	Signal- Noise ratio <sup>3)</sup> S/N- weighted (dB)	Adjustment Range Output- Level <sup>1)</sup> (dBμV)	Noise- Factor <sup>2)</sup> (dB)	Current- Con- sumption (V/mA)
	Input 47-68	Input 174-230	Input 470-862	Output 47-68 118-350	Output 470-862					
<b>UFO 220</b> 260138			Ch	Ch		55-85	50	85-95	10	5/150 12.5/400 15/20 33/5
<b>UFO 221</b> 260139		Ch		Ch		55-85	55	85-95	8	5/150 12.5/400 15/20 33/5
<b>UFO 222</b> 260284	Ch			Ch		55-85	55	85-95	8	5/150 12.5/400 15/20 33/5
<b>UFO 230</b> 260409			Ch		Ch	55-85	52	85-95	8	5/150 12.5/400 15/20 33/5
<b>UFO 250</b> 260508			Ch		Ch	40-85	52	85-95 (PAL) 70-85 (DVB-T)	< 8	5/50 -5/20 12.5/700 33/15

<sup>1)</sup> DIN 45004-K, 54-dB-IMod.

<sup>2)</sup> At maximum amplification

<sup>3)</sup> For input level ≥ 80 dBμV

## TV Converter Standard D/I

<b>UFO 220/DI</b>	260285	Standard D/I	Input: 470-862 MHz	Output: 44,5-68,5/118-350 MHz
-------------------	--------	--------------	--------------------	-------------------------------

- Required software level for central controller: V 2.10 or higher
- All other data as for the standard types listed above

# UFO<sup>®</sup>plus – Terrestrial Audio Channel Units

## FM-band Range Amplifier

**UFO 210**    260137    **CE** **A**

- For wide-band reception of FM programmes
- Four separately adjustable filters to suppress interfering signals
- Mono-connection block UFS 101 included in scope of delivery
- Dimensions (mm): 260 x 27 x 112
- Packaging unit / weight (pcs./kg): 1/1.6



Type Order No.	Frequency Range (MHz)	Amplification (dB)	Adjustment Range of Amplification (dB)	Trap loss per Filter Circuit (dB)	Noise Factor (dB)	Maximum Output Level* (dBμV)	Current Consumption (V/mA)
<b>UFO 210</b> 260137	87.5–108	36	18–36	20	< 5	110	12/200

\*) Acc. to EN 50083, Part 5, for interference products 3rd Class at 66-dB-XMod. (DIN 45004 B)

## FM Converter

**UFO 211**    260283    **CE** **A**

- For selective conversion of one FM radio signal
- Conversion via base band (remodulation)
- Switchable for stereo or mono operation
- Co-channel capable
- Setting of FM input frequency, FM output frequency and stereo/mono mode via the central controller
- Mono connection block UFS 101 included in scope of delivery
- Required software level for central controller: V 4.0 or higher
- Dimensions (mm): 260 x 27 x 112
- Packaging unit / weight (pcs./kg): 1/1.5



Type Order No.	Frequency Range (MHz)		Input Level (dBμV)	Sum distortion (dB)	Noise Voltage ratio <sup>1)</sup> (dB)	Cross-talk attenuation (dB)	Min. Channel-increment at Output (kHz)	Output level Adjustable (dBμV)	Current Consumption (V/mA)
	Input 87,5–108	Output 87,5–108							
<b>UFO 211</b> 260283	<b>Ch</b>	<b>Ch</b>	Stereo: 40–88 Mono: 20–88	50	63	43	300	85–95	-5/26 5/90 12.5/220 33/6

<sup>1)</sup> At input level 60 dBμV (stereo) or 40 dBμV (mono)

## FM Modulator

**UFO 126**    260402    **CE** **A**

- To process audio signals to a standard FM stereo-radio signal
- Can be used for stereo and mono processing
- All essential parameters can be set via the central controller
- Required software level for central controller: V 4.0 or higher
- Dimensions (mm): 260 x 27 x 112
- Packaging unit / weight (pcs./kg): 1/1.3



Type Order No.	Frequency Range (MHz)		Input Voltage* <sup>1)</sup> (V <sub>eff</sub> )	Output Level Adjustable (dBμV)	Sum distortion (dB)	Noise-Voltage ratio (dB)	Cross talk attenuation (dB)	Current Consumption (V/mA)
	Input (Hz) 40–15000	Output (MHz) 87.5–108						
<b>UFO 126</b> 260402	<b>L R</b>	<b>Ch</b>	0.5	85–95	54	70	40	-5/30 5/100 12.5/120

<sup>1)</sup> FM signal deviation: ± 40 kHz

# UFO<sup>®</sup>plus – Module Carrier, Power Supply/Control Unit

The individual components are included in the basic and extension units, and so do not need to be ordered separately. It is, however, possible to assemble a system individually from separate components.

## Module Carrier

**UFG 501**      260326

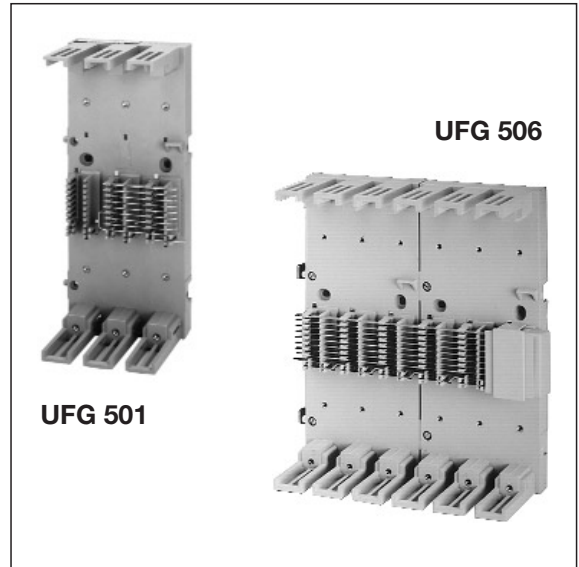
- To install power supply unit in 19" racking
- For indoor mounting
- Dimensions (mm): 111 x 260 x 100
- Packaging unit / weight (pcs./kg): 1/0.4

