Catalog
Channel Processing 2018

Perfect technology
for highest demands

Table of Contents

Channel Processing Compact Headend

Channel Processing Micro Headend

Table of Contents

Channel Processing accessories

Content in alphabetical order

D

G

O

Z

TANGRAM
HIGH DENSITY VIDEO PLATFORM

Maximum Performance, Minimum Footprint

Flexible Installation
Any module in any slot

Easy configuration of the complete platform via
1 management port

Expandability for increasing bandwidth and port redundancy by **GigE SFP GT12 extension (+4 GigE)**

4x GigE interface individually configurable for **streaming bandwidth distribution**

Channel processing Tangram

Tangram High Density Video Platform

The **TANGRAM platform** is highly customizable and offers advanced DVB stream processing in a small footprint 1 RU chassis concept. The TANGRAM chassis can be equipped with 6+1 modules and comes with an integrated GigE Switch.

The integrated switch operates as a configurable switching unit for audio / video streaming via Gigabit Ethernet and manages the modules for the redundancy mechanism. One port of the GT11 provides the management interface. The six rear loaded modules have different functionalities, and can perform all necessary signal processing functions.

The WISI TANGRAM video platform is a high-density digital TV headend for contribution of digital TV via IP networks and end-to-end IPTV solutions such as video-on-demand, connected TV and OTT (Over The Top) or Web TV.

WISI Tangram at a glance:

- Excellent cost-performance by highest density and low power consumption
- High level of reliability by full redundancy concept and hot swappable fan bay & PSUs
- Maximum flexibility and simplicity by modular architecture and easy to operate via web GUI
- Great variety for building your future proof TV network. IP, DVB-C, ASI, DVB-T/T2/S/S2, DVB-T2-MI, PAL, NTSC, SECAM, FM, ISDB-T

EdgeFM   CSA Scrambler   EdgeQAM   ASI in/out   Descrambler   EdgePAL

Base units

GT 01 O 0048

Tangram basic unit, 48 V DC, without switch and controller

The TANGRAM platform is a highly customizable and offers advanced DVB stream processing in a small footprint 1RU chassis. The TANGRAM chassis GT01O0048 will be delivered with one 48 V DC power supply, with passive module for connecting the streaming interface of the modules and can be equipped with 6 modules on the backside. The WISI TANGRAM video platform is a high-density digital TV headend for contribution of digital TV via IP networks and end-to-end IPTV solutions such as video-on-demand, connected TV and OTT (Over The Top) or Web TV.

Technical data	
Switch/Controller	
Streaming ports	6 pcs. (1 Gbps, 100 Mbps, 10 Mbps)
Control ports	1 pcs. per module (100 Mbps)
Category	Layer 2+
Multicast	IGMP V2 + V3
Protocols	RTP, UDP, HTTP, IGMP, SNMPv2
Redundancy	no N+1 module redundancy
Connectors	
Module slots	6 pcs. rear panel
RJ45	6 pcs. (without modules, purely chassis)
Power supply	1 pcs. GT 55 W 0048
Optional redundant power supply unit	1 pcs. GT 55 W 0048
General data	
Power consumption max.	≤ 40 W (Chassis GT 11; fan unit without modules)
Operating voltage DC	48 V DC
Operating temperature range	-5°C...+45°C, 23°F...113°F, (ETSI EN 300 019-1-3 Class 3.1)
Max. humidity, non condensing	95 %
Electro Magnetic Compatibility (EMC)	EN 50083-2

characteristics

- Small footprint in 1RU chassis
- Carrier grade chassis with optional redundant power supplies
- Combine GT modules for your application
- Hot swappable fan tray
- Modular architecture

Scope of delivery

- 1x Tangram basic unit GT01 1RU
- 1x Power supply 48 V DC
- 1x Quick Guide

Base units

GT 01 O 0230

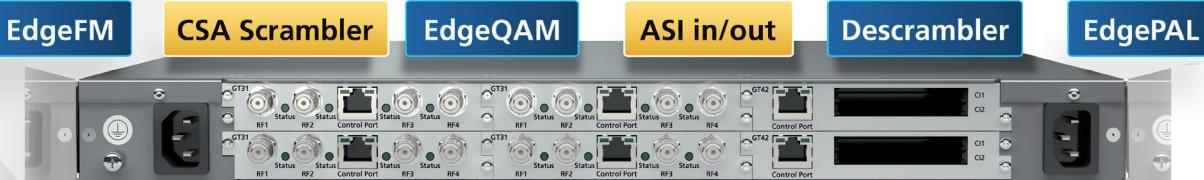Tangram basic unit, 230 V AC, without switch and controller

The TANGRAM platform is a very highly customizable and offers advanced DVB stream processing in a small footprint 1RU chassis concept. The TANGRAM chassis GT01O0230 will be delivered with one 230 V AC power supply, with passive module for connecting the streaming interface of the modules and can be equipped with 6 modules on the backside. The WISI TANGRAM video platform is a high-density digital TV headend for contribution of digital TV via IP networks and end-to-end IPTV solutions such as video-on-demand, connected TV and OTT (Over The Top) or Web TV.

