

Product News 2017

Innovative System Solutions



SAT

KATHREIN

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Who we are and what we stand for

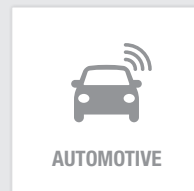
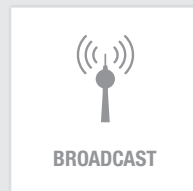
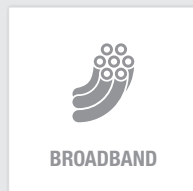
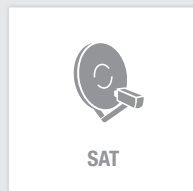
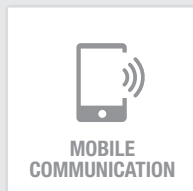
Kathrein is a leading international specialist for reliable, high-quality communication technologies.

We are an innovation and technology leader in today's connected world. Our ability to provide solutions and systems enables people all over the world to communicate, access information and use media, whether at home, at the office or on the road.

We cover a broad spectrum: from mobile communication and RFID solutions, to satellite reception, broadband and broadcast technology, to transmission and reception systems in vehicles.

As a hidden champion and family-owned enterprise, we have been working on the technologies of tomorrow since 1919. We take pride in our dedicated employees and our passion for customers and quality.

Our Solutions



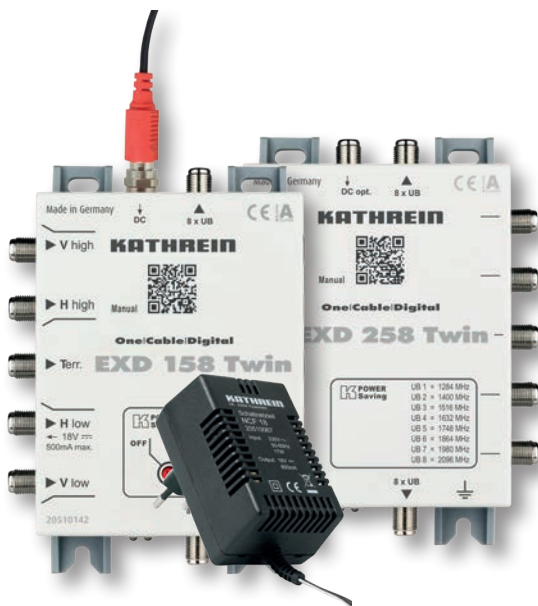
Find out more about us at www.kathrein.com

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Single-cable system

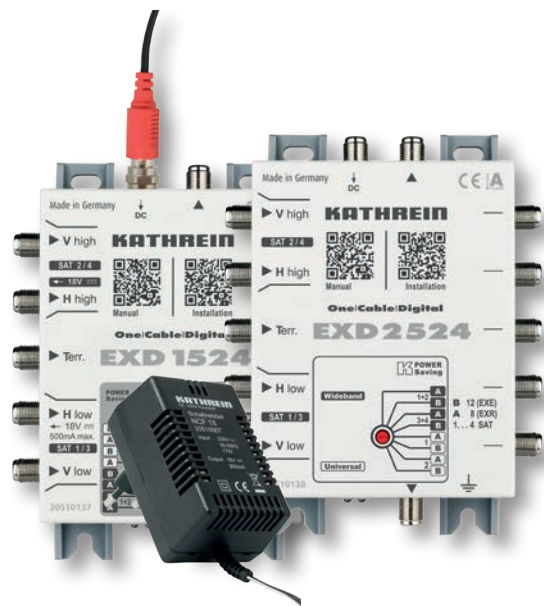
- **Digital single-cable multi-switches**
EXD 158 Twin, EXD 258 Twin, EXD 1524,
EXD 2524, EXD 1532, EXD 2532

Digital channel stacking switches
with full-band capture technology



EXD 158 Twin/EXD 258 Twin

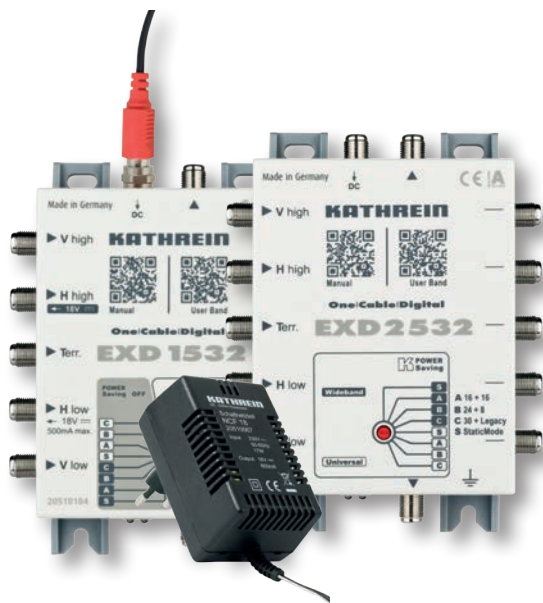
- Cascadable twin multi-switches (2 x 8 user band frequencies)
- User band frequencies compatible with previous Kathrein models
- EN 50494 single-cable command set and the new, extended EN 50607 (SCD 2) command set are supported
- EXD 158 Twin: Single-cable multi-switch for up to 2 x 8 user bands and external power supply unit for LNB supply
- EXD 258 Twin: Loop-through multi-switch for system extension by two single-cable connections with eight user bands each



EXD 1524/EXD 2524

- Cascadable twin multi-switches: For both outputs, various configurations/numbers of user bands can be selected using the rotary switch (max. 2 x 12 user band frequencies)
- User band frequencies are compatible with previous Kathrein models
- Multifeed by means of easy connection of the outputs with the EBC 110 splitter
- EXD 1524: Configurable single-cable multi-switch for up to 24 (2 x 12) user bands and external power supply unit for LNB supply
- EXD 2524: Configurable loop-through multi-switch for system extension for up to 24 (2 x 12) user bands





EXD 1532/EXD 2532

- Second-generation single-cable multi-switches – digital channel stacking switches (dCSS) with cutting-edge full-band capture technology
- Cascadable twin multi-switches. For both outputs, various configurations/numbers of user bands can be selected using the rotary switch (max. 2 x 16 user band frequencies)
- 32 user bands on two outputs for maximal operational reliability and lean distribution
- EXD 1532: Configurable single-cable multi-switch for up to 32 user bands, static mode and external power supply unit for LNB supply
- EXD 2532: Configurable loop-through multi-switch for system extension by two single-cable connections for up to 32 user bands or static mode

➤ App for configuring the EXD 1532/ EXD 2532 single-cable multi-switches “Kathrein Userband Editor” for Windows

Configuration of the EXD 1532 and EXD 2532 single-cable multi-switches. Enables you to edit the configuration of the static mode of your EXD 1532 or EXD 2532 multi-switch quickly and intuitively. In static mode, up to 32 transponders are available for TV and recordings at the same time for an unlimited number of subscribers. Together with the SWP 50 programming device, the “Kathrein Userband Editor” is your professional tool. The “Kathrein Userband Editor” is available free of charge for Windows.