**UFG 506**      260229

- To install input splitter, output coupler, and six channel units
- Complete with bus cover and bus bridge
- For indoor mounting
- Dimensions (mm): 222 x 260 x 100
- Packaging unit / weight (pcs./kg): 1/1.45

**UFG 509**      260228

- To install power supply/control unit, input splitter, output coupler and six channel units
- Complete with bus cover and bus bridge
- For indoor mounting
- Dimensions (mm): 333 x 260 x 100
- Packaging unit / weight (pcs./kg): 1/1.9



## Power Supply/Control Unit

**UFN 500**      290633      CE

- To supply the various channel units with the necessary voltages, and to tune all essential transmission parameters
- Permitted ambient temperature: -20 to +55 °C
- Dimensions (mm): 260 x 140 x 165
- Packaging unit / weight (pcs./kg): 1/4.1

**UFN 501**      290632      CE

- AS UFN 500, but without control unit
- Packaging unit / weight (pcs./kg): 1/3.7

Secondary Voltage/ Max. Current	Nominal Voltage, primary	Power Consumption
+5 V / 8,4 A -5 V / 400 mA +12,5 V / 4,5 A +14 V / 600 mA +33 V / 110 mA	230 V +10 %, -14 % 50/60 Hz Protection Class II	150 W



### Notes:

- Some channel units have a higher current consumption. For this reason, observe the maximum permitted load of the power supply.
- Control units with a software level ≤ 6.06 are downwards compatible, and support all older channel units.
- Control units with a software level ≥ 6.07 no longer support the following older channel units for capacity reasons:
  - UFO 120
  - UFO 130 and UFO 131, all versions
  - UFO 160 and UFO 161, all versions
  - UFO 180 (Order No. 260336)

# UFO<sup>®</sup>plus – Individual Components

## Mono Connection Block

**UFS 101**      260273      CE    A

- To connect individual channel units, for instance, when only one programme or when only one polarisation is to be received from a satellite in multi-feed systems
- Direct-current passage
- Included in scope of delivery with terrestrial channel units

## Input Distribution

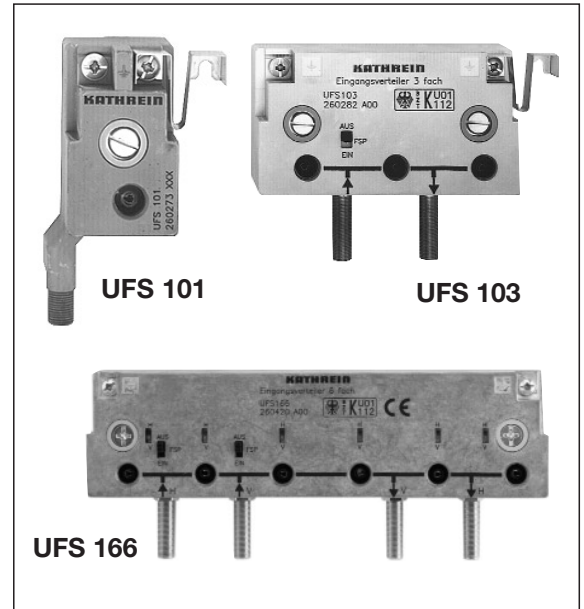
- For dsplit satellite signals to the individual channel units
- Remote feed for LNB supply can be switched with slide switch

**UFS 103**      260282

- 3-way input splitter with loop-through input for connecting to other splitters

**UFS 166**      260420      CE    A

- 6-way input splittner with 2 loop-through inputs for connecting to other splitters
- Polarisation H/V optionally switchable with slide switch
- Polarisation automatically switchable with channel units  
UFO 135, UFO 175, UFO 183, UFO 184, UFO 185 and UFO 187  
(Control signal: 0/22 kHz) via controller



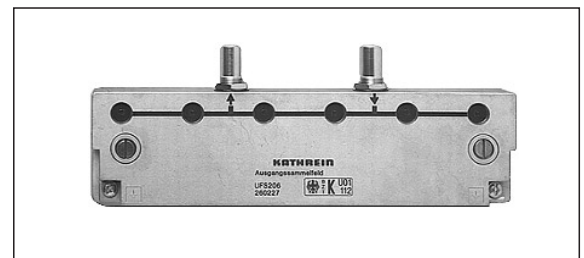
Type Order No.	Symbol		Frequency Range (MHz)	Remote Feed Voltage/ Max. Remote Feed Current (V/mA)	De-coupling (dB)	Dimensions (mm)	Pkg./Unit/ Weight (pcs./kg)
<b>UFS 101</b> 260273		1 Input Output Loop-thr. loss (dB)	0–2300 1 0.3	14/600	–	42 x 92 x 30	1/0.20
<b>UFS 103</b> 260282		1 Input Outputs Split loss (dB) Loop-thr. loss (dB)	920–2150 3 ≤ 13.0 ≤ 11.0	14/600	≥ 25	110 x 92 x 30	1/0.40
<b>UFS 166</b> 260420		2 Input Outputs Split loss (dB) Loop-thr. loss (dB)	920–2150   920–2150 6, optionally hor./vert. switchable ≤ 17.5 ≤ 7	14/540 Remote Feed only via Outputs 1 and 6	≥ 25	220 x 92 x 30	1/0.70

## Output Couplers

**UFS 206**      260227      CE    A

**UFS 216**      260417      CE    A

- 6-way couplers to couple several channel units to one output
- UFS 206 active, UFS 216 passive
- UFS 216 for larger systems with many cascaded trunk/line amplifiers
- Loop-through output to cascade several couplers
- Feed voltage supply is via the collector inputs of the channel units



