



SAT

Meters

SAT/TV/FM/IPTV/ASI/DAB+/TS analysis and optical



KATHREIN
Digital Systems GmbH

KATHREIN | Digital Systems GmbH

Who we are and **what** we stand for

We ensure the best possible radio and TV reception

KATHREIN Digital Systems is the market leader for digital satellite, terrestrial, cable or IP reception and signal distribution in buildings and caravans. Our high-quality and reliable product portfolio for modern TV and radio reception is constantly being expanded to include innovative solutions in the field of building technology.

Thanks to extensive know-how in development and unsurpassed quality standards in production, our solutions and systems are among the best in their class.

High-quality satellite reception systems in conjunction with sophisticated solutions for signal distribution – whether in single-family homes or in large building complexes – bring the signals to the receiving equipment in best HD quality. New technologies such as SAT>IP, optical SAT distribution or modular headend technology for hotel TV close the gap between traditional signal distribution and modern optical fibre and network technology.

KATHREIN Digital Systems' advanced solutions are also the best choice for mobile TV reception in caravans and mobile homes.

Find out more about us at www.kathrein-ds.com

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Portable meters

> Portable signal meter for SAT/TV MSK 30/L

Compared to the fully-equipped MSK 140/OHD and MSK 240/OIA, the MSK 30/L is a reasonably-priced meter at entry level, which, with its comprehensive basic features, provides the installer with an all-round device for daily use in a working environment. The MSK 30/L is designed as a portable multi-function meter for DVB-S/S2, DVB-C and DVB-T/T2. A high-resolution 4.3" TFT colour touch screen enables digital image display in MPEG-2 and MPEG-4 format in the highest quality. The intuitive menu enables rapid measurements in the SAT and TV range.



MSK 30/L – 2170000003

Features

- Level measurement of analogue and digital TV signals (DVB-S/S2, DVB-C, DVB-T/T2, TV)
- Image display of digital TV signals (no display of HEVC/H.265 signals)
- BER/MER measurement and display
- Constellation diagram display
- 4.3" touch TFT colour display (480 x 272 pixels), splash-proof
- Battery life at least three hours
- Spectrum display
- SAT finder function
- Acoustic signal for antenna alignment
- Level display optional in dB μ V, dBmV or dBm
- Automatic measuring range selection
- Direct frequency and channel input
- Measurement and display of the remote feed current
- Audio carrier measurement (TV)
- Audio control with built-in speakers, Dolby Digital AC3 sound available on request. For details go to MSK 30/L on our website (www.kathrein-ds.com)
- DiSEqC™1.2 control signal
- SCR/SCD2 single-cable system control commands
- Data rate measurement of the services in the DVB transport stream
- Memory for meter settings
- Software update via USB interface
- Data logger function
- Video input (cinch)
- Mains or battery operation

Scope of supply:

- Bag with shoulder strap (see p. 7)
- Power supply unit
- Measuring cable with F adapters
- USB cable

➤ Portable meter for SAT/TV/FM/optical/DAB+ and return path MSK 140/OHD

The MSK 140/OHD is a portable multi-standard signal meter for DVB-S/S2/S2X, DVB-C, DVB-T/T2, analogue TV, DAB+, FM radio and the return path and features an additional optical measurement input. The frequency range for DVB-C has been expanded to 1250 MHz to meet future requirements in cable networks.

A high-resolution 9" TFT colour touch screen enables the display of analogue and digital TV signals in MPEG-2 and MPEG-4 (HEVC/H.265) format in the highest quality. Measurement results can be saved on a USB flash drive.