Features

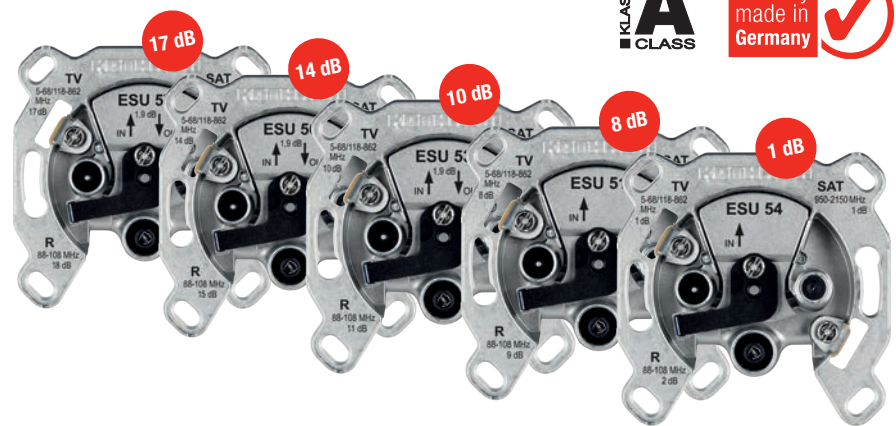
- Easy configuration of the user bands with pre-selected presets
- Configuration via USB cable or conveniently via WLAN
- The user interface is available in German and English

Easy and safe

> Programmable single-cable outlets ESU 51, ESU 53, ESU 54, ESU 56, ESU 57

The programmable single-cable outlets of the ESU 50 series ensure interference-free reception in single-cable satellite reception systems. By means of these single-cable outlets it is possible to program the user bands. The single-cable outlets contain a micro-controller that monitors the signalling inside single-cable systems.

Graduated connection attenuations:



A comprehensive system solution for a wide range of distribution network structures with graduated connection attenuations for perfect signal quality at the respective subscriber connection.

Features (all programmable single-cable outlets)

NEW: Return path compatible for systems with cable connection (CATV modem) or in IP-over-coax systems, e.g. with KLAN modem (EXI 01)

NEW: Monitoring of DiSEqC™ signalling by micro-controller

NEW: Future-proof, as additional functions can be learned using the SWP 50 programming device

NEW: Configurable functions using the SWP 50 programming device:

- Disable individual user bands
- Operation in legacy mode (no switch-off at 18 V constant signal for standard multi-switch system)
- Operation in disconnect mode (fixed-mode single-cable systems)
- Configurable LED for displaying error messages
- Functions can be extended

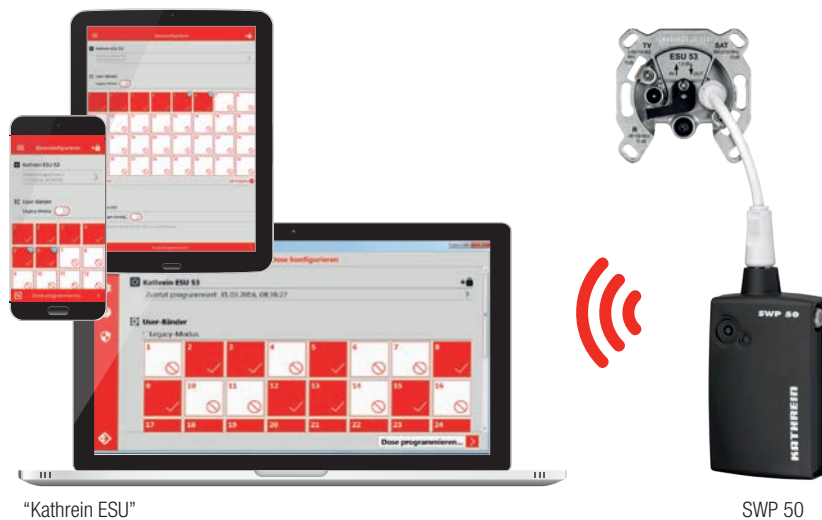
Basic functions as delivered:

- A connected receiver will be switched off if it is not equipped with the single-cable DiSEqC™ command set in compliance with EN 50494 or EN 50607 (voltage is switched off from the satellite connection to the input at +18 V after approx. 400 ms)
- Configured for single-cable systems
- All user bands (UB1 ... UB32) are enabled
- LED display switched off
- Overload protection by means of an electronic fuse and decoupling diodes
- Connections:
 - TV – IEC connector (m) (IEC 61169-2)
 - Radio – IEC connector (f) (IEC 61169-2)
 - SAT – F socket (IEC 61169-24)
- CE, class A
- Compliant with EN 60728-11 and EN 50083-2

> Programming device

SWP 50

The SWP 50 programming device enables the setting and configuration of the programmable single-cable outlets of the ESU 50 series. The programming device is used to configure the user bands in the single-cable outlets. This ensures that the subscribers in a single-cable system do not interfere with each other (installation across several apartments). The programming device can be accessed via tablet, smartphone or a PC with Windows OS.



"Kathrein ESU"

SWP 50

> App for configuring the single-cable outlets

"Kathrein ESU" for Android, iOS and Windows

Use the "Kathrein ESU" app to check and change the configuration of a programmable single-cable outlet. This app allows you to disable or enable user bands on a single-cable outlet quickly and intuitively. In addition, you can protect the configuration of an outlet against unauthorised changes using a PIN code. Together with the SWP 50 programming device, "Kathrein ESU" is your professional tool. "Kathrein ESU" is available free of charge for Android, iOS and Windows. Download the app using the QR codes on the right.



You can find "Kathrein ESU" in Google Play™, in the App Store or under www.kathrein.com, or scan the following QR codes:



Google Play™



App Store

Satellite TV over network

> Sat>IP server

EXIP 4124

The EXIP 4124 SAT>IP server “translates” satellite TV signals (DVB-S and DVB-S2) into IP-enabled signals so that they can be used on network-based end devices. Viewers can now enjoy top-quality satellite TV even on devices that do not have an integrated satellite receiver (tablets, PCs, etc.). Satellite signals can be transported over any IP infrastructure, with or without cable.