**Note:** To optimise the intermodulation or signal to noise ratio, we recommend cascading not more than 2 x UFS 206, and to further passively link them externally (prescribed for UFS 216). See also Planning Data, Pages 36-39

Type Order No.	Symbol		Frequency Range (MHz)	Current Consumpt. (V/mA)	Decoupling (dB)	Dimensions (mm)	Pkg.Unit/Weight (pcs./kg)
<b>UFS 206</b> 260227		6 Inputs Amplification Loop through inp. (dB) Amplification (dB)	47–862 6,5 47–862 11	12.5/180	> 30	220 x 85 x 30	1/0.60
<b>UFS 216</b> 260417		6 Inputs Loss (dB) Loop through inp. (dB) Loss (dB)	47–862 14/18*) 47–862 4	12.5/30	> 30	220 x 85 x 30	1/0.60

\*) As the second coupler when cascaded

## 19" Assembly Carrier

**TGZ 10** 236430

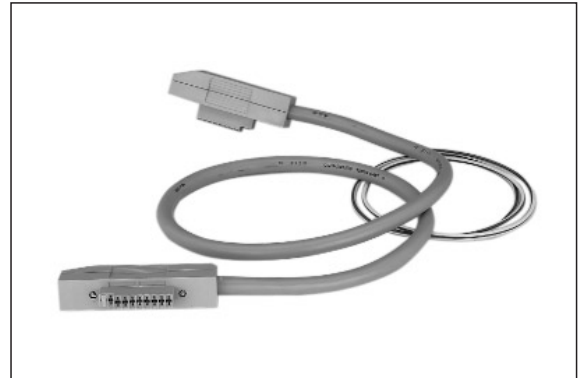
- For installation of UFO<sup>®</sup>plus components in a 19" cabinet (e.g. TUG 100)
- To take one UFG 600 or two UFG 601 or three UFG 501
- Dimensions (mm): 483 x 267 x 198 (19", 6 HE)
- Packaging unit / weight (pcs./kg): 1/3.3



## Bus Connecting Cable

**LSO 75** 271760

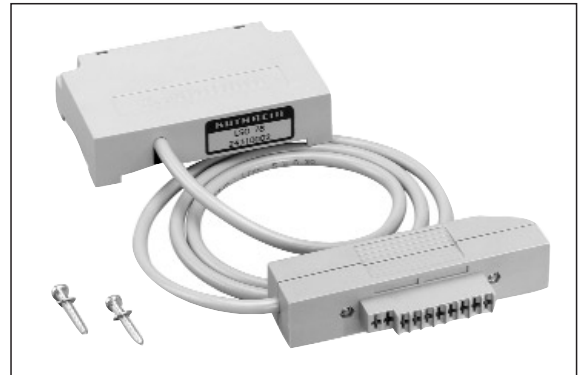
- For connection of the bus lines of UFG 501 to UFG 506 or UFG 601
- Required only when power supply installed separately
- Length (m): 1
- Packaging unit / weight (pcs./kg): 1/0.5



## Connecting Cable with Optical Coupler

**LSO 78** 24310002

- For connection of the bus lines (control signals only) of UFG 600 to UFG 602
- With electrical isolation of the data bus via optical coupler
- Length (m): 1.1
- Packaging unit / weight (pcs./kg): 1/0.2



## Software

**USW 20** 21010005

- User-friendly Java software for the UFO<sup>®</sup>plus-System
- Programming of all channel-unit parameters via PC/Laptop
  - Runs under Windows 95/98/NT/2000, Linux and Solaris
  - Programming of existing UFO<sup>®</sup>plus systems can be read out and stored on PC/Laptop
  - Stored programmes are read into identically structured new or replacement systems
  - Simultaneous control of several systems, depending on the available serial ports
  - Remote control/remote maintenance of UFO<sup>®</sup>plus systems using PC/Laptop via modem, LAN or telephone line (Modem 3Com U.S. Robotics Sportster FLASH)
  - System configuration can be printed out
  - Current satellite tables on the Kathrein homepage can be used
  - Photo-realistic presentation (minimum required resolution: 800 x 600 pixels)
  - Clear presentation of several systems (folders)
  - Automatic recognition of connected systems
  - Language-switching between German and English
  - Required software level for central controller: V 6.06 or higher
  - Scope of delivery: CD, RS 232 nil-modem cable, description



# Accessories for 19" Installation, Sample Systems, Planning Data

---



19" Universal Rack,  
Accessories for 19" Universal Rack,  
19" Assembly Carrier

Page  
32

UFO®DIGIplus Sample Configuration

33

Schematic Circuit Diagrams  
UFO®compact and UFO®plus

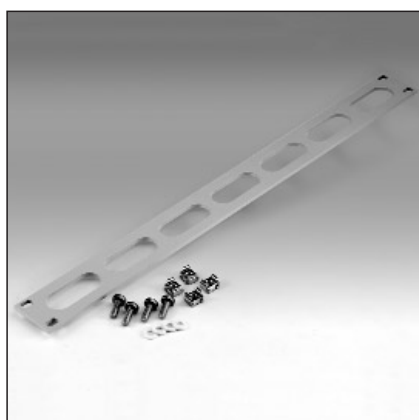
34

Sample System UFO®DIGIplus

35

Planning data

36-39



# Accessories for 19" Installation

## 19" Universal Rack

**TUG 100** 24310003

- For installation of head-ends in 19" racks
- Can be fitted with 19" base units and 19" assembly carriers from both front and rear
- Form: 41 height units (equivalent to 2 m)  
Width: 60 cm, depth: 60 cm
- Dimensions (mm):  
600 x 2000 x 600 without glass door  
600 x 2000 x 670 with glass door
- Packaging unit / weight (pcs./kg): 1/31 net