MSK 140/OHD – 2170000002

Features

- 9" touch TFT colour display (800× 480 pixels), splash-proof
- Level measurement of analogue and digital radio and TV signals (DVB-S/S2/S2X, DVB-C, DVB-T/T2, TV, DAB+, FM) including the return path
- Display of digital TV signals in accordance with codec H.265/HEVC (e.g. DVB-T2 in Germany)
- BER/MER measurement and display
- Constellation diagram display
- Spectrum display
- Return path measurement
- Data rate measurement of the services in the DVB transport stream
- Wideband LNB support
- SAT finder function (Sat-Expert)
- Calibration function for two LNBS (multi-feed reception)
- Acoustic signal for antenna alignment
- Level display can be selected in dB μ V, dBmV or dBm
- Automatic measuring range selection
- Direct frequency and channel input
- Measurement and display of the remote feed current
- Audio carrier measurement (TV)
- DAB+: Signal evaluation and decoding for playback (integrated loudspeaker)
- LTE analyser
- AAC/HE-AAC, Dolby AC3 audio control with built-in loudspeaker
- DiSEqC™ 1.2 control signal and SCR/SCD2 single cable control signals
- Programming of the ESU 5x single-cable outlets as in the SWP 50
- Memory for meter settings
- Storage of measured values and software updates possible via universal USB interface
- TV output: HDMI
- Video input: Cinch
- Mains or battery operation
- Battery life at least 2.5 hours

Scope of supply:

- Carrying case for meter and accessories
- High-quality bag with shoulder strap for meter
- Power supply unit
- Measuring cable with F adapters
- USB cable
- USB flash drive
- SC/APC and CLIK! optical adapter

▶ Portable meter for SAT/TV/FM/H.265/HEVC/DAB+/CI interface MSK 240/OIA

The MSK 240/OIA is a portable multi-standard signal meter for DVB-S/S2, DVB-C, DVB-T/T2, analogue TV, DAB+, FM radio, the return path, IPTV, ASI and features an additional optical measurement input. Display of HEVC/H.265 signals.

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 option to carry out a comprehensive transport stream analysis turn the MSK 240 into a real all-rounder. The integrated CI interface also enables the display of coded channels. Measurement results can be saved on a USB stick.



MSK 240/OIA – 217500001

Features

The MSK 240/OIA has the same features as the MSK 140/OHD plus the following additional features:

- TS analysis functions of all DVB input signals (independent of the physical measurement input):
 - Measurement of transport stream, service and stuffing bit rates and service lists
 - MPEG-2 transport stream analysis: Priority 1, 2, and 3¹⁾ errors
 - 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, display
- ASI in/out measurement interface

Scope of supply:

- Carrying case for meter and accessories
- Bag with shoulder strap
- Power supply unit
- Measuring cable with F adapters
- USB cable
- USB flash drive
- FC/CLIK! optical adapter

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

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

> Bag with shoulder strap
Safe storage for meter and accessories

A high-quality bag with handle and shoulder strap is supplied with every meter of the MSK 30/L, MSK 140/OHD and MSK 240/OIA series. An additional accessory bag can be fastened by means of a Velcro® strip. This makes sure that you always have the necessary connectors, adapters and cables with you.

The MSK 140/OHD and MSK 240/OIA also come with a very sturdy plastic transport case.