**24 independent
tuners**

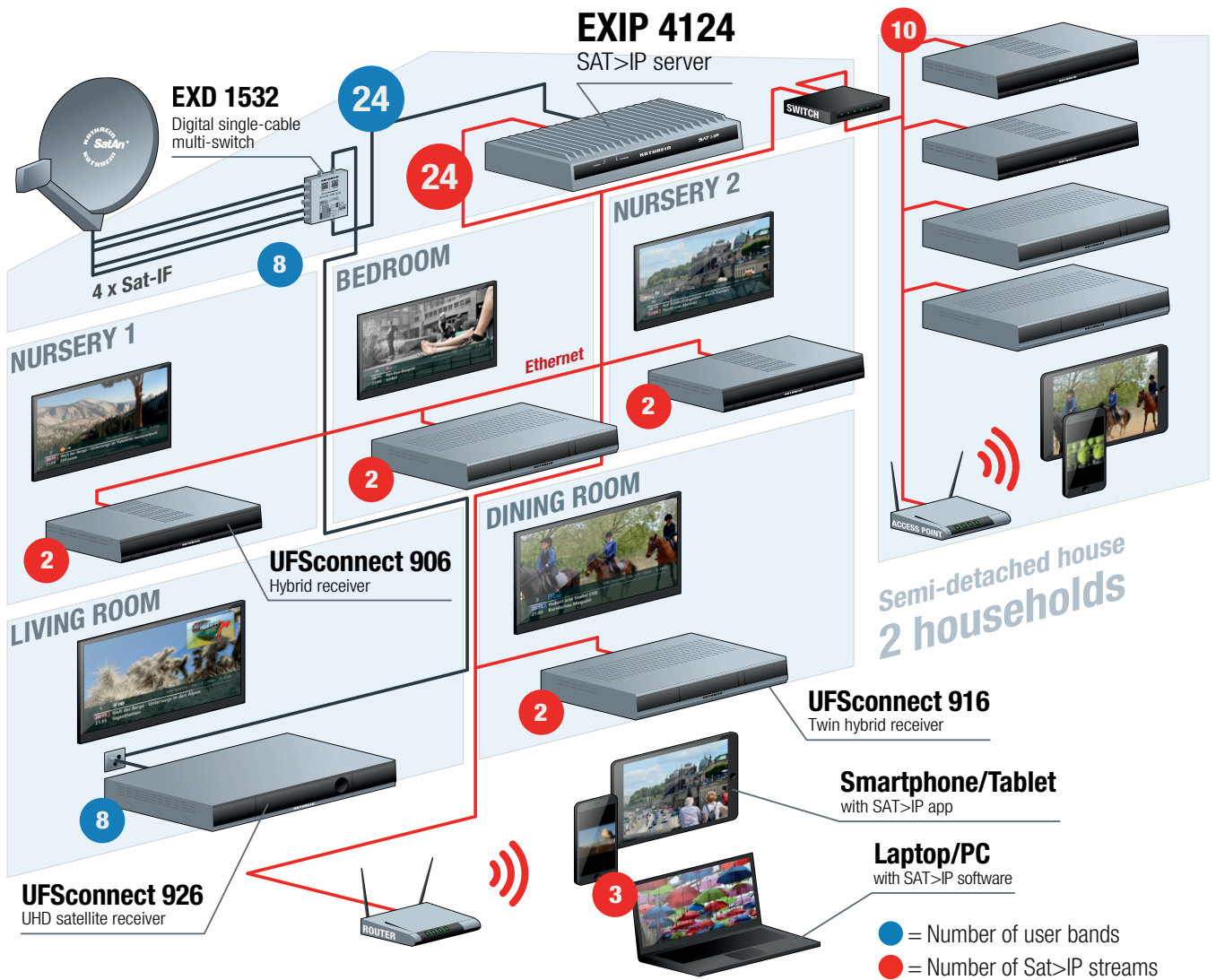
SAT > IP™



Features

- Converts 24 DVB-S(2) signals into 24 independent IP data streams (SAT>IP standard in compliance with EN 50585)
- Different types of networks (LAN, K-LAN, Powerline, WLAN integration via router, e.g. FRITZ!Box) can be used for the entire TV-signal distribution
- Two satellite inputs; one RJ 45 Ethernet connector
- Operation on wideband LNBs or single-cable multi-switches/LNBs
- Dynamic mode: By means of the 24 integrated tuners, 24 receivers can be operated independently (complete channel range provided by the satellite for 24 receivers)
- Can be configured for different clients ¹⁾: Tablet PCs, smartphones, notebooks, SAT>IP-capable receivers/TV sets (e.g. UFSconnect 916, UFSconnect 926)
- Certified by SES ASTRA

¹⁾ Provided the required software/app is installed on the device



Headend system

> UFOmini 16-way multi-DVB headends

The UFOmini 16-way headend enables the combined reception of DVB-S(2)/DVB-T(2)/DVB-C using state-of-the-art triple tuner technology and offers additionally 16 flexibly adjustable output channels in DVB-C. The headend system is delivered with a pre-programmed channel list for 16 DVB-C channels. The plug and play solution is perfectly suited for hotels, guest houses, the housing industry and medium-sized cable networks.

Features

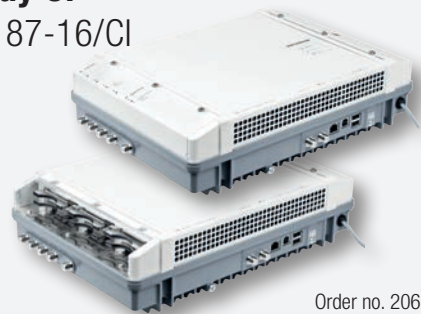
- Stand alone headend
- 8 DVB-S(2) inputs for satellite multi-switches and/or LNB operation, as well as two DVB-T(2)/C inputs flexibly distributable to 16 multi-standard frontends
- All transmission parameters can be set using the free USW 800 PC management software
- Remote service and configuration
- Extensive baseband signal processing with, e.g. channel filter functionality, NIT and LCN assistants
- No fan, therefore noise and maintenance-free
- UFO 87-16/CI has an integrated 6-way decryption unit, which enables a combined serial and individual decryption