## Accessories for 19" Universal Rack

**ESO 06** 24310005

- Two side pieces and rear wall for TUG 100
- Packaging unit / weight (pcs./kg): 1/30.5 net

**ZSO 210** 24310007

- Glass door for TUG 100
- Packaging unit / weight (pcs./kg): 1/19.7 net

**ZSO 200** 24310004

- Universal rail set for TUG 100
- For installing any 19" inserts  
(not needed for base units and assembly carrier TGZ 1x)
- Packaging unit / weight (pcs./kg): 1/1.4

**ZSO 74** 276249

- Front plate (1 HE)
- For cable conduit and ventilation
- Packaging unit / weight (pcs./kg): 1/0.2

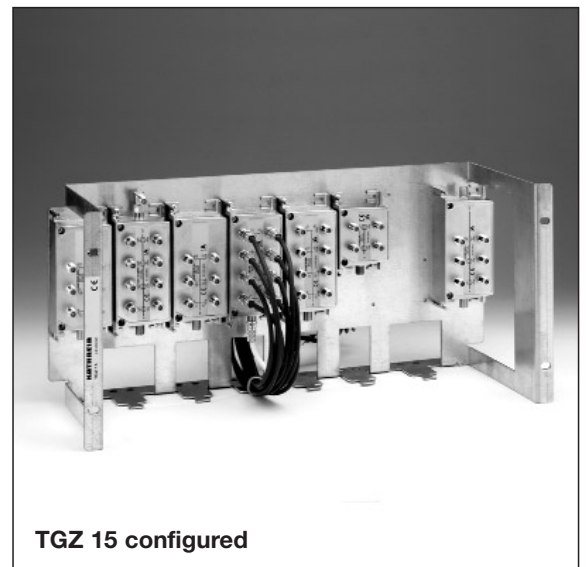
## 19" Assembly Carrier

**TGZ 10** 236430

- For installing UFO<sup>®</sup>plus components and peripheral components for head-ends in TUG 100
- For more data, see also Page 30

**TGZ 15** 24310006

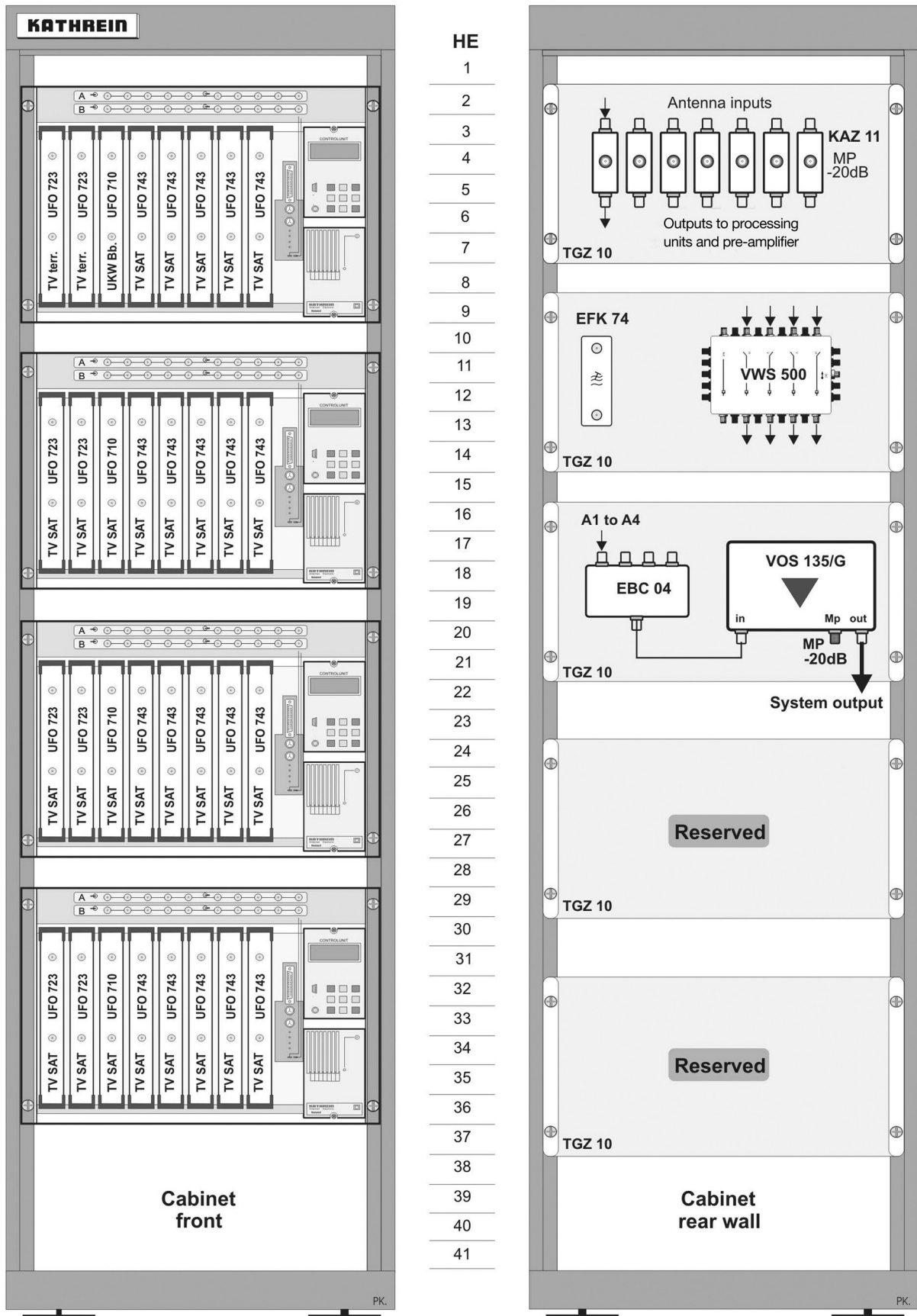
- For installing EAX 24/26/28 and EBC 06/08 as splitters and couplers (e.g. in optical transmitter and receiver sites)
- Dimensions (mm): 483 x 221 x 190 (19", 5 HE)
- Packaging unit / weight (pcs./kg): 1/2.8