Technical data	
Switch/Controller	
Streaming ports	6 pcs. (1 Gbps, 100 Mbps, 10 Mbps)
Control ports	1 pcs. per module (100 Mbps)
Category	Layer 2+
Multicast	IGMP V2 + V3
Protocols	RTP, UDP, HTTP, IGMP, SNMPv2
Redundancy	no N+1 module redundancy
Connectors	
Module slots	6 pcs. rear panel
RJ45	6 pcs. (without modules, purely chassis)
Power supply	1 pcs. GT 55 W 0230
Optional redundant power supply unit	1 pcs. GT 55 W 0230
General data	
Power consumption max.	≤ 10 W (only chassis without modules)
Operating voltage AC	230 V (50/60 Hz)
Operating temperature range	-5°C...+45°C, 23°F...113°F, (ETSI EN 300 019-1-3 Class 3.1)
Max. humidity, non condensing	95 %
Electro Magnetic Compatibility (EMC)	EN 50083-2

characteristics

- Small footprint in 1RU chassis
- Carrier grade chassis with optional redundant power supplies
- Combine GT modules for your application
- Hot swappable fan tray
- Modular architecture

Scope of delivery

- 1x Tangram basic unit GT01 1RU
- 1x Power supply 230 V AC
- 1x Cold-device plug, IEC 60320-C14
- 1x Quick Guide

Base units

GT 01 W 0048

Tangram basic unit, 48 V DC, with switch and controller

The TANGRAM platform is a very highly customizable and offers advanced DVB stream processing in a small footprint 1RU chassis concept. The TANGRAM chassis can fit up to 6 modules on the backside and 1 module on the front panel. The TANGRAM chassis GT01W0048 comes with one 48 V DC power supply, with an embedded switch on the backplane (GT01W, GT11) and a hot swappable fan tray. The GT01W is a carrier grade chassis and supports a fully redundant concept (1+1, n+1). The WISI TAN-GRAM video platform is a high-density digital TV headend for contribution of digital TV via IP networks and end-to-end IPTV solutions such as video-on-demand, connected TV and OTT (Over The Top) or Web TV.

Technical data	
Switch/Controller	
Streaming ports	4 pcs. (1 Gbps, 100 Mbps, 10 Mbps)
Control ports	1 pcs. (100 Mbps)
Category	Layer 2+
Multicast	IGMP V2 + V3
Protocols	RTP, UDP, HTTP, IGMP, SNMPv2, SNMPv3
Redundancy	N+1 module redundancy
Connectors	
Module slots	6+1 pcs. 6 back sides, 1 front
RJ45	5 pcs. (without modules, purely chassis)
Power supply	1 pcs. GT 55 W 0048
Optional redundant power supply unit	1 pcs. GT 55 W 0048
General data	
Power consumption max.	≤ 40 W (Chassis GT 11; fan unit without modules)
Operating voltage DC	48 V DC
Operating temperature range	-5°C...+45°C, 23°F...113°F, (ETSI EN 300 019-1-3 Class 3.1)
Max. humidity, non condensing	95 %
Electro Magnetic Compatibility (EMC)	EN 50083-2

characteristics

- Fully redundant concept (1+1, n+1)
- Scrambling and remultiplexing
- Small footprint in 1RU chassis
- Carrier grade chassis with optional redundant power supplies
- Combine GT modules for your application
- Hot swappable fan tray
- Modular architecture
- Embedded switch

Scope of delivery

- 1x Tangram basic unit GT01 1RU
- 1x Power supply 48 V DC
- 1x GT11 Switch Module
- 1x Quick Guide

Base units

GT 01 W 0110

Tangram basic unit, 110 V AC, with switch and controller

The TANGRAM platform is a very highly customizable and offers advanced DVB stream processing in a small footprint 1RU chassis concept. The TANGRAM chassis can fit up to 6 modules on the backside and 1 module on the front panel. The TANGRAM chassis GT01W0110 comes with one 110 V AC power supply, with an embedded switch on the backplane (GT01W, GT11) and a hot swappable fan tray. The GT01W is a carrier grade chassis and supports a fully redundant concept (1+1, n+1). The WISI TANGRAM video platform is a high-density digital TV headend for contribution of digital TV via IP networks and end-to-end IPTV solutions such as video-on-demand, connected TV and OTT (Over The Top) or Web TV.

Technical data	
Switch/Controller	
Streaming ports	4 pcs. (1 Gbps, 100 Mbps, 10 Mbps)
Control ports	1 pcs. (100 Mbps)
Category	Layer 2+
Multicast	IGMP V2 + V3
Protocols	RTP, UDP, HTTP, IGMP, SNMPv2, SNMPv3
Redundancy	N+1 module redundancy
Connectors	
Module slots	6+1 pcs. 6 back sides, 1 front
RJ45	5 pcs. (without modules, purely chassis)
Power supply	1 pcs. GT 55 W 0110
Optional redundant power supply unit	1 pcs. GT 55 W 0110
General data	
Power consumption max.	≤ 40 W (Chassis GT 11; fan unit without modules)
Operating voltage AC	110 V (50/60 Hz)
Operating temperature range	-5°C...+45°C, 23°F...113°F, (ETSI EN 300 019-1-3 Class 3.1)
Max. humidity, non condensing	95 %
Electro Magnetic Compatibility (EMC)	EN 50083-2
Safety compliance	UL/CSA/CAN 60950-1

characteristics

- Fully redundant concept (1+1, n+1)
- Scrambling and remultiplexing
- Small footprint in 1RU chassis
- Carrier grade chassis with optional redundant power supplies
- Combine GT modules for your application
- Hot swappable fan tray
- Modular architecture
- Embedded switch