16-way multi-DVB – DVB-C FTA UFO 87-16



Order no. 20610154

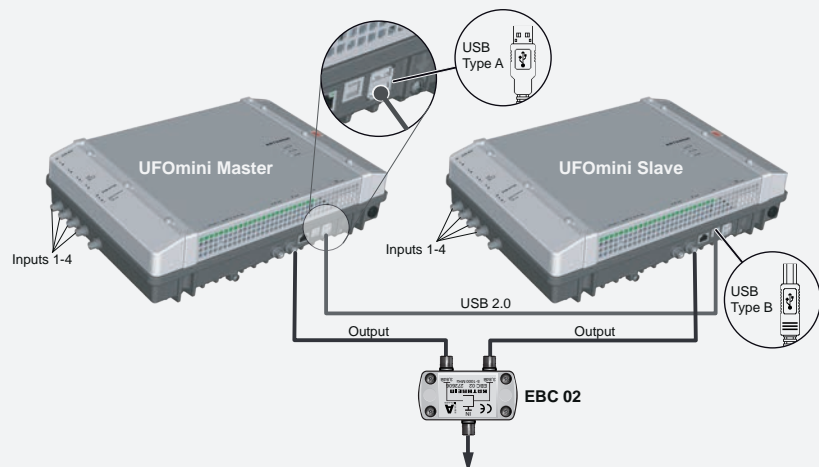
16-way multi-DVB – DVB-C with 6-way CI UFO 87-16/CI



Order no. 20610155

Interconnection

A USB cable and a splitter (EBC 02) are used to combine two 8-way headends into a 16-way headend (USB cable and splitter are included).



> UFOcompact plus® management software

USW 800

The USW 800 management software is suitable for configuring the following headend systems:

- UFOcompact plus®
- UFOmini
- UFOnano

The software can be downloaded free of charge under www.kathrein.com for Windows and Linux.

New features for UFOcompact plus®

- LCN assistant: Creation of channel lists in M3U format (for Panasonic IPTV devices)
- Backplane “port forwarding” enables free routing of transport streams (e.g. from slot 4 to slot 10)
- Filtering of PIDs in the UFO 844 IP streamer possible
- Setting options for UDP and RTP protocols in the UFO 828/858/844 IP modules



Backplane “Port forwarding”

Example: Port forwarding from slot 3 to slot 5

Measuring instruments

> Signal meter Sat/TV/FM/IPTV/ASI/TS/optical MSK 130/IA and MSK 130/OIA

The MSK 130/IA is a portable multi-standard signal meter for DVB-S/DVB-S2, DVB-C, DVB-T/DVB-T2, analogue TV, FM radio, the return path, IPTV, ASI and TS analysis. The MSK 130/OIA features an additional optical measurement input, which can also be retrofitted on the MSK 130/IA.

Analogue and digital video signals in MPEG-2 and MPEG-4 format are displayed on a high-resolution 9" TFT colour touch screen in the highest quality. Additional measuring functions for IPTV and the possibility to carry out a comprehensive transport stream analysis turn the entire MSK 130 series into real all-rounders. The integrated CI interface makes it possible to also display coded channels. Measurement results can be saved on a USB stick.



Features

- Level measurement of analogue and digital TV signals (DVB-S/S2, DVB-C, DVB-H/T/T2, TV, FM) incl. return path
- Optical measurement (MSK 130/OIA)
- TS analysis functions of all DVB input signals
- Measurement of transport stream, service and stuffing bit rates, service lists
- MPEG-2 transport stream analysis: 1st priority, 2nd priority and 3rd priority errors ¹⁾
- Analysis of PSI/SI tables: PAT, CAT, NIT and SDT ²⁾
- IPTV measurements for SPTS and MPTS transport streams
- Protocol type (UDP/RTP), VBR/CBR, packet number and length, FEC type, lost packets, lock failure, video display
- BER/MER measurement and display
- Constellation diagram display
- 9" touch TFT colour display (800 x 480 pixels), splash-proof
- Battery life at least three hours
- Spectrum display
- Satellite finder function (Sat-Expert)
- Calibration function for two LNBS (multifeed reception)
- Acoustic signal for antenna alignment
- Level display optionally in dB μ V, dBmV or dBm
- Automatic measuring range selection
- Dolby AC3
- DiSEqCTM1.2 control signal
- SCR/SCD2 single-cable system control commands
- IP test: Ping test
- Data rate measurement of the services in the DVB transport stream
- Data logger function

¹⁾ TS sync loss, sync byte error, PAT error, continuity count error, PMT error, PID error, transport error, CRC error, PCR error, PCR accuracy error, PTS error, CAT error, NIT error, SI repetition error, unreferenced PID, SDT error, EIT error, RST error, TDT error

²⁾ PSI (program specific information), SI (service information), PAT (program association table), CAT (conditional access table) NIT (network information table), SDT (service description table)

Satellite receiver

Ultra-fast channel-change times - flexible like never before!

> UHD satellite receiver
UFSconnect 926

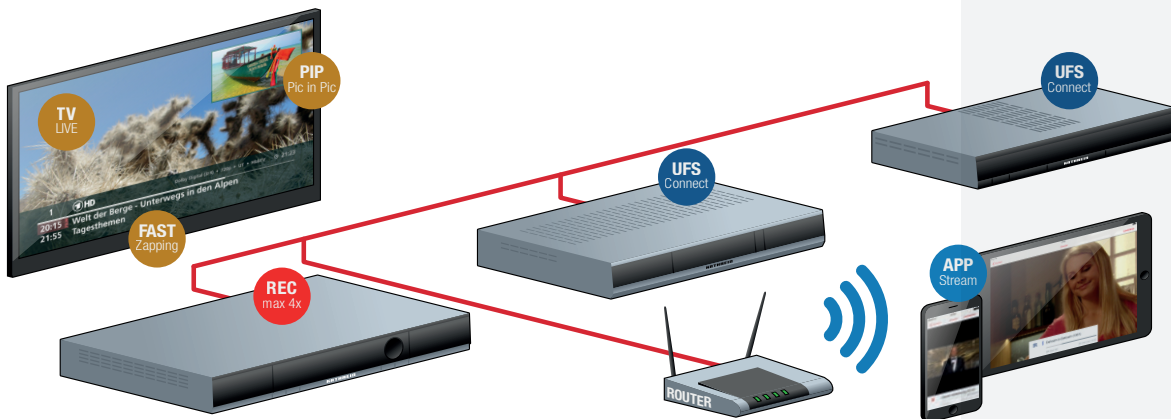
ready for **HD + sky**



- UHD** Television
- 4K** Upscaling
- 8x** Receiver
- HDMI 2.0** HDCCP 2.2
- WLAN** Integrated
- GBIT** Network
- USB 3.0** 2 Ports

Features

- 2 x UHD (4K) tuners
- Fast zapping: Ultra-fast channel-change times
- 8 demodulators (receivers) – absolute flexibility and individuality for recording and live streaming
- UFSconnect: Easy video signal splitting, auto-tuner sharing, shared archive and much more
- Sat>IP client
- For more information, see our current receiver programme



8x Receiver

FAST Zapping	TV LIVE	FAST Zapping	+	REC	REC	REC	REC	UFS Connect	4 Recordings parallel
				PIP Pic in Pic	UFS Connect	UFS Connect	APP Stream	APP Stream	1 Stream to an UFSconnect receiver
				REC	APP Stream	APP Stream	APP Stream	APP Stream	1 Picture-in-Picture function
									2+2 Streams to 2 UFSconnect receivers and 2 smartphones/tablets
									1 Recording
									4 Streams to 4 smartphones/tablets

Subject to technical changes.