# UFO® DIGIplus – Sample Configuration E 19” Universal Unit Rack

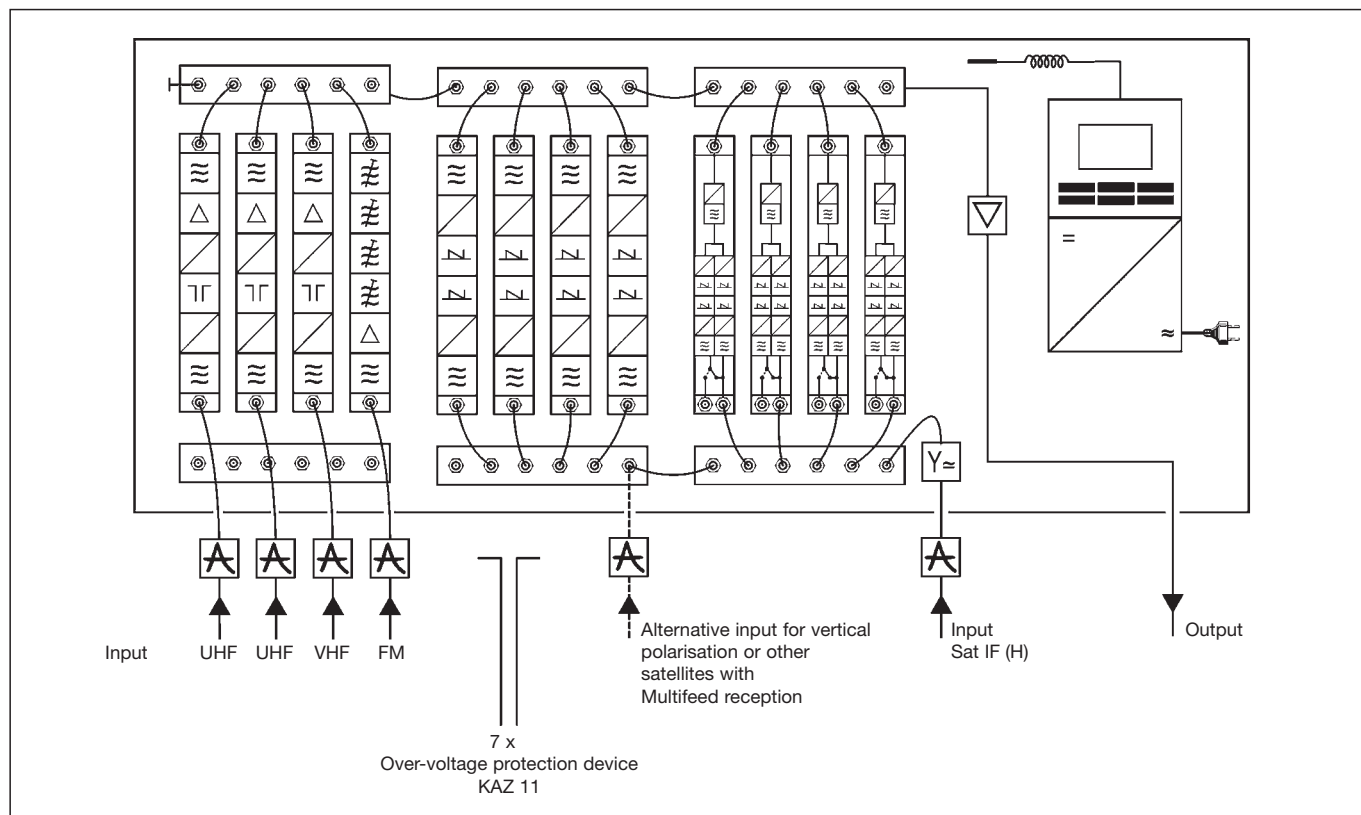
19" universal unit rack TUG 100 configured front and back.  
 With its 41 height units (HU) it can be fitted with 32 cassettes, power supplies and control unit on the front side.  
 The rear wall of the cabinet, with unit carriers TGZ 10, is fitted with all the necessary peripheral components and the amplifier VOS 135/G.  
 Assembly and overall tuning of all components, with acceptance log, can be carried out at the factory.



