

FUNCTION OVERVIEW

OPERATION

Mains	external AC power supply unit	100...240 V
Battery	internal Li-Ion battery	12 V/6,5 AH
external battery supply	vehicle	11 V...16 VDC

OPERATION

keyboard	12 hardkeys	On/Off, Help, Prog.+, Prog.-, Analyze, Source, OSD/Off, Vol.+, Vol.-, Copy, Function, Extend
external keyboard	ASCII keyboard (PS2)	to enter ASCII characters
Touch	Infra-red Touch	Intuitive operation and ASCI character entry

REMOTE CONTROL

Ethernet				
RS232				
PCMCIA-Module	analogue modem	GSM modem		

VIDEO DISPLAY

Analogue video	TV-CATV	TV terrestrial	Satellite	SCART/video
FTA digital video	DVB-C J83 B	DVB-T ATSC	DVB-S	TS-parallel/ASI
Scrambled digital video	DVB-C J83 B CI/CA	DVB-T ATSC CI/CA	DVB-S CI/CA	TS-parallel/ASI CI/CA

SIGNALLING

Display	Position	green signal	red signal
operational mode/ standby	Front (using ON/OFF button)	In mains or external DC operation	Battery operation
LNB supply	Front (using EXTEND button)	Voltage supply is on, blinks if overloading is greater than 0.6 A	external voltage is con- nected

Note:



Switch to “standby” by pressing ON/OFF and then selecting the “suspend Mode”, or by closing the display cover!

Display	Position	green signal	yellow signals
Battery status	rear panel	green = charging	5 x each 20 % = Battery status

FUNCTION OVERVIEW

RECEPTION RANGES

TV (CATV/terrestrial)	5...900 MHz
Satellite	900....3100 MHz
FM	87,5...108 MHz
Spectrum analysis	5...3100 MHz

DEMODULATION

Digital CATV	J83 A/C (DVB-C) 16, 32, 64, 128 ,256 QAM	J83 B 64 QAM	DOCSIS 64, 256 QAM
Analogue CATV	PAL, NICAM B/G, I, D/K, L/L', M/N	NTSC, NICAM B/G, I, D/K, L/L', M/N	SECAM, NICAM B/G, I, D/K, L/L', M/N
Digital-terrestrial	COFDM (DVB-T) 2k, 8k; 4, 16, 64 QAM; 6,7,8 MHz	ATSC 8 VSB	
Analogue-terrestrial	PAL, NICAM B/G, I, D/K, L/L', M/N	NTSC, NICAM B/G, I, D/K, L/L', M/N	SECAM, NICAM B/G, I, D/K, L/L', M/N
Digital-satellite	DVB-S(2) QPSK, 8PSK		
Analogue-satellite	PAL B/G, I, D/K, L/L', M/N	NTSC B/G, I, D/K, L/L', M/N	SECAM B/G, I, D/K, L/L', M/N
Radio	FM		

MEASUREMENT OPTIONS

Spectrum analyser	Level measurement, Video/audio carrier, Levels of digital signals, C / N	Frequency measurement, Frequency spacing	CTB, CSO
Constellation analyser	Constellation, 4,16,32,64,128,256QAM, COFDM	MER, BER, Frequency offset	Echo display (DVB-T)
NICAM-BER	BER measurement in analogue TV modulation		
Memory oscilloscope	Audio, Amplitude, Daviati- on, Frequency	Video, Line memory, Am- plitude, S/N weighted, S/N unweighted	DiSEqC™, Swing in/out, 22 kHz carrier, modulation
MPEG screen	SID, PMT, PCR, Channel name, type of service, programme status, CA information, elementary current, video/audio, NIT		
DiSEqC screen	DiSEqC™2.0 transmitter and receiver	UFO® <i>micro</i> DiSEqC™	
LNB multimeter	current 0...30 V DC	current 0...600 mA DC	Remote feed current and voltage

SAVING MEASURED VALUES

Internal memory	Data logging
Printer	

TECHNICAL APPENDIX

DESIGN

- Manageable portable signal meter
- High-resolution 10.4“ TFT colour display to graph analogue and digital TV signals and graphics
- Backlight - thus the display is excellently readable also in bright sunlight (typ. 600 cd/m²)
- Easy operation using 12 hard keys and through the infrared touch screen for menu-dependant, user-controlled, intuitive operation (context-dependant help)
- The touch screen control panels can be adapted to the needs of left and right handers
- Alphanumeric touch screen keyboard to enter numbers and text
- Shoulder strap that can be adapted in length

FUNCTIONS

- MER measurement for all digital modulation types
- BER measurement
- Spectrum analyser with individually selectable start and stop frequencies, centre-frequency entry and span
- Simultaneous representation of channel spectrum and picture
- Memory-oscilloscope
- Constellation analyser for all DVB standards
- MPEG and analogue TV screen
- Demodulation of analogue signals: AM (CATV, rerr.), FM (satellite, radio)
- Demodulation of digital signals: DVB-C, DVB-T, DVB-S (DVB-S2 projected)
- Demodulation of the digital USA standard s (J83B, DOCSIS, ATSC)
- Possibility to measure the video amplitude with line selection, S/N weighting and hum measurement
- S/N weighting: typ. 57 dB
- Channel selection in DVB-C, DVB-S, DVB-T and analogue through frequency entry, channel entry and user lists
- Remote control through Ethernet and modem
- Data logging and automatic measurements (in preparation)
- Automatic measurements for CTB and CSO (in preparation)
- Return path measurements (in preparation)
- The result of the memory oscilloscope and the numerical value are shown in large format
- Measurement units dB μ V, dBm (dBmV, μ V and mV in preparation)
- DiSEqC™ screen
- Multimeter for LNB supply
- Insert positions to extend the meter in its functions
- For mains and battery operation
- Rechargeable 6.5 Ah Li-Ion battery, thus suitable for mobile use
- Remote control software (optional with MZS 200)