DVB-T/DVB-T2

> DVB-T2 HD receiver

UFT 930sw

With the UFT 930, TV channels can be received in HD via digital terrestrial transmission. The integrated IRDETO encryption system makes it possible to receive both free (public-service) and private channels in HD quality. The receiver is also able to use additional content via the Internet (HbbTV).

Features

- Receives free and encrypted DVB-T2 channels in HD
- Highly efficient signal processing thanks to HEVC video processor
- HbbTV (additional information and services from the Internet)
- Remote feeding of an active DVB-T2 antenna (e.g. BZD 30, 32, 40) via RF input possible
- For more information, see our current receiver programme

Our solutions for
receiving DVB-T2 HD

freenet TV



> DVB-T/DVB-T2 indoor antenna, active

BZD 32

Active VHF/UHF antenna for receiving digital terrestrial TV channels and radio stations (DVB-T/DVB-T2).

Features

- DVB-T/DVB-T2 indoor antenna for horizontal and vertical polarisation
- Active antenna with integrated amplifier
- Attractive, space-saving design
- High figure of merit
- No specific alignment required, as it has almost omni-directional characteristics (vertical)
- Remote feeding (5 V/30 mA) via the USB remote feeding cable, e.g. from the TV set
- Connection: IEC connector (f)
- Integrated trapping filter against GSM and LTE interference
- Accessories supplied: Support foot for easy mounting, wall support with fastenings and USB remote feeding cable

Quality
made in
Germany



With USB
remote
feeding
cable

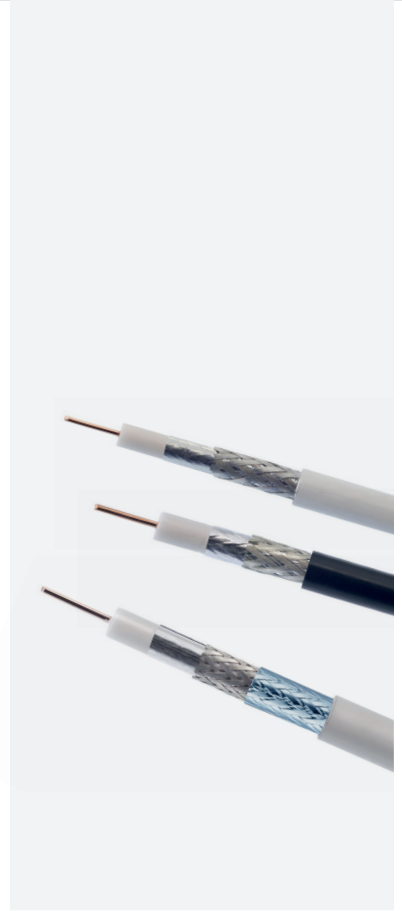
Fire safety regulations

> Fire safety for coaxial cables

In compliance with Regulation (EU) No. 305/2011

Regulation (EU) No. 305/2011 will become effective on 1 July 2017. Cables that are intended to be used as construction products and are placed or made available on the market are subject to the Construction Products Regulations (German: BauPVO) in compliance with EN 50575.

The CE Declarations of Conformity as well as the Declarations of Performance for all our coax cables can be downloaded at www.kathrein.com from 1 July 2017. We guarantee that as of 1 July 2017, all packagings, cable drums, cable reels, cable bundles and cables will be labelled and fitted with the CE declarations and fire classifications.



Fire classes for Kathrein cable types (certified in compliance with EN 50575)

Type	Description	Data	Fire classes EN 50575
LCD 89	For domestic installation; lead and silicone-free; screening class A	Inner conductor 0.75 mm Cu; outer sheath 5.0 mm; white	E _{ca}
LCD 90	For domestic installation; lead and silicone-free; screening class A	Inner conductor 1.0 mm Cu; outer sheath 6.9 mm; white	E _{ca}
LCD 95A+	Lead and silicone-free; screening class A+; approved by Vodafone/KDG	Inner conductor 1.13 mm Cu; outer sheath 6.8 mm; white	E _{ca}
LCD 111A+	Lead and silicone-free; screening class A+; approved by Vodafone/KDG	Inner conductor 1.13 mm Cu; outer sheath 6.9 mm; white	E _{ca}
LCD 115A+	Halogen-free; UV-resistant; screening class A+; approved by Vodafone/KDG	Inner conductor 1.13 mm Cu; outer sheath 6.9 mm; black	C _{ca s1d1}
LCM 14	Lead and silicone-free; screening class A; suitable for outdoor use	Inner conductor 1.63 mm Cu; outer sheath 10.4 mm; black	D _{ca s2d1}
LCM 17	Lead and silicone-free; screening class A; can be laid underground	Inner conductor 1.63 mm Cu; outer sheath 10.4 mm; black	F _{ca}
LCM 17A+	Lead and silicone-free; screening class A+; can be laid underground	Inner conductor 1.63 mm Cu; outer sheath 10.4 mm; black	F _{ca}
LCM 33	Can be laid underground; screening class A+	Inner conductor 3.3 mm Cu; outer sheath 17.0 mm; black	Underground cable not required
LCM 50	Can be laid underground; screening class A+	Inner conductor 2.2 mm Cu; outer sheath 12.5 mm; black	Underground cable not required