# Schematic Circuit Diagrammes of UFO<sup>®</sup>compact and UFO<sup>®</sup>plus

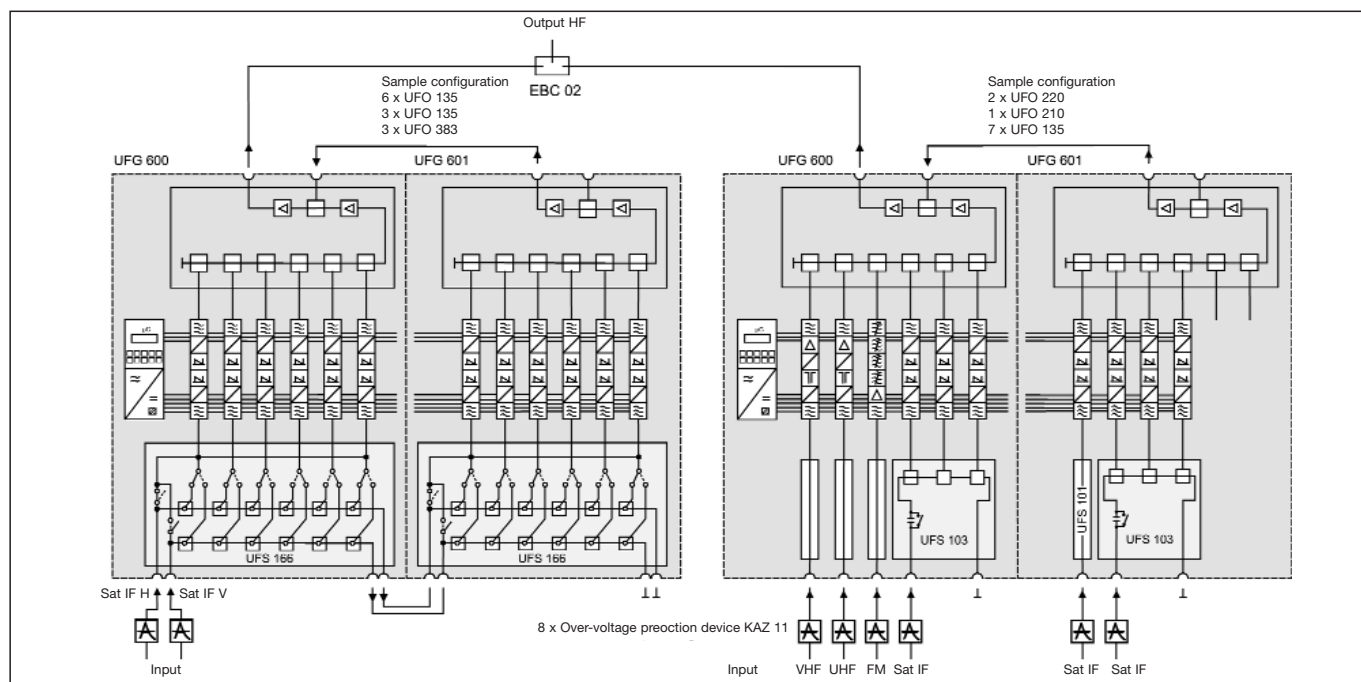
## Block Diagramme UFO<sup>®</sup>compact

- Base unit UFG 312 with 12 cassettes
- Sample configuration:
  - 2 x UFO 320
  - 1 x UFO 321
  - 1 x UFO 310
  - 4 x UFO 383/384
  - 4 x UFO 340



## Block Diagramme UFO<sup>®</sup>plus

24 UFO<sup>®</sup>plus-channel units with active coupler



# UFO®DIGIplus – Sample System Installed in 19” Racking Technology

32 channel units, for a maximum of 64 programs using twin cassettes in analogue operation.  
 The passive coupling with the downstream amplifier VOS 135/G, depending on the size of the antenna, provides maximal S/N and optimal CTB-/CSO parameters.

FM  
**ABE 01**

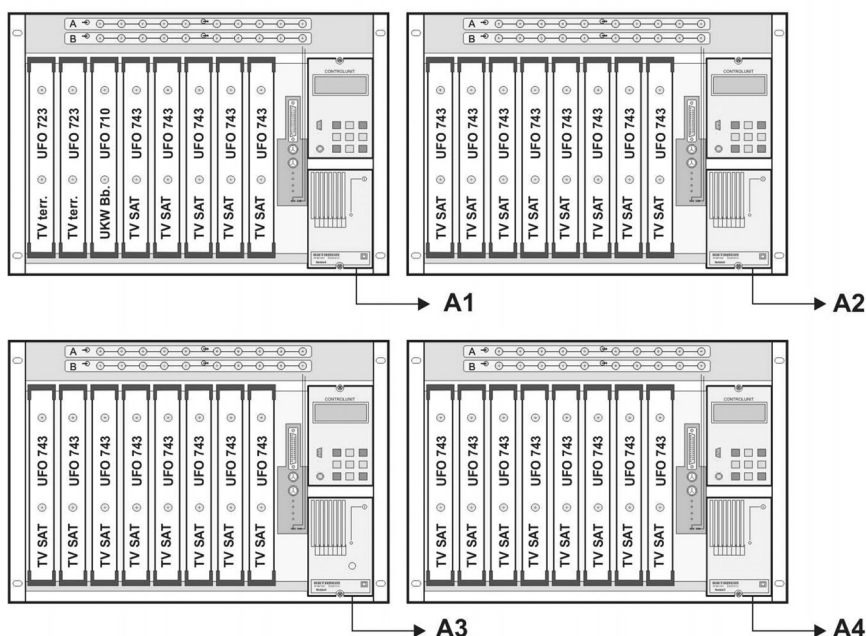
TV  
**AVK ...**

TV  
**AOS 65**



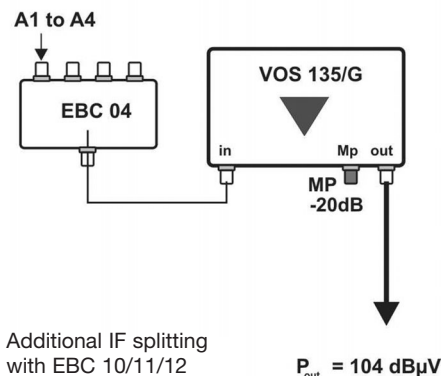
**CAS 120**  
**ZAS 120**  
**UAS 484 / EAS 484**

Antenna example with CAS 120/124,  
 C/N for ASTRA reception in Munich: 20,7 dB



7x LCD 99

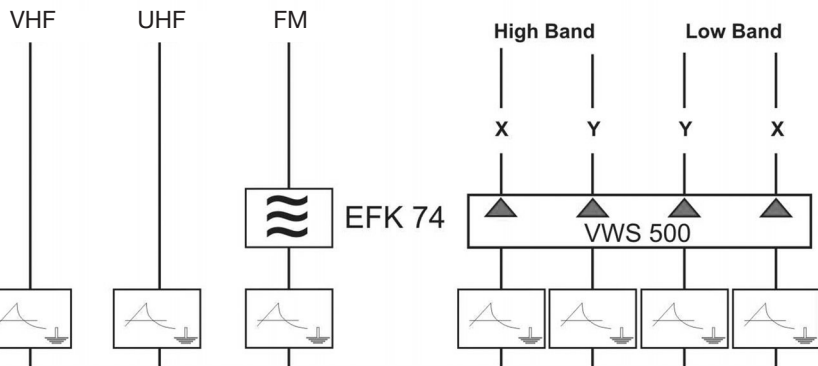
Installation of the peripheral components in the 19” carrier TGZ 10