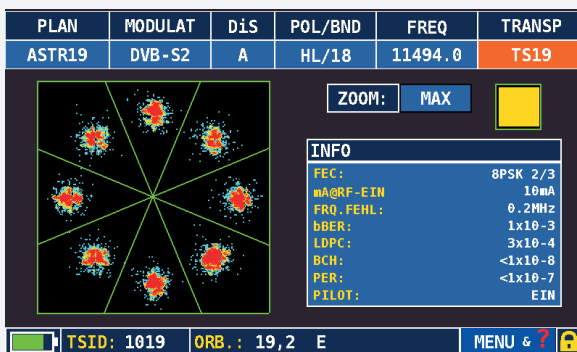
> MSK 240/OIA menu options



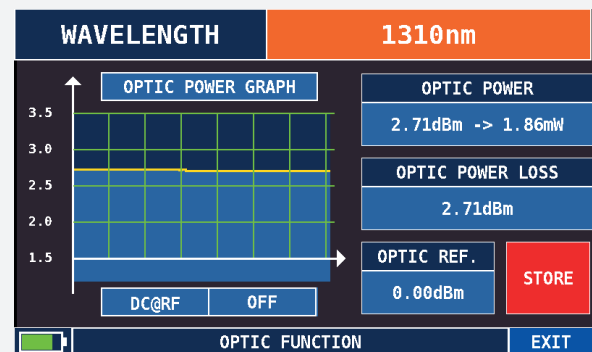
Measuring the current video data rate of "Das Erste HD" with image display



Clear display of level, MER, noise margin, bit error rates and associated live image



Display of the constellation diagram with the current bit error rates



Optical budget measurements using a graph

Retrofits and software

▶ IPTV and ASI retrofit for MSK 130 and MSK 130/O MZS 130/IP

The MZS 130/IP retrofit adds IPTV and ASI measuring functions to the MSK 130 and MSK 130/O meters. In addition, an MPEG-2 transport stream analysis of all DVB input signals is also possible.

The screenshot displays the MZS 130/IP meter's interface with several data panels:

PLAN	INPUT	BANDBR	DC@RF	FREQ	KANAL
---	IP	---	---	---	---

IP Messungen:		Service List	
Time:	0:00.20	SAT.1	
Protokoll Typ:	rtp	ProSieben	
Paket Nummer:	7	kabel eins	
Paket Länge:	188	N24	
Bitrate:	40003430	SAT.1 Gold	
FEC type: none	L: 0 D: 0	Pro7 MAXX	
Verlorene Pakete:	0	kabel eins classics	
Korrig. Paketreihe:	0	SAT.1 Bayern	
Korrig. Paketspalte:	0	SAT.1 NRW	
Min.Lat.:	377		
Max.Lat.:	377		
Overunderun:	0		
Lock Loss:	0		
Average IAT:	0.265ms		
Min.IAT:	0.252ms		
Max.IAT:	1.053ms		
Std deviation:	0.028ms		

PLAN	INPUT	BANDBR	DC@RF	FREQ	KANAL
---	IP	---	---	---	---

Priority 1		Priority 2		Priority 3	
1.1 Sync loss	0	2.1 Transp.	0	3.1 PID NIT	0
1.2 Sync byte	0	2.2 CRC	0	3.2 SI rep	0
1.3.1 PAT Int	0	2.3.a PCR rep	0	3.3 Buffer err	0
1.3.2 PAT PID	0	2.3.b PCR disc	0	3.4 Unref. PIDs	0
1.3.3 PAT scr	0	2.4 PCR acc	0	3.5 SDT	0
1.4.a Cont[Ord]	0	2.5 PTS	0	3.6 EIT	0
1.4.b Cont[Tri]	0	2.6.a CAT[Scr]	0	3.7 RST	0
1.4.c Cont[Los]	0	2.6.b CAT[Table]	0	3.8 TDT	0
1.5.1 PMT Int	0				
1.5.2 PMT Scr	0				
1.6 PID Err	0				

TSID: 1107 | ME | TIME: 0:00.17 | PAG 2/5 | NEXT | NID: 1 | NETW: ASTRA 1 | MENU & 🔒

MZS 130/IP – 21710052

Features

- Retrofitting of IPTV and ASI measurement functions
- Analysis functions of all DVB input signals (independent of the physical measurement input):
 - Measurement of transport stream, service and stuffing bit rates and service lists
 - MPEG-2 transport stream analysis: Priority 1, 2, and 3¹⁾ errors
 - Analysis of PSI/SI tables: PAT, CAT, NIT and SDT²⁾
- IP measurements:
 - Protocol type (UDP/RTP), packet number and length, FEC type, lost packets, lock failure, video display

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

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

➤ Addition: Software option for remote control of MSK 130/MSK 240/OIA MZS 130/REMOTE

The MZS 130/REMOTE software option makes it possible to control MSK 130 and MSK 240/OIA meters remotely, so that all measurement functions are available via a network connection. The meter is accessed remotely via a web browser. All of the meter functions can be accessed and controlled from anywhere using a smartphone, tablet, PC or laptop.



MZS 130/REMOTE – 21710051

Features

- Remote access to MSK 130 and MSK 240/OIA measurement functions via network
- Enables the measurement and monitoring of analogue and digital SAT/TV/radio signals:
 - Level, MER, noise margin, BER (before and after error protection)
 - Spectrum measurement functions
 - Transport stream analysis, service lists, video display
 - Monitoring functions, threshold values: level, noise, BER
- Can be integrated into existing networks (e.g. to remotely monitor headends)

Technical data

Type	MSK 30/L
Order no.	2170000003
RF component	
Frequency range DVB-C/T/T2, TV [MHz]	47–880
Frequency range DVB-S/S2 [MHz]	950–2150
Frequency resolution [kHz]	Cable/TV/FM: 50, SAT: 100
TV standards	B/G, I, D/K, M, N
Digital SAT receiver DVB-S/S2/S2x	
Modulation method	QPSK, 8PSK
Code rate (FEC) DVB-S	$\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, $\frac{7}{8}$
Code rate (FEC) DVB-S2	$\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, $\frac{8}{9}$, $\frac{9}{10}$, $\frac{2}{5}$, $\frac{3}{5}$
Input symbol rate [MS/s]	2–45 (DVB-S), 2–45 (DVB-S2)
BER	1E-6 ... 2E-2 (pre Viterbi)
MER [dB]	25
Digital terrestrial TV receiver DVB-T/T2	
Modulation method DVB-T [QAM]	QPSK, 16/64
Modulation method DVB-T2 [QAM]	QPSK, 16/64/256
FFT mode DVB-T [k]	2, 8
FFT mode DVB-T2 [k]	1, 2, 4, 8, 16, 32
Guard interval DVB-T	$\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{32}$
Guard interval DVB-T2	$\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{32}$, $\frac{1}{128}$, $\frac{19}{128}$, $\frac{19}{256}$
Code rate (FEC) DVB-T	$\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, $\frac{7}{8}$
Code rate (FEC) DVB-T2	$\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, $\frac{7}{8}$, $\frac{3}{5}$, $\frac{4}{5}$
Channel bandwidth [MHz]	6, 7, 8
BER	1E-6 ... 1E-2 (pre Viterbi)
MER [dB]	36
Digital CATV receiver DVB-C (J83 A)	
Modulation method DVB-C [QAM]	16/32/64/128/256
Input symbol rate [MS/s]	2–6.999
BER	1E-9 ... 1E-2 (pre RS)
MER [dB]	40

Type	MSK 30/L
TV system	
Colour standards	PAL, SECAM, NTSC
Audio	FM, NICAM and AM sound, can be retrofitted on request. More information at MSK 30/L on our website
Digital image decoding	MPEG-2; MPEG-4/AVC
DVB transport stream	
Data rate	Services can be measured in Mbit/s
Level measuring unit	
Level measuring range [dB μ V]	30–95
Measurement accuracy [dB]	Typically ± 1.5
Analogue detector	TV: Peak value, SAT/FM: Mean value
Digital detector	Mean value
Display	
Monitor	4.3" touch TFT colour display (480 x 272 pixels)
SAT finder (acoustical)	Level-dependent beep
Power supply	
Lithium/ion rechargeable battery [Ah/Wh/V]	2.6/19/7.4
Mains (power supply unit) [V]	100–240 (50/60 Hz)
DC external [V]	12
Remote feeding	
Remote feed voltage [V]	5/13/18
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-type coaxial socket)
USB port	1 x socket, USB 1.1
DC supply 12 V [mm]	Hollow plug socket 2.5/5.5
General information	
Safety standards	Protection class II (AC/DC power supply unit), VDE EN 61010
Dimensions (W x H x D) [mm]	185 x 125 x 44
Weight [kg]	approx. 0.7

Type	MSK 140/OHD
Order no.	217000002
Frequency range	
DVB-C/T/T2, DAB, TV, FM [MHz]	5–1250
Frequency range DVB-S/S2 [MHz]	230–2600
Frequency resolution [kHz]	Cable/TV/FM: 50, SAT: 100
TV standards	B/G, I, D/K, M, N
Digital SAT receiver DVB-S/S2/S2x	
Modulation method	QPSK, 8 PSK, 16/32 APSK
Code rate (FEC) DVB-S	$\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, $\frac{7}{8}$
Code rate (FEC) DVB-S2	$\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, $\frac{8}{9}$, $\frac{9}{10}$, $\frac{2}{5}$, $\frac{3}{5}$
Code rate (FEC) DVB-S2x	$\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{2}{5}$, $\frac{3}{5}$, $\frac{4}{5}$, $\frac{5}{6}$, $\frac{8}{9}$, $\frac{9}{10}$
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
Modulation method DVB-T2	QPSK, 16/64/256
FFT mode DVB-T [k]	2, 8
FFT mode DVB-T2 [k]	1, 2, 4, 8, 16, 32
Guard interval DVB-T	$\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{32}$
Guard interval DVB-T2	$\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{32}$, $\frac{1}{128}$, $\frac{19}{128}$, $\frac{19}{256}$
Code rate (FEC) DVB-T	$\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, $\frac{7}{8}$
Code rate (FEC) DVB-T2	$\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, $\frac{7}{8}$, $\frac{3}{5}$, $\frac{4}{5}$
Channel bandwidth [MHz]	6, 7, 8
BER	1E-6 ... 2E-2 (pre Viterbi)
MER [dB]	40
Digital CATV receiver DVB-C (J83 A)	
Modulation method DVB-C [QAM]	64/128/256
Input symbol rate [MS/s]	2–6.999
BER	1E-9 ... 1E-2 (pre RS)
MER [dB]	40
Optical receiver	
Inputs	SC/APC, CLIK optical adapter
Wave length [nm]	1310–1550
Input level range [dB]	-40 to +6

Type	MSK 140/OHD
Measurement accuracy [dBm]	± 0.5
RF frequency range [MHz]	5–2600
Level measuring unit	
Level measuring range [dB μ V]	30–120
Measurement accuracy [dB]	Typically ± 1.5
Analogue detector	TV: Peak value; SAT/FM: Mean value
Digital detector	Mean value
Display	9" touch TFT colour display 800 × 480 pixels
SAT finder (acoustical)	Level-dependent beep
Power supply	
Lithium/ion rechargeable battery [Ah]	4.8
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	DiSEqC™ 1.2, SCR/SCD2 single cable system, programming of the ESU 5x single-cable outlets as in the SWP 50
Connections	
RF input (impedance) [Ω]	75 (F-type coaxial socket)
TV output	HDMI
Video input analogue	Cinch socket analogue
USB port	2 × socket, USB 2.0
LAN interface [MBit/s]	RJ 45, 100
DC supply 12 V [mm]	Hollow plug socket 2.5/5.5
General information	
Safety standards	Protection class II
(AC/DC power supply unit)	VDE EN 61010
Dimensions (W x H x D) [mm]	270 × 155 × 40
Weight [kg]	approx. 2.2
TV system	
Colour standards	PAL, SECAM, NTSC
Audio	FM, NICAM and AM sound, Dolby AC3; AAC/HE-AAC
Digital image decoding	MPEG-2; MPEG-4 (H.265/HEVC up to 1080p)

Type	MSK 240/OIA
Order no.	217500001
RF component	
Frequency range DVB-C/T/T2, DAB+, TV, FM [MHz]	5–1250
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 SAT receiver DVB-S/S2/S2x	
Modulation method	QPSK, 8PSK, 16/32APSK
Code rate (FEC) DVB-S	$\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, $\frac{7}{8}$
Code rate (FEC) DVB-S2	$\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, $\frac{8}{9}$, $\frac{9}{10}$, $\frac{2}{5}$, $\frac{3}{5}$, $\frac{1}{4}$, $\frac{1}{3}$, $\frac{2}{5}$, $\frac{1}{2}$, $\frac{3}{5}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{4}{5}$, $\frac{5}{6}$, $\frac{8}{9}$, $\frac{9}{10}$
Code rate (FEC) DVB-S2x	$\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{2}{5}$, $\frac{3}{5}$, $\frac{4}{5}$, $\frac{5}{6}$, $\frac{8}{9}$, $\frac{9}{10}$
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 [QAM]	QPSK, 16/64
Modulation method DVB-T2 [QAM]	QPSK, 16/64/256
FFT mode DVB-T [k]	2, 8
FFT mode DVB-T2 [k]	1, 2, 4, 8, 16, 32
Guard interval DVB-T	$\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{32}$
Guard interval DVB-T2	$\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{32}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{128}$, $\frac{19}{128}$, $\frac{19}{256}$
Code rate (FEC) DVB-T	$\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, $\frac{7}{8}$
Code rate (FEC) DVB-T2	$\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, $\frac{7}{8}$, $\frac{3}{5}$, $\frac{4}{5}$
Channel bandwidth [MHz]	6, 7, 8
BER	1E-6 ... 2E-2 (pre Viterbi)
MER [kHz]	40
Digital CATV receiver DVB-C (J83 A)	
Modulation method DVB-C [QAM]	16/32/64/128/256
Input symbol rate [MS/s]	2–6.999
BER	1E-9 ... 1E-2 (pre RS)
MER [dB]	40
Optical receiver	
Inputs	FC/APC CLIK! optical adapter
Wave lengths [nm]	1310–1550
Input level range [dBm]	-40 to +10
Measurement accuracy [dBm]	± 0.5
RF frequency range [MHz]	5–2250

Type	MSK 240/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; HEVC/H.265 (up to 1080p)
DVB transport stream	
Data rate	Services can be measured in Mbit/s
Level measuring unit	
Level measuring range [dB μ V]	30–120
Measurement accuracy [dB]	Typically ± 1
Analogue detector	TV: Peak value, SAT/FM: Mean value
Digital detector	Mean value
Display	
Monitor	9" touch TFT colour display (800 \times 480 pixels)
SAT finder (acoustical)	Level-dependent beep
Power supply	
Lithium/ion rechargeable battery [Ah/Wh/V]	4.8/34/7.4
Mains (power supply unit) [V]	100–240 (50/60 Hz)
DC external [V]	12
Remote feeding	
Remote feed voltage [V]	5/13/18
Remote feed current [mA]	Max. 500
Control signals	22 kHz, DiSEqC™1.2, SCR/SCD2 single cable system, SWP 50 control commands
Connections	
RF input (impedance) [Ω]	75 (F-type coaxial socket)
TV output	HDMI, analogue video
Headphone socket [mm]	Jack socket, 3.5
USB port	2 x socket, USB 2.0
ASI IN/OUT [Ω]	75 (BNC)
LAN interface	RJ 45, 100 MBit/s
LAN interface (IPTV)	RJ 45, 100 MBit/s
CI interface	CAM module
DC supply 12 V [mm]	Hollow plug socket 2.5/5.5
General information	
Safety standards	Protection class II (AC/DC power supply unit), VDE EN 61010
Dimensions (W x H x D) [mm]	295 \times 172 \times 55
Weight [kg]	Approx. 2.2

Your specialist supplier:

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Technical advice for specialist suppliers

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