Technical data

> Single-cable system

Type	EXD 158 Twin	EXD 258 Twin
Order no.	20510142	20510143
Subscriber connections	2 x 8	
Inputs	1 x terrestrial/4 x Sat IF	
Frequency range [MHz]	5-862/950-2150	
Connection attenuation (terrestrial) [dB]	11/-	
Through loss [dB]	-/-	3/1.5
Sat (AGC) output level [dBμV]	94	
Horiz./vert. decoupling [dB]	-/30	
Trunk decoupling [dB]	-/-	-/40
Sat input level [dBμV]	60-90	
Subscriber frequency/user band [MHz]	-	
Subscriber frequency/user band address receivers 1/2/3/4/5/6/7/8 [MHz]	1284/1 1400/2 1516/3 1632/4 1748/5 1864/6 1980/7 2096/8	
Permissible supply voltage at the subscriber output [V]	12-14	
Max. current consumption via the subscriber connection [mA]	20	With PSU: 20, without PSU: 450
Nominal input voltage [V]	230 (47-63 Hz)	-
Permissible input voltage range [V]	207-253	-
Nominal input power at 0/150/500 mA load [W] ¹⁾	5.4/8.7/15.5	-
Secondary voltage ("horiz. low" input) [V]	18	-
Max. permissible remote feed current ("horiz. low" input) [mA]	500	-
Max. permissible remote feed current per trunk [mA]	-	1000
Protection class/protection type	II (double insulated)/IP 30	-/IP 30
Permissible ambient temperature [°C]	-20 to +55	
Connections	F connectors	
Dimensions [mm]	102.8 x 148 x 44	111.5 x 148 x 44
Packaging unit/weight [pc./kg]	1 (10)/0.51	1 (10)/0.4

¹⁾ All subscriber frequencies/user bands in operation

EXD 1524	EXD 2524	EXD 1532	EXD 2532
20510137	20510138	20510104	20510105
Up to 2 x 8 or 2 x 12		Up to 32	
1 x terrestrial/4 x Sat IF			
5-862/300-2350			
11/-			
-/-	3/1.5	-/-	3/1.5
94			
-/30			
-/-	-/40	-/-	-/40
60-90			
Frequency assignment of the various UBs in modes A, B and C, see user instructions		Frequency assignment of the various UBs in modes A, B and C, see user instructions	
-			
12-14			
20	With PSU: 20, without PSU: 450	20	With PSU: 20, without PSU: 450
230 (47-63 Hz)	-	230 (47-63 Hz)	-
207-253	-	207-253	-
5.4/8.7/15.5	-	5.4/8.7/15.5	-
18	-	18	-
500 (2 x 250 for wideband)	-	500 (2 x 250 for wideband)	-
-	1000	-	1000
II (double insulated)/IP 30	-/IP 30	II (double insulated)/IP 30	-/IP 30
20 to +55			
F connectors			
102.8 x 148 x 44	111.5 x 148 x 44	102.8 x 148 x 44	111.5 x 148 x 44
1 (10)/0.51	1 (10)/0.4	1 (10)/0.51	1 (10)/0.4

Type	ESU 54	ESU 51	ESU 53	ESU 56	ESU 57
Order no.	21110027	21110061	21110026	21110028	21110029
Through loss [dB]					
5-10 MHz	-	-	1.5	1.5	1.5
10-862 MHz	-	-	1.1	1.1	1.1
862-2150 MHz	-	-	1.9	1.9	1.9
Connection attenuation [dB]					
TV 5-68/118-862 MHz	1	8	10	14	17
SAT 950-2150 MHz	1	8	10	14	17
R 87.5-108 MHz	2	9	11	15	18
Decoupling (between two subscribers) [dB]					
5-862 MHz	-	-		≥ 42	
950-2150 MHz	-	-		≥ 32	

Type	SWP 50			
Order no.	21110025			
Measured variable	Measurement condition	Min. value	Typ. value	Max. value
USB input voltage [V]	V_{INUSB} at micro USB port	4.75	5.0	5.25
F socket input voltage [V]	V_{INF} at F socket	14.0		20.0
USB charging current [mA]	$V_{\text{INUSB}} = 5.0 \text{ V}$			450
F socket charging current [mA]	$V_{\text{INF}} = 14.0 \text{ V}$			300
F socket charging current [mA]	$V_{\text{INF}} = 18.0 \text{ V}$			250
F socket output voltage [V]		0	7/14/18	19
F socket output current [mA]				280
Rechargeable battery input voltage [V]		3.5		4.1
Rechargeable battery output voltage [V]		3.5		4.1
Charging time [h]	$V_{\text{INUSB}} = 5.0 \text{ V}, I_{\text{chargUSB}} = 450 \text{ mA}$		2	3
WLAN standard	IEEE	802.11b/g/n		
Encryption		Open security, WPA, WPA2		
WLAN SSID		SWP 50		

> Sat>IP server

Type	EXIP 4124
Order no.	20510136
Input	2 x Sat
Subscriber connections	1 x 24
Frequency range [MHz]	250-2300
Input level range [dB μ V]	42-87
Impedance [Ω]	75
Permissible remote feed voltage at input [V]	12-20
Max. permissible remote feed current [mA]	2 x 1000
Output voltage horizontal [V]	> 17.5 (at 400 mA)/< 19 (at 0 mA)
Output voltage vertical [V]	> 12.5 (at 400 mA)/< 14 (at 0 mA)
Power consumption of server [W]	Typ. 12/min. 6
Permissible ambient temperature [°C]	0 to +40
Connections	F connectors, RJ 45, USB, DC socket 5.5 x 2.5 mm
Dimensions (W x H x D) [mm]	222 x 138 x 43
Packing unit/weight [pc./kg]	1 (4)/ca. 0.72
Power supply unit	
Nominal input voltage [V]	100-240 (50-60 Hz)
Secondary voltage [V]	12
Max. output current [A]	4
In compliance with	EN 60950-1: 2006 + A11: 2009 + A1: 2010 + A12: 2011 + A2: 2013

> UFOmini 16-way multi-DVB headends

Type	UFO 87-16	UFO 87-16/CI
Order no.	20610154	20610155
Inputs		
Sat-IF input [Ω]	8 x F connector, 75	
Terrestrial/cable input [Ω]	2 x F connector, 75	
Decoupling [dB]	> 25	
Return loss [dB]	Typ. 10	
DiSEqC™1.0	Vert./Horiz., Low/High; Sat. pos. (A/B/C/D)	
Switch-over polarisations [V/kHz]	14/18, 0/22	
Remote feed current for LNB [mA]	Max. 250 (on F socket No. 3), max. 60 (on F socket No. 1, 2, 4)	
Remote feed current for active antenna (5V) [mA]	100 (on F socket No. 5)	
Frontend		
DVB-S/S2/T/T2/C	16 x	
Frequency steps [MHz]	1	
Input level range [dB μ V]	60 ... 100	
Permissible level difference [dB]	20	
Demodulation DVB-S		
Standard	EN 300 421	
Frequency range [MHz]	950 ... 2150	
Input symbol rate QPSK [MS/s]	1 ... 45	
Code rate (Viterbi)	1/2, 2/3, 3/4, 5/6, 7/8	
Roll off [%]	35	
AFC adjustment range [MHz]	\pm 5	
Demodulation DVB-S2		
Standard	EN 302 307, TR 102-376	
Input symbol rate QPSK [MS/s]	1 ... 45	
Code rate (LDPC)	1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10	
Input symbol rate 8PSK [MS/s]	1 ... 45	
Code rate (LDPC)	3/5, 2/3, 3/4, 5/6, 8/9, 9/10	
Roll off [%]	20/25/35	