Additional IF splitting  
 with EBC 10/11/12

VWS 500 provides LNC supply  
 and compensates cable and  
 splitting losses

KAZ 11 serves as an over-voltage  
 protection and equipotential bond.  
 With test socket -20 dB



# Planning Data for UFO<sup>®</sup>compact, UFO<sup>®</sup>DIGIplus and UFO<sup>®</sup>plus

## 1. Input Level

Input-level range of channel units:

**UFO<sup>®</sup>compact, UFO<sup>®</sup>plus:** 43-80 dB $\mu$ V  
**UFO<sup>®</sup>DIGIplus:** 35-80 dB $\mu$ V (QPSK-QAM, UFO 784/785/794/795)  
 40-80 dB $\mu$ V (QPSK-PAL, UFO 773/775)  
 65-80 dB $\mu$ V (PAL, UFO 741/743/744/745)

	Input Splitter	Coupling loss (dB)	Loop-through loss (dB)	Min. System Input Level (dB $\mu$ V)		
				QPSK-QAM	QPSK-PAL	PAL
UFO <sup>®</sup> compact	1-4 Chan/Pol.	13	4	56		
	5-8 Chan/Pol.	17	8	60		
	9-12 Chan/Pol.	21	12	64		
UFO <sup>®</sup> DIGIplus	1-9 Chan/Pol.	16	-	QPSK-QAM	QPSK-PAL	PAL
				51	56	81
UFO <sup>®</sup> plus	UFS 101	0.3	-	43		
	UFS 103	13	11	56		
	UFS 166	17.5	7	60.5		
	UFS 166 & 103	20	18	63		
	2 x UFS 166	24.5	14	67.5		

## 2. C/N at output UAS 484 / EAS 484\*) for ASTRA-/EUTELSAT reception

The values specified are typical values, and apply to a transponder bandwidth of 27 MHz/16-MHz deviation (Modulation gain: 32 dB), e.g. for ASTRA and EUTELSAT/HOTBIRD.

An EIRP value of 52 dBW is assumed for all calculations, in the case of EUTELSAT/HOTBIRD, this value may be up to 3 dB lower.

- Minimum required C/N: 15 dB for analogue signal processing (plus system reserve) 12 dB for digital signal processing

Parabolic ant. Feed System	Band	G/T dB/K	C/N Hamburg	C/N Düsseldorf	C/N Kassel	C/N Dresden	C/N Munich
CAS 09/90 – UAS 484	Low-Band	17.8	17.3	17.5	17.5	17.5	17.7
	High-Band	18.7					
CAS 120/124 – UAS 484	Low-Band	20.9	20.3	20.5	20.5	20.5	20.7
	High-Band	21.9					
CAS 120/124 – EAS 484	Low-Band	20.6	20.0	20.3	20.3	20.3	20.5
	High-Band	21.6					
CAS 180 – EAS 484	Low-Band	23.8	23.3	23.5	23.5	23.5	23.7
	High-Band	24.8					

\*) For antenna sizes > 1.2 m, the professional quatro feed system EAS 484 must be used because of the danger of overdrive (intermodulation products would otherwise impair the C/N)

# Planning Data for UFO<sup>®</sup>compact, UFO<sup>®</sup>DIGIplus and UFO<sup>®</sup>plus

## 3. S/N on output of the satellite processing

● The specified values apply to the analogue satellite-TV channel units, and are typical values.

C/N-Input (dB)	S/N Output UFO 340 (dB)				S/N Output UFO 741/3/4/5 (dB)	S/N Output UFO 135/175 (dB) B IVHF, UHF
	1*) Cassette	4*) Cassettes	12*) Cassettes	24*) Cassettes		
17	48.4	48.1	47.8	47.4	48.4	48.0/48.4
18	49.2	48.9	48.6	48.1	49.2	48.8/49.2
19	50.0	49.7	49.3	48.7	50.0	49.5/50.0
20	50.8	50.4	49.9	49.2	50.8	50.2/50.8
21	51.5	51.1	50.5	49.7	51.5	50.9/51.5
22	52.2	51.7	51.0	50.2	52.2	51.5/52.2
23	52.9	52.3	51.5	50.6	52.9	52.0/52.9
24	53.5	52.8	51.9	50.9	53.5	52.5/53.5
25	54.0	53.2	52.3	51.2	54	52.9/54.0

\*) Number of UFO 340 cassettes per system

- For DVB transmodulators QPSK-QAM:  
The output-side MER value is typically 37 dB (MER = Modulation Error Rate)  
(UFO<sup>®</sup>compact, UFO<sup>®</sup>DIGIplus and UFO<sup>®</sup>plus)
- For DVB transcoder QPSK-PAL:  
The output-side S/N nominal value is typically 59 dB (UFO<sup>®</sup>compact, UFO<sup>®</sup>plus)  
and typically 55 dB for UFO<sup>®</sup>DIGIplus

## 4. S/N on output of the TV converter

Input Level (dBμV)	S/N Output UFO <sup>®</sup> compact (dB)		S/N Output UFO <sup>®</sup> DIGIplus (dB)	S/N Output UFO <sup>®</sup> plus (dB)		
	UFO 320	UFO 321	UFO 721/3/4/5	UFO 220	UFO 221/2	UFO 230
55	43	47	–	41	47	43
60	46	51	–	44	51	46
65	48	54	–	46	54	48
70	50	55	–	48	55	50
75	51	55	53	49	55	51
80	52	55	53	50	55	52
85	52	55	53	50	55	52

The values listed are typical for the least favourable combination of input and output channel.