Scope of delivery

- 1x Tangram basic unit GT01 1RU
- 1x Power supply 110V AC
- 1x Rubber conenctor, Type B NEMA 5-15, 3-pole
- 1x GT11 Switch Module
- 1x Quick Guide

Base units

GT 01 W 0230

Tangram basic unit, 230 V AC, with switch and controller

The TANGRAM platform is a very highly customizable and offers advanced DVB stream processing in a small footprint 1RU chassis concept. The TANGRAM chassis can fit up to 6 modules on the backside and 1 module on the front panel. The TANGRAM chassis GT01W0230 comes with one 230 V AC power supply, with an embedded switch on the backplane (GT01W, GT11) and a hot swappable fan tray. The GT01W is a carrier grade chassis and supports a fully redundant concept (1+1, n+1). The WISI TANGRAM video platform is a high-density digital TV headend for contribution of digital TV via IP networks and end-to-end IPTV solutions such as video-on-demand, connected TV and OTT (Over The Top) or Web TV.

Technical data	
Switch/Controller	
Streaming ports	4 pcs. (1 Gbps, 100 Mbps, 10 Mbps)
Control ports	1 pcs. (100 Mbps)
Category	Layer 2+
Multicast	IGMP V2 + V3
Protocols	RTP, UDP, HTTP, HTTPS, IGMPv2, IGMPv3, SNMPv2, SNMPv3
SNMP	SNMP versions 2c, and 3 with support for traps
Web Interface	Browser-based device configuration (HTTP/HTTPS)
Redundancy	N+1 module redundancy
Port grouping Port grouping	No
VLAN VLAN	Yes. Supported VLAN range from VLAN ID 1 to 4095. ID 1 and 16 are reserverd for internal managment. ID 10 to 15 are reserverd for internal streaming.
IGMP Querier IGMP Querier	IGMP v1 or v2. IGMP querier is used to support a Layer 2 multicast domain of snooping switches in the absence of a multicast router
IGMP Snopping IGMP Snopping	Yes
Port monitor Port monitor	Yes. Data traffic monitor per port receiving and transmitting in kbit/s
Connectors	
Module slots	6+1 pcs. 6 back sides, 1 front
RJ45	5 pcs. (without modules, purely chassis)
Power supply	1 pcs. GT 55 W 0230
Optional redundant power supply unit	1 pcs. GT 55 W 0230
General data	
Power consumption max.	≤ 40 W (Chassis GT 11; fan unit without modules)

Technical data	
Operating voltage AC	230 V (50/60 Hz)
Operating temperature range	-5°C...+45°C, 23°F...113°F, (ETSI EN 300 019-1-3 Class 3.1)
Max. humidity, non condensing	95 %
Electro Magnetic Compatibility (EMC)	EN 50083-2
Safety compliance	CE
Signalling	Multicolor LEDs (Power on - green, Error - red)
Operation Mode	-
Hardware revision	1010100
Software version	3.2.4

characteristics

- Fully redundant concept (1+1, n+1)
- Scrambling and remultiplexing
- Small footprint in 1RU chassis
- Carrier grade chassis with optional redundant power supplies
- Combine GT modules for your application
- Hot swappable fan tray
- Modular architecture
- Embedded switch

Scope of delivery

- 1x Tangram basic unit GT01 1RU
- 1x Power supply 230 V AC
- 1x Cold-device plug, IEC 60320-C14
- 1x GT11 Switch Module
- 1x Quick Guide

Modules

GT 12 W

Switch extension board with 4 SFP slots
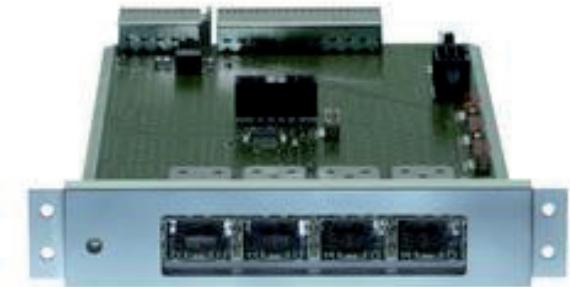
The GT12 is a module of TANGRAM Family and enables to expand the number of streaming ports up to 8 ports. Furthermore it supports standard SFPs, thus enabling a connection of electrical or optical networks. Typical applications include the connection of optical transport networks with bandwidth upgrades for receiving further transport streams via IP or redundant connections to other switches and routers. TANGRAM is a modular headend architecture with high signal density and a very flexible platform. The TANGRAM modules can be combined individually and you can put them together according to your needs to create a professional video headend system.