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Type	UFO 87-16	UFO 87-16/CI
Demodulation DVB-T (COFDM)		
Standard	EN 300744, NorDig Unified 2.2.1, D-Book 7.0, supports all C.R, G.I, LP and HP streams	
Frequency range [MHz]	42-870	
Guard interval	1/4, 1/8, 1/16, 1/32	
FEC	1/2, 2/3, 3/4, 5/6, 7/8	
FFT mode	2k, 8k	
Bandwidth [MHz]	6, 7, 8	
Constellation	QPSK, 16 QAM, 64 QAM	
Demodulation DVB-T2 (COFDM)		
Standard	EN 302755-V1.31, DVB-T2 Lite compliant, single and multiple PLP support, NorDig Unified 2.2.1, D-Book 7.0	
Guard interval	1/128, 1/32, 1/16, 19/256, 1/8, 19/128, 1/4	
FEC	1/2, 3/5, 2/3, 3/4, 4/5, 5/6	
FFT mode	1k, 2k, 4k, 8k, 16k, 32k	
Bandwidth [MHz]	1.7/5/6/7/8	
Constellation	QPSK, 16 QAM, 64 QAM, 256 QAM	
Demodulation DVB-C		
Standard	EN 300 429/ITU J.83 Annex A/C	
Frequency range [MHz]	42-1002	
Input symbol rate [MS/s]	1-7.2	
Constellation	4/16/32/64/128/256 QAM	
MPEG-TS processor		
Channel filter		
PSI/SI processing	Cable NIT, LCN, PCR correction, CAT	
LCN data	NorDig Descriptor V1	
Stuffing	Automatic	
Decoding		
6 CAM insert positions	-	PCMCIA interface
TS routing CAM	-	Individual and serial decryption

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Type	UFO 87-16	UFO 87-16/CI
Modulator		
Output channels	16 x DVB-C (J.83A)	
Constellation	16/32/64/128/256 QAM	
Symbol rate [MS/s]	2.25 ... 7.25	
Roll off [%]	15	
RF output		
Output [Ω]	1 x F connector, 75	
Frequency range [MHz]	47 ... 1006 (fine-tuning in 125 kHz steps)	
Frequency range (channel list) [MHz]	47 ... 86/110 ... 862 (setting via channel list)	
Return loss [dB]	14 (47 MHz) -1.5 dB/oct.	
Output level [dB μ V]	110	
Pre-emphasis [dB]	8	
Output level setting range [dB]	-20 (in 0.5 dB steps)	
Level stability [dB]	\pm 0.8	
Frequency stability [ppm]	35	
MER [dB]	Typ. 45	
Roll-off attenuation [dB]	\geq 60 (at standard level)	
Spurious emissions [dB]	\geq 60	
Test output		
Test socket [Ω]	2 x F connector, 75	
Level relative to output [dB]	25	
System data		
Power consumption per unit [W]	33 ... 37 *)	37 ... 46 *)
Temperature range [°C]	0 ... +45	
Mains voltage [V]	100-240	
Safety cut-off [°C]	> 70	
Dimensions per unit (H x W x D) [mm]	97 x 350 x 244	
Weight [kg]	Approx. 8	Approx. 9

*) The power consumption depends on the input and output configuration (data without LNB supply or remote powering for active antennas)

> Measuring instruments

Type	MSK 130/IA	MSK 130/OIA
Order no.	21710053	21710054
RF component		
Frequency range DVB-C/T/T2, DAB, TV, FM [MHz]	4-1010	
Frequency range DVB-S/S2 [MHz]	930-2250	
Frequency resolution [kHz]	Cable/TV/FM: 50, Sat: 100	
TV standards	B/G, I, D/K, M, N	
Digital satellite receiver DVB-S/S2		
Modulation process	QPSK, 8PSK, 16/32APSK	
Code rate (FEC) DVB-S	1/2, 2/3, 3/4, 5/6, 7/8	
Code rate (FEC) DVB-S2	1/2, 2/3, 3/4, 5/6, 8/9, 9/10, 2/5, 3/5	
Input symbol rate [MS/s]	1-45 (DVB-S), 2-45 (DVB-S2)	
BER	1E-6 ... 2E-2 (pre Viterbi)	
MER [dB]	25	
Digital terrestrial TV receiver DVB-T/T2/H		
Modulation method DVB-T	QPSK, 16/64 QAM	
Modulation method DVB-T2	QPSK, 16/64/256 QAM	
FFT mode DVB-T	2k, 8k	
FFT mode DVB-T2	1k, 2k, 4k, 8k, 16k, 32k	
Guard interval DVB-T	1/4, 1/8, 1/16, 1/32	
Guard interval DVB-T2	1/4, 1/8, 1/16, 1/32, 1/128, 19/128, 19/256	
Code rate (FEC) DVB-T	1/2, 2/3, 3/4, 5/6, 7/8	
Code rate (FEC) DVB-T2	1/2, 2/3, 3/4, 5/6, 7/8, 3/5, 4/5	
Channel bandwidth [MHz]	6, 7, 8	
BER	1E-6 ... 2E-2 (pre Viterbi)	
MER [dB]	40	
Digital CATV receiver DVB-C (J.83A)		
Modulation process DVB-C	16/32/64/128/256 QAM	
Input symbol rate [MS/s]	2-6.999	
BER	1E-9 ... 1E-2 (pre RS)	
MER [dB]	40	
Optical receiver		
Inputs	-	FC, CLIK! (Adapter)
Wave lengths [nm]	-	1310-1550
Input level range [dBm]	-	-40 to +10
Measurement accuracy [dBm]	-	± 0.5
RF frequency range (MHz)	-	5-2250

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Type	MSK 130/IA	MSK 130/OIA
TV system		
Colour standards	PAL, SECAM, NTSC	
Audio	FM, NICAM and AM sound, AAC/HEAAC, Dolby AC3	
Digital image decoding	MPEG-2; MPEG-4/AVC	
DVB transport stream		
Data rate	Services can be measured in Mbit/s	
Level measuring section		
Level measuring range [dB μ V]	30 ... 120	
Measurement accuracy [dB]	Typ. \pm 1	
Analogue detector	TV: Peak value, Sat/FM: Mean value	
Digital detector	Mean value	
Display		
Monitor	9" touch TFT colour display (800 x 480 pixels)	
Sat finder (acoustical)	Level-dependent beep	
Power supply		
Lithium-ion rechargeable battery	4.8 Ah, 34 Wh, 7.4 V	
Mains (power supply unit) [V]	100-240 (50/60 Hz)	
DC external [V]	12	
Remote feeding		
Remote feed voltage [V]	513/18	
Remote feed current [mA]	Max. 500	
Control signals	22 kHz, DiSEqC™1.2, SCR/SCD2 single-cable system	
Connections		
RF input (impedance) [Ω]	75 (F coaxial socket)	
TV output	HDMI, analogue video	
Headphone socket [mm]	Jack socket, 3.5	
USB port	2 x ports, USB 2.0	
LAN interface	RJ 45, 100 MBit/s	
CI interface	CAM module	
DC supply 12 V	DC plug adapter 2.5/5.5 mm	
General		
Safety standards	Protection class II (AC/DC power supply unit), VDE EN 61010	
Dimensions (W x H x D) [mm]	295 x 172 x 55	
Weight [kg]	Approx. 2.2	

> Satellite receivers

Type	UFSconnect 926 si/ 1000 GB/CI+	UFSconnect 926 sw/ 1000 GB/CI+	UFSconnect 926si/ 500 GB/CI+	UFSconnect 926sw/ 500 GB/CI+
Order no.	20210234	20210236	20210233	20210235
Colour	Silver	Black	Silver	Black
RF range				
Sat IF range [MHz]	950-2150			
Input level range [dB μ V]	44-83			
Modulation, FEC, demultiplexer	DVB-S/DVB-S2 standard			
Video resolution	CCIR 601 (720 x 576 lines), 576p, 720p, 1080i, 1080p, 2160p			
Video decoding	MPEG-2, MPEG-4/H.264, HEVC/H.265, Xvid			
Input data rate [MSymb/s]	2-45 (30 for DVB-S2/8PSK)			
S/N (dB)	> 53			
TV system, audio				
Decoding	AC 3, MPEG-1, Layer 1, 2 and 3 (mp3)/HE-AAC			
Sampling rate [kHz]	32/44,1/48			
S/N (dB)	> 65			
Hard disk recorder				
Storage capacity [GByte]	1000		500	
Power supply				
Mains voltage [V/Hz]	230/50-60			
Power consumption (max./typ. operation/stand-by) [W]	< 75/typ. 22/< 0.5			
LNB supply (horiz./vert.) [V/mA]	14/18; max. 400			
Control signal [kHz]	22; DiSeqC™1.0/1.1/1.2, USALS, SCR single cable (EN 50494), SCD2 (EN 50607)			
Connections				
Sat-IF input	2 x F socket			
Video output analogue	3 x Cinch socket (YPbPr)/1 x Cinch socket			
Video/audio output digital	1 x HDMI			
Audio output analogue	2 x Cinch socket			
Audio output digital (optical/electrical)	Standard fibre-optic (S/PDIF)/1 x Cinch socket			
Common interface/encryption system	For 2 CI+/CI modules			
Data interface				
USB	2 x USB 3.0 (rear panel), 1 x USB 2.0 (front panel)			
Ethernet	1			
SD card reader	1			
General				
Ambient temperature [°C]	Max. +5 to +40			
Dimensions (W x H x D) [mm]	435 x 67 x 273			
Weight [kg]	3.6			

> DVB-T/DVB-T2

Type	UFT 930
Order no.	20210241
Colour	Black
RF properties	
Input frequency range [MHz]	174-230 and 470-862
Loop-through range [MHz]	174-862
Channel bandwidth [MHz]	7/8, automatic switching
Modulation type	COFDM 2k, 8k
Mapping	QPSK, 16 QAM, 64 QAM
Guard interval	1/4, 1/8, 1/16, 1/32
FEC	1/2, 2/3, 3/4, 5/6, 7/8
Input level range [dB μ V]	28-86 (at 16 QAM)
TV system, video	
Modulation, FEC, demultiplexer	DVB-T2 standard (HEVC/H.265)
Video resolution	CCIR 601 (720 x 576 lines), 576p, 720p, 1080i, 1080p
Input data rate [MSymbols/s]	5-32
Video decoding	MPEG-1/2/4 and H.265 compatible
Bit rate [MBit/s]	1.5-15
Frequency range [MHz]	0.02-5
Output voltage [Vpp]	1
S/N [dB]	> 53
TV system, audio	
Audio decoding	MPEG-1 and 2, Layer 1 and 2
Sampling rate [kHz]	32/44.1/48
Frequency range [kHz]	0.04-20
Output voltage [mVpp]	Typ. 770 (TV-Scart)
S/N [dB]	> 65
Power supply	
Mains voltage [V/Hz]	230/50 \pm 10%
Power consumption (max./typ. operation/stand-by) [W]	< 10/7/0.5
Remote feeding [V/mA]	5/50

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Type	UFT 930
Connections	
RF input/output (loop-through)	IEC socket/pin
Video/audio output (analogue)	3.5 mm jack
Video/audio output (digital)	1 x HDMI
Audio digital output (electrical)	SPDIF
Data interface	USB 2.0
General	
Permissible ambient temperature [°C]	+5 to +40
Dimensions (W x H x D) [mm]	155 x 36 x 110
Weight [kg]	1.0

Type	BZD 32
Order no.	20710013
Reception range [MHz]	174-230/470-790
Figure of merit [dB/K] ¹⁾	Typ. -28.5
Gain [dB]	B III: 18, B IV/V: 15
Max. output level [dBμV] ²⁾	Typ. 95
Permissible remote feed voltage [V]	5
Dimensions [mm]	140 x 195
Packaging unit/weight [pc./kg]	1 (10)/0.5
Single pack dimensions [mm]	250 x 160 x 70

¹⁾ Bandwidth 8 MHz, Tu 290 K, connection cable a = 3.5 dB, receiver NF = 7 dB @ 560 MHz

²⁾ In compliance with EN 60728-5, for 60 dB intermodulation distance (2 transmitters – 3rd order) measured at the antenna output

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