# Planning Data UFO<sup>®</sup>compact, UFO<sup>®</sup>DIGIplus and UFO<sup>®</sup>plus

## 5. Output Coupling

### 5.1 Standard installation with base unit and built-in output amplifier

#### 5.1.1 UFO<sup>®</sup>compact basic units UFG 312 (see block diagramme on Page 34)

	Output Level (dBμV)	C/N (dB)	S/N (dB)	IMod 2 (dB)	IMod 3*) (dB)
12 Cassettes	98	57.5	59	60	60

\*) For modulation with 24 channels

#### 5.1.2 UFO<sup>®</sup>DIGIplus-Basic Unit UFG 712

	Output Level (dBμV)	C/N (dB)	S/N (dB)	IMod 2 (dB)	IMod 3*) (dB)
12 Cassettes	106	68.5	70	60	60

\*) For modulation with 24 channels

#### 5.1.3 UFO<sup>®</sup>plus with active coupler UFS 206 (see block diagramme on Page 34)

- To optimise intermodulation or signal and noise ratios, Kathrein recommend that you cascade no more than two UFS 206
- Further coupling couplers external with EBC 02

	Output Level (dBμV)	C/N (dB)	S/N (dB)	IMod 2 (dB)	IMod 3*) (dB)
12 Cassettes	102 (only VHF)	65	66.5	Typ. 60	≥ 65
	100 (only VHF)	63	64.5		
	98 (VHF/UHF)	60	61.5		

\*) For modulation with 12 channels

### 5.2 Passive coupling and external amplifier VOS 135/G

- Standard coupling for UFO<sup>®</sup>compact and UFO<sup>®</sup>DIGIplus base units (UFG 311/19" and UFG 708/19") for installation in 19" cabinets (see also sample system UFO<sup>®</sup>DIGIplus, Page 35; the sample system applies in principle to UFO<sup>®</sup>compact and UFO<sup>®</sup>plus also)
- For UFO<sup>®</sup>plus with passive coupler UFS 216

#### 5.2.1 Max. possible head-end output level on output of the VOS 135/G

Coupling with	UFO <sup>®</sup> compact UFG 311/19"		UFO <sup>®</sup> DIGIplus UFG 708/19"		UFO <sup>®</sup> plus UFG 6xx with UFS 216	
	Number of Cassettes	Max. Poss. Output Level (dBμV)	Number of Cassettes	Max. Poss. Output Level (dBμV)	Number of Cassettes	Max. Poss. Output Level (dBμV)
EBC 02	2 x 12	101	2 x 8	107	2 x 12	106
EBC 03	3 x 12	99	3 x 8	105	3 x 12	104
EBC 04	4 x 12	98	4 x 8	104	4 x 12	103
EBC 08	-	-	-	-	8 x 12	99

# Planning Data for UFO<sup>®</sup>compact, UFO<sup>®</sup>DIGIplus, UFO<sup>®</sup>plus

## 5.2.2 System data VOS 135/G

- Signal-noise ratio and interference ratios depend on the possible output levels
- If interference range is predefined (CTB/CSO), select the appropriate output level
- Interpolate intermediate values for other output levels

Output Level (dBμV)	Signal-Noise Ratio		Interface Ratio*)	
	C/N (dB)	S/N (dB)	CTB (dB)	CSO (dB)
106	66	67.5	68	67
104	64	65.5	72	69
102	62	63.5	76	71
100	60	61.5	80	73
98	58	59.5	84	75

\*) Acc. to DIN EN 50083-3, CENELEC channel plan 862 MHz

C/N = Output level - Amplification - Noise factor - 2 dBμV (RF noise ratio)

S/N = C/N + 1.5 dB (Video-noise ratio, weighted)

## 6. Head-end System Data – Global View

### Assumptions:

- ASTRA reception in Munich with CAS 120 and UAS 484
- UFO<sup>®</sup>compact 19" system with 2 x 12 cassettes and external VOS 135/G
- Output level selected: 100 dBμV

The individual signal-noise ratio and interference ratio values are highlighted in grey in the tables from which they are taken.

	Output Level (dBμV)	C/N (dB)	S/N*) (dB)	CTBA (dB)	CSOA (dB)
Output UAS 484		20.7	-	-	-
Output UFG 311/19"	72		49.7	-	-
Output VOS 135/G	100	60	61.5	80	73
Total	100		49.4	80	73

\*) The total S/N is calculated by adding the two S/N values (power addition)

# Head office, Service centre in Germany, Technical customer service

---

## Head office

**83004 Rosenheim**  
Germany

KATHREIN-Werke KG

Anto-Kathrein-Straße 1-3

Phone: +49 (0) 80 31 18 4-0

Fax: +49 (0) 80 31 18 4-3 06

## Service centre in Germany

### Factory Service Company

**83224 Grassau**  
Germany

ESC Elektronik Service  
Chiemgau GmbH

Bahnhofstr. 108

Phone: +49 (0) 86 41 95 45-0

Fax: +49 (0) 86 41 95 45-35

E-Mail: [service@esc-kathrein.de](mailto:service@esc-kathrein.de)

Internet: <http://www.esc-kathrein.de>

## Technical customer service

**83004 Rosenheim**

KATHREIN-Werke KG

Phone: +49 (0) 80 31 18 4-0

Fax: +49 (0) 80 31 18 4-3 06

E-Mail:

[technische-kundenberatung@kathrein.de](mailto:technische-kundenberatung@kathrein.de)

## Your contact

Internet: <http://www.kathrein.de>

KATHREIN-Werke KG · Telefon (0 80 31) 184-0 · Telefax (0 80 31) 184-306  
Anton-Kathrein-Straße 1-3 · Postfach 100 444 · D-83004 Rosenheim

**KATHREIN**  
Antennen · Electronic