Technical data	
Connectors	
SFP socket	4 pcs.
Standards	INF-8074i, Specification for SFP Transceiver
General data	
Operating voltage DC	12 V DC
Power consumption	< 0,5 W
Dimensions (width x height x depth)	100 x 220 mm
Operating temperature range	-5°C...+45 °C (ETSI EN 300 019-1-3 Class 3.1) °C
Electro Magnetic Compatibility (EMC)	EN 50083-2

characteristics

■ 4x SFP slots for optical or electrical access

■ High flexibility for bandwidth extension

■ High reliability by port and service redundancy for external connection (main/backup)

■ Support of standard SFPs

■ Bit rate Port Monitoring

Scope of delivery

■ 1x GT12 module

■ 1x Quick Guide

Modules

GT 21 W

Tangram Modul IP in 6x PAL/SECAM/NTSC

Technical data	
Streaming-Input	
IP-Inputs	32 pcs.
IP-Compliance	ISO/IEC 13818
IP-Input bitrate	Max. 425 Mbit/s per IPTS, Max. 850 Mbit/s total
IP-Input protocol	UDP/RTP/RTP+FEC Unicast and Multicast, IGMP v2 and v3
IP-TS-Input format	SPTS CBR/VBR, MPTS CBR
IP-FEC Inputs	Yes, with GTFEC License
IP-FEC compliance	SMPTE 2022-1, SMPTE 2022-2
IP-Packet format	MPEG over UDP/IP and RTP/IP
IP-Packet size	188 Byte
IP-PCR restamping	Yes
IP-Dejittering	Yes, per default 100ms, individual adjustable
Video processing	
Video decoder	6x MPEG-2 SD (MP@ML) 1,5..15 MBit/s or 6x MPEG-4 SD (MP@ML) Level 4.1 or 3x MPEG-4 HD (MP@HL) Level 4.1
Video downscaling	3x MPEG-4 HD and 3x MPEG-2 SD concurrent (PAL/SECAM) or 2x MPEG-4 HD and 2x MPEG-2 SD concurrent (PAL-M/NTSC)
Video formats	4:3/16:9/4:3 Zoom
Video Standard	PAL/SECAM/NTSC
Video scaling	Auto, Ignore, Letterbox, Pan and scan, Combined, Forced
Vertical blanking interval	WST Teletext inserting (lines 7-15, 20-21), VPS inserting (line 16) WSS inserting according to aspect ratio
Subtitle	DVB and Teletext (EBU) EN 300 743, SCTE 27
Test lines	Line 17, 18, 330, 331
Test carrier wave	Yes
OSD Video	Yes, text or picture PNG (<400 kB)

Technical data	
OSD Radio	Yes, text or picture PNG (<400 kB)
Compliance	ISO 13818-2 (MPEG-2/H.262); ISO 14496-10 (MPEG-4/H.264/AVC)
Video parameters	
Differential gain	<1,5 %
Differential phase	<1,5 °
Group delay time	<50 ns (-0,5...4,43 MHz)
Static nonlinearity	%
Video frequency response	±1 dB (10...5 MHz, CCIR 18)
S/N Video, weighted (CCIRrec. 567-1)	typ. 64 dB (at 1 channel; at 2/3 channels typ. 62 dB)
2-T Puls K Faktor	K <1,2 %
Test picture	Coulor bars
Audio processing	
Audio decoder	ISO 13818-3 MPEG-1 (L1/L2) MPEG-2 (L1/L2), Dolby AC-3 (Dolby and the double-D symbol are trademarks of Dolby Laboratories. Manufactured under license from Dolby Laboratories)
Audi Dolby Decoding	Yes, with GTDOL software option (The Dolby audio decoding functionality requires a TANGRAM GT21W HW that is Dolby enabled. You can check this on the Serial number (S/N: 0462xxxxxxxxxxxxx Dolby is enabled, S/N: 0460xxxxxxxxxxxxx Dolby is not enabled). Older TANGRAM GT21W HW versions cannot be upgraded to Dolby capability. Please contact WISI Sales for more information)
Audio language	ISO 639
Audio format	Mono/Stereo/Dual NICAM/BTSC/SAP
Audio format switching	Manual / auto

Technical data	
Audio outputs Audio outputs	PAL-625/SECAM mode: 6x Mono/ Stereo/Dual NICAM, PAL-M/ NTSC mode: 6x Mono, PAL-M/ NTSC with BTSC mode: 4x Stereo (BTSC) + 2 SAP audio
Audio parameters	
S/N Audio	75 % (with color testable)
Standard B/G/D/K/I/N	typ. 64 dB (weighted)
Standard NTSC	typ. 64 dB (weighted)
Standard-L	typ. 48 dB (weighted)
Frequency response	±1 dB (40 Hz...15 kHz)
VSB - AM modulation	
TV standards	B/G, D/K, I, L, M, N
Channel bandwidth	4.2/5/6 MHz
Output level (each RF port)	117 dBµV (1 ch), 113 dBµV (2 ch), 111 dBµV (3 ch)
Output level stability	±1 dB
Output return loss	≥14 dB (45 MHz) -1,5 dB/Octave
Output level setting	0...30 dB (0,5 dB steps)
Spurious (outside TV-Channels)	45...450 MHz, typ. 66 dB; 450..862 MHz, typ. 64 dB
RF parameters	
Output ports	2 pcs.
Channels per port	up to 3 (PAL-625/SECAM); up to 3 (PAL-M/NTSC); up to 2 (PAL-M/ NTSC with BTSC)
Output impedance	75 Ω
Output frequency	45...862 MHz
Output frequency window	34,2 MHz/port
Output frequency steps	1 kHz
Output frequency stability	±10 kHz
Processing	
PCR correction and de-jitter	Yes
Processing bitrate	Max. 1200 Mbps total
Number of PIDs	Max. 2000 PIDs total
Connectors	
RJ45	1 pcs. (for local management)

Technical data	
F-socket RF- output	4 pcs. (2x RF-Output, 2x Test-Output -20dB ± 1dB)
General data	
Power consumption	max. ≤26 W
Operating temperature range	-5°C...+45°C, 23°F...113°F, (ETSI EN 300 019-1-3 Class 3.1)
Max. humidty (non condensing)	95 %
Electro Magnetic Compatibility (EMC)	EN 50083-2
Safety compliance	UL/CSA/CAN 60950-1
Signalling	Multicolor LEDs (Power on - green, Error - red)
Operation Mode	PAL-625/SECAM, PAL-M/NTSC, PAL-M/NTSC with BTSC
Hardware revision	1001
Software version	3.2

Modules

GT 22 C

Tangram module IP to 8x FM

Technical data	
Streaming-Input	
IP-Inputs	32 pcs.
IP-Compliance	ISO/IEC 13818
IP-Input bitrate	Max. 425 Mbit/s per IPTS, Max. 850 Mbit/s total
IP-Input protocol	UDP/RTP/RTP+FEC Unicast and Multicast, IGMP v2 and v3
IP-TS-Input format	SPTS CBR/VBR, MPTS CBR
IP-FEC Inputs	Yes, with GTFEC License
IP-FEC compliance	SMPTE 2022-1, SMPTE 2022-2
IP-Packet format	MPEG over UDP/IP and RTP/IP
IP-Packet size	188 Byte
IP-PCR restamping	Yes
IP-Dejittering	Yes, per default 100ms, individual adjustable
Audio and RDS processing	
Audio decoder	ISO 13818-3 MPEG-1 (L1/L2); MPEG-2 (L1/L2)
Audio language	ISO 639
Audio format	Mono/Stereo/Joint-Stereo
Audio level range	±6 dB
Audio level step size	1 dB
Pilot tone frequency	19 kHz (±2 kHz)
Pilot tone phase stability	< ±3 °
Pilot tone level	6.75 kHz (±0,75 kHz)
RDS insertion	Yes, UECP SPB490 (dynamic and static)
RDS carrier frequency	57 kHz (±6 Hz)
RDS carrier level	2.5 kHz (±0,25 kHz)
RDS carrier phase stability	< ±10 °
Audio parameters	
38 kHz supression	≥42 dB
Flatness	≤ ±0,5 dB (40 Hz...15 kHz)
15 kHz low pass filter	>40 dB (>19 kHz)
Total harmonic distortion	%

Technical data	
S/N ratio (unweighted)	>60 dB (75 kHz dev.), (weighted ITU-R BS 468,4) >60 dB (75 kHz dev.)
L/R channel level difference	<1 dB (40 Hz...15 kHz)
L/R phase difference	<10 dB (40 Hz...15 kHz)
L/R separation	>43 dB (300 Hz...4 kHz)
Preemphasis characteristics	50 µs (±2 µs)
RF parameters	
Output ports	1 pcs. (the second RF port is not in operation)
Channels per port	up to 8
Output impedance	75 Ω
Output frequency	87,5...108 MHz
Output frequency steps	1 kHz
Output level stability	±1 dB
Output level	102 dBµV
Output level setting	0...30 dB (0,5 dB steps)
Output return loss	≥14 dB (45 MHz -1,5 dB/Okt.)
Output spectral purity	>66 dB
Output broadband noise	< -120 dBm/Hz
Processing	
PCR correction and de-jitter	Yes
Processing bitrate	Max. 1200 Mbps total
Number of PIDs	Max. 2000 PIDs total
Connectors	
RJ45	1 pcs. (for local management)
F-socket RF- output	4 pcs. (1x RF-Output, 1x Test-Output -20dB ± 1dB, 2x not in operation)
General data	
Power consumption	max. ≤19 W
Operating temperature range	-5°C...+45°C, 23°F...113°F, (ETSI EN 300 019-1-3 Class 3.1)
Max. humidty (non condensing)	95 %
Electro Magnetic Compatibility (EMC)	EN 50083-2
Safety compliance	-

Technical data	
Signalling	Multicolor LEDs (Power on - green, Error - red)
Operation Mode	-
Hardware revision	1000
Software version	3.1

Modules

GT 23 W

Tangram module IP to 8 or 12x QAM

Technical data	
Streaming-Input	
IP-Inputs	128 pcs.
IP-Standard	ISO/IEC 13818
IP-Input bitrate	Max. 425 Mbit/s per IPTS, Max. 850 Mbit/s total
IP-Input protocol	UDP/RTP/RTP+FEC Unicast and Multicast, IGMP v2 and v3
IP-TS-Input format	SPTS CBR/VBR, MPTS CBR
IP-FEC Inputs	Yes, with GTFEC License
IP-FEC compliance	SMPTE 2022-1, SMPTE 2022-2
IP-Packet format	MPEG over UDP/IP and RTP/IP
IP-Packet size	188 Byte
IP-PCR restamping	Yes
IP-Dejittering	Yes, per default 100ms, individual adjustable
QAM Modulation	
Compliance	DVB-C (EN 300 429), ITU-T J.83 Annex A, B and C
Modulation type	16-, 32-, 64-, 128-, 256-QAM
Symbol rate	4,45...7,00 MS/s
Roll-Off	12%, 13%, 15%, 18%
MER	> 45 dB (typ. 46 dB)
BER	≤ 1*10-10
Spectrum flatness	± 0,3 dB
Shoulder attenuation	≥ 55 dB
RF parameters	
Output ports	2 pcs.
Channels per port	up to 4 (DVB-C, J.83 Annex A and C), up to 3 (J.83 Annex B)
Output impedance	75 Ω
Output frequency range	45...1002 MHz
Output frequency window	34,2 MHz/port
Output frequency steps	1 kHz
Output frequency stability	± 10 kHz
Channel bandwidth	06-07-2008 MHz

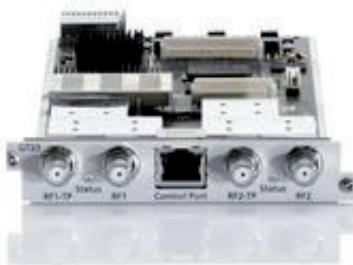| Technical data	
Output level (each RF port)	119 dBµV (1 ch), 115 dBµV (2 ch), 113 dBµV (3 ch), 111 dBµV (4 ch)
Output level stability	± 1 dB
Output return loss	≥ 14 dB (45 MHz) -1,5 dB/Octave
Output level steps	0...30 dB (0,5 dB steps)
Spurious (Inside TV-Channels)	> 60 dB
Spurious (outside TV-Channels)	45...450 MHz, typ. 66 dB, 450..1002 MHz, typ. 64 dB
Processing	
Service remultiplexing	Yes, with GTMUX Software option
PID filtering and remapping	Yes
PCR correction and de-jitter	Yes
Advanced PSI/SI regeneration	Yes
NIT generation	Yes, with GTPSISI or GTSYMUX
Encryption	Yes, DVB-CSA
Encryption throughput	Max. 450 Mbps total (DVB-C 8 outputs, J.83 Annex A,C), Max. 300 Mbps total (J.83 Annex B)
Compliance	ETSI EN 300 468
Processing bitrate	Max. 1200 Mbps total
Number of PIDs	Max. 2000 PIDs total
Connectors	
RJ45	1 pcs.
F-socket RF- output	4 pcs. (2x RF-Output, 2x Test-Output -20dB ± 1dB)
General data	
Power consumption	Max. ≤ 19 W
Operating temperature range	-5°C...+45°C, 23°F...113°F, (ETSI EN 300 019-1-3 Class 3.1)
Max. humidty (non condensing)	95 %
Electro Magnetic Compatibility (EMC)	EN 50083-2
Safety compliance	UL/CSA/CAN 60950-1
Signalling	Multicolor LEDs (Power on - green, Error - red)

Technical data	
Operation Mode	DVB-C 8 outputs J.83 Annex B, J.83 Annex C
Hardware revision	1000
Software version	3.0

Modules

GT 24 W

Tangram module IP to 8x COFDM

Technical data	
Interface Gigabit Ethernet	
Data protocol	MPEG over UDP/IP and RTP/IP
Communication protocol	Unicast and multicast IGMP V2 (optional V3)
Syntax	SPTS and MPTS (ISO/IEC 13818)
Maximum data input bitrate using several MPTS signals	>800 Mbps (using multiple MPTS signals)
Maximum MPTS input bitrate	>100 Mbps (per specific MPTS)
Services per MPTS	1024 pcs. (per module)
Number of filter	up to 32 (multicast/unicast filter)
Jitter tolerance	±100 ms
TS Processing	
SPTS/MPTS Multiplexing inc.	SPTS / MPTS Multiplexing inc. supported
PID-Remapping	PID-Remapping
MPTS Pass-Through	Yes
SI-Table handling	Yes
Individual Cycle Times for Outgoing PSI-/SI-Tables	Yes
Max. number of simultaneous E 16	16 pcs.
COFDM Processing	
MER	>40 dB (typ. 42 dB)
SNR	≥45 dB
Roll-Off	35 %
BER	≤1*10-10
I/Q Ampl. Imbalance	≤0,10 %
I/Q Quadratur Error	≤0,10 °
Modulation	QPSK, 16-, 64-QAM
FEC	1/2, 2/3, 3/4, 5/6, 7/8
Guard Interval	1/4, 1/8, 1/16, 1/32
FFT Mode	2k, 8k switchable
Spectrum flatness	±0,3 dB
Shoulder attenuation	≥54 dB
RF parameters	
Output ports	2 pcs.

Technical data	
Channels per port	up to 4 (2k-mode) or 3 (2k/8k-mode)
Output impedance	75 Ω
Output frequency	45...862 MHz
Output frequency window	34.2 MHz (per port)
Output frequency steps	1 kHz
Modulation COFDM	
Channel bandwidth	5 / 6 / 7 / 8 MHz
Output level (each RF port)	115(1 ch), 111(2 ch), 109(3 ch), 107(4 ch) dBµV
Test port at each output	-20 dB (±1 dB)
Output level stability	±1 dB
Output return loss	≥14 dB (45 MHz -1,5 dB/Okt.)
Output level setting	0...30 dB (0,5 dB steps)
Spurious (Inside TV-Channels)	>60 dB
Spurious (Outside TV-Channels)	45...450 MHz, typ. 66 dB, 450...862 MHz, typ. 64 dB, 862...1006 MHz, typ. 64 dB
Connectors	
RJ45	1 pcs.
F-socket RF- output	4 pcs.
General data	
Power consumption max.	<20,4 W (max.)
Dimensions (width x height x depth)	100 x 200 mm
Operating temperature range	-5°C...+45 °C (ETSI EN 300 019-1-3 Class 3.1)

Modules

GT 26

Tangram module IP to 4x ISDB-T

Technical data	
Streaming-Input	
IP-Compliance	ISO/IEC 13818
IP-Inputs	32 pcs. MPTS or SPTS
IP-FEC Inputs	Yes, with GTFEC License
IP-Input bitrate	Max. 100 Mbps per IPTS, Max. 850 Mbps total
IP-Input protocol	UDP/RTP/RTP+FEC Unicast and Multicast, IGMP v2 and v3
IP-TS-Input format	VBR and CBR
IP-Packet format	MPEG over UDP/IP and RTP/IP
IP-Packet size	188 Byte
IP-PCR restamping	Yes
Processing	
Multiplexing	Yes, with GTMUX or GTSYMUX Software option
PID filtering and remapping	Yes
ISDB-T-Output	
Program scheduling	Yes
Output modulation standard	ARIB STD-B31, Layer A
Output spectrum (mode)	Mode1 (2k), Mode2 (2k), Mode3 (8k)
Total carriers	1405, 2809, 5617
Output modulation type	ISDB-T
Output hierarchy	Layer A
Number of segments	13
Output S/N	>45 dB
Output MER	>41 dB typ. 43 dB
Output BER	<1*10-10
Output FEC	1/2, 2/3, 3/4, 5/6, 7/8
Output guard intervall	1/4, 1/8, 1/16, 1/32
Output spectrum flatness	±0,3 dB
Output shoulder attentuation	>54 dB
RF parameters	
Output ports	pcs.
Channels per port	2 pcs.
Output impedance	75 Ω

Technical data	
Output frequency range	45...862 MHz
Output frequency steps	1 kHz
Output frequency stability	±10 kHz
Channel bandwidth	6 MHz
Output level	115 dBµV
Test port at each output	- 20 dB ±1 dB
Output level stability	±1 dB
Output return loss	>14 dB (45 MHz -1,5 dB/Okt.)
Output level setting range	0...30 dB (0,5 dB steps)
Output level detection	for alarm monitoring and redundancy switching
Spurious (inside TV-Channels)	>60 dB
Spurious (outside TV-Channels)	dB 45...450 MHz typ. 66 dB min. 62 dB, 450...862 MHz typ. 64 dB min. 60 dB,
Connectors	
F-socket RF- output	4 pcs. (2x F-connector, 2x F-connector Test port)
RJ45	1 pcs. (100BaseTX, for local management)
General data	
Power consumption max.	<20,4 W
Operating temperature range	-5°C...+45 °C (ETSI EN 300 019-1-3 Class 3.1)
Electro Magnetic Compatibility (EMC)	EN 50083-2
Max. humidty (non condensing)	95 %
Signalling	Multicolor LEDs (Power on - green, Error - red)

Modules

GT 31 W

Tangram Frontend DVB-S/S2/C/T/T2/ISDB-T

Technical data	
RF-Inputs DVB-S/S2	
Number of tuner	4 pcs.
Modulation type	DVB-S/S2
Frequency range	950...2150 MHz
Level range	35...90 dBμV, -74...-19 dBm
Symbol rate	1...45 Mbaud (<100 Mbit)
FEC inner DVB-S2	LDPC 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
Return loss	>12 dB
DiSEqC	DiSEqC 1.0
LNB electrical power supply	0.4 A 13/ 18 V max.
RF-Inputs DVB-T/T2	
Number of tuner	4 pcs.
Modulation type	DVB-T/T2
Frequency range	43...862 MHz
Level range	39...79 dBμV, -70...-30 dBm
COFDM-Spectrum DVB-T	2 k and 8 k FFT
Guard Interval	1/32, 1/16, 1/8, 1/4
FEC inner code DVB-T/T2	Conv., K=7, G=1/2, 2/3, 3/4, 4/5, 5/6, 7/8
DVB-T2 bandwidth	1.7, 5, 6, 7, 8 MHz (and extended bandwidth)
Return loss	>18 dB @ 47 MHz, >12 dB @ 862 MHz
RF-Inputs DVB-C	
Number of tuner	4 pcs.
Modulation type	DVB-C
Frequency range	43...862 MHz
Level range	49...90 dBμV, -90...-19 dBm (QAM 256)
Symbol rate DVB-C	1...7.2 Mbaud
QAM-Modulationsart	16-, 32-, 64-, 128-, 256-QAM
Return loss	>18 dB @ 47 MHz, >12 dB @ 862 MHz

Technical data	
Compliance	EN300421, EN302307, EN300744, EN302755, EN300429, Nordig unified ver 2.2.1, D-book 7.0
RF-Inputs ISDB-T	
Number of tuner	4 pcs.
Modulation type	ISDB-T
Frequency range	43...862 MHz
Level range	38...90 dBμV, -71...-19 dBm
Compliance	ARIB STD-B31, Layer A
Bandwidth ISDB-T	6/7/8 MHz
Streaming-In-/Output	
IP-Inputs	0 pcs.
IP-Outputs	64 or 128 pcs. (128 with GTSTRX License)
IP-Compliance	ISO/IEC 13818
IP-Input bitrate	-
IP-Output bitrate	Max. 425 Mbit/s per IPTS, Max. 850 Mbit/s total
IP-Input protocol	-
IP-Output protocol	UDP/RTP/RTP+FEC Unicast and Multicast, IGMP v2 and v3
IP-TS-Input format	-
IP-TS-Output format	SPTS CBR/VBR, MPTS CBR
IP-FEC Inputs	-
IP-FEC Outputs	32, with GTFEC License
IP-FEC compliance	SMPTE 2022-1, SMPTE 2022-2
IP-Packet format	MPEG over UDP/IP and RTP/IP
IP-Packet size	188 Byte
IP-PCR restamping	Yes
Processing	
Service remultiplexing	Yes, with GTMUX Software option
PID filtering and remapping	Yes
PCR correction and de-jitter	Yes
Advanced PSI/SI regeneration	Yes

Technical data	
Encryption	Yes, DVB-CSA, AES, Samsung LYNK
Encryption throughput	Max. 600 Mbps total
Decryption	Yes, BISS (GTBISS)
Decryption throughput	Max. 300 Mbps total
Compliance	ETSI EN 300 468
Processing bitrate	Max. 1200 Mbps total
Number of PIDs	
Connectors	
RJ45	1 pcs.
F connector RF input	4 pcs.
General data	
Power consumption max.	<25 W (max.)
Operating temperature range	-5°C...+45°C, 23°F...113°F, (ETSI EN 300 019-1-3 Class 3.1)
Max. humidty (non condensing)	95 %
Electro Magnetic Compatibility (EMC)	EN 50083-2
Safety compliance	UL/CSA/CAN 60950-1
Signalling	Multicolor LEDs (Power on - green, Error - red)
Operation Mode	-
Hardware revision	1102
Software version	3.0
Tuner	Tuner 067

Modules

GT 32 W

High-density ASI input/output module

Technical data	
ASI input / output	
ASI-Inputs	4 pcs. (max.)
ASI-Outputs	4 pcs. (max.)
ASI-Impedance	75 Ω
ASI-Frequency range	< 270 MHz
ASI-Return loss	> 17 dB (27...270 MHz)
ASI-Compliance	EN 50083-9:2002
ASI-Packet size Input/Output	188, 204/188 Byte
ASI-PCR restamping	Yes
ASI-Input/Output max. payload bit rate	Typ. 200 Mbit/s
Streaming-In-/Output	
IP-Inputs	64 or 128 pcs. (128 with GTSTRX License)
IP-Outputs	64 or 128 pcs. (128 with GTSTRX License)
IP-Standard	ISO/IEC 13818
IP-Input bitrate	Max. 425 Mbit/s per IPTS, Max. 850 Mbit/s total
IP-Output bitrate	Max. 425 Mbit/s per IPTS, Max. 850 Mbit/s total
IP-Input protocol	UDP/RTP/RTP+FEC Unicast and Multicast, IGMP v2 and v3
IP-Output protocol	UDP/RTP Unicast and Multicast, IGMP v2 and v3
IP-TS-Input format	SPTS CBR/VBR, MPTS CBR
IP-TS-Output format	SPTS CBR/VBR, MPTS CBR
IP-FEC Inputs	Yes, with GTFEC License
IP-FEC Outputs	Yes, with GTFEC License
IP-FEC compliance	SMPTE 2022-1, SMPTE 2022-2
IP-Packet format	MPEG over UDP/IP and RTP/IP
IP-Packet size	188 Byte
IP-PCR restamping	Yes
Processing	
Service remultiplexing	Yes, with GTMUX Software option
PID filtering and remapping	Yes

Technical data	
PCR correction and de-jitter	
Advanced PSI/SI regeneration	Yes, with GTMUX Software option
Encryption	-
Encryption throughput	-
Decryption	-
Decryption throughput	-
Compliance	ETSI EN 300 468
Processing bitrate	Max. 1200 Mbps total
Number of PIDs	Max. 4000 PIDs total
Connectors	
RJ45	1 pcs.
BNC-socket	4 pcs. Individidually configurable for in/out via UI
General data	
Power consumption max.	≤ 10 W
Operating temperature range	-5°C...+45°C, 23°F...113°F, (ETSI EN 300 019-1-3 Class 3.1)
Max. humidty (non condensing)	95 %
Electro Magnetic Compatibility (EMC)	EN 50083-2
Safety compliance	UL/CSA/CAN 60950-1
Signalling	Multicolour LEDs
Operation Mode	-
Hardware revision	1102
Software version	3.0
Tuner	-

Modules

GT 33

Tangram 8VSB - ATSC/QAM J.83 B IP Gateway

Technical data	
RF-Inputs ATSC 8 VSB	
Number of tuner	8 pcs.
Modulation type	8VSB
Frequency range	47...862 MHz
Level range	45...90 dBμV, -64...-49 dBm
Return loss	>13 dB
RF-Inputs DVB-C	
Number of tuner	8 pcs.
Modulation type	J.83 Annex B
Frequency range	47...862 MHz
Level range	45...90 dBμV, -64...-49 dBm
QAM-Modulationsart	64-, 256-QAM
Return loss	>18 dB @ 47 MHz, >12 dB @ 862 MHz
Compliance	EN300421, EN302307, EN300744, EN302755, EN300429, Nordig unified ver 2.2.1, D-book 7.0
Streaming-In-/Output	
IP-Inputs	0 pcs.
IP-Outputs	64 o. 128 pcs.
IP-Compliance	ISO/IEC 13818
IP-Input bitrate	-
IP-Output bitrate	Max. 425 Mbit/