TECHNICAL APPENDIX

Type	CE	MSK 200/S2	MSK 200/S2
Order no.		21710024	21710025
Spectrum analyser			
Frequency range	MHz	5-3100	
Resolution bandwidth (-3 dB)	MHz	0.001-10	
Resolution bandwidth (-6 dB)	kHz	9, 25, 50, 120, 200	
Video bandwidths	MHz	0.00001-3	
Phase noise at 10 kHz carrier level spacing	dBc	<-90 (1 Hz), typ. -95 (1 Hz)	
Phase noise at 100 kHz carrier level spacing	dBc	<-100 (1 dB), typ. -110 (1 Hz)	
Dynamic (RBW: 100 kHz)	dB	Typ. 70	
Level measurement range	dB μ V	20-130	
Accuracy of measurements	dB	< 1.5	
Measurement detector	dB	Max peak, min peak, auto peak, sample, RMS	
Return loss (pre-attenuation 5 dB)	dB	> 16 (VSWR: 1.35)	
Repetition speed	Picture/s	Max. 10	
Reference level	dB μ V	30-130	
Range of indication	dB	100, 70, 50, 30, 20, 10	
Screen resolution	Pixel	Max. 800 x 600/nominal 501 x 401	
Analogue TV receiver			
Standards		B/G, I, D/K, L/L', M/N	
Colour standards		PAL, SECAM, NTSC	
Sound standards		IRT-A2, NICAM, BTSC, EIA-J	
Frequency increment	kHz	50	
Video IF bandwidth		Standard-dependent	
Audio IF bandwidth		Standard-dependent	
Video output voltage/impedance	V _{ss} /Ω	1/75 ± 1 dB	
Hum measurement	dB	> 50	
S/N weighting (to CCIR Rec. 567)	dB	> 55/typ. 57	
Analogue satellite receiver			
Standard		FM to CCIR Rec. 405	
Colour standards		PAL, SECAM, NTSC	
Sound standards	μs	De-emphasis: 50/Panda-Wegener: 75	
Frequency increment	kHz	200	
Video IF bandwidth	MHz	27/36	
Audio IF bandwidth	kHz	130/380	
Video output voltage/impedance	V _{ss} /Ω	1/75 ± 3 dB	
Hum measurement	dB	> 50	
S/N weighting (to CCIR Rec. 567)	dB	> 55/typ. 60	
Analogue input			
S/N weighting (to CCIR Rec. 567)	dB	Typ. up to 80	

TECHNICAL APPENDIX

Digital CATV receiver (J83 A, B, C)		
Modulation type		16 QAM, 32 QAM, 64 QAM, 128 QAM, 256 QAM
Symbol frequency	MSymb/s	2.0-6.999
Frequency increment	kHz	50
Video output voltage/impedance	V _{ss} /Ω	1/75 ± 1 dB
IF bandwidths	MHz	1, 5, 6, 7, 8, 12
MER measurement	dB	> 33/typ. 38
Digital terrestrial TV receiver (DVB-T, ATSC)		
Modulation type		QPSK, 16 QAM, 64 QAM, 8 VSB
Symbol frequency		Standard-dependent
Frequency increment	kHz	50
Video output voltage/impedance	V _{ss} /Ω	1/75 ±1 dB
IF bandwidths	MHz	1,5, 6, 7, 8, 12
MER measurement	dB	> 35
Digital satellite receiver (DVB-S, DVB-S2)		
Modulation type		QPSK, 8PSK
Symbol frequency	MSymb/s	2-45.0
Frequency increment	kHz	200
IF bandwidths	MHz	8, 18, 27, 36, 54
Video output voltage/impedance	V _{ss} /Ω	1/75 ± 1 dB
MER measurement	dB	>1 4
Constellation analysis		
DVB-C		16 QAM, 32 QAM, 64 QAM, 128 QAM, 256 QAM
DVB-T		QPSK, 16 QAM, 64 QAM
DVB-S(2)		QPSK, 8PSK
ATSC		8 VSB
Memory oscilloscope		
Resolution	Bit	12
Sampling rate	MHz	54
Memory depth	Picture	1
Remote Feeding		
Switching voltage/max. current	V/mA	5-20/600
Control signals	kHz	22, Tone Burst, DiSEqC™ 2.0, SCR single-cable system and UFO® ^{micro} control signals
Power supply		
Mains (power supply unit)	V/Hz/W	100-250/50-400/100
Rechargeable Li-Ion battery	V/Ah	11,1/6.45
DC external	V	10.8-14.0

TECHNICAL APPENDIX

Connections			
RF input standarad (impedance)	Ω	1.6/5.6 (75)	N-type socket (50)
Composite colour picture input/output, RGB output			Scart socket
Video input/output			2 x BNC socket
Transport current input/output			2 x Sub D socket (25-pole)
ASI input/output			2 x BNC socket
Common interface/card reader			1/1
PCMCIA slot			1
Interconnection			1 x Ethernet
USB port			2
External keyboard			PS-2
External mouse			USB
Headphone connection	mm		Phone jack 3.5
Modem interface			RS 232/Mini DIN, 9-pole (socket)
DC supply 12 V			XLR socket
General			
Screen			10.4", TFT, 800 x 600 pixels with backlight
Touch Screen			Infra-red
Temperature range	°C		+5 to +45
Dimensions (W x H x D)	mm		374 x 294 x 124
Weight	kg		Approx. 8



The illustration shows the MSK 200/S2 21710024 with 75-Ω-BNC socket; another version is available, MSK 200/S2 21710025 with 50-Ω-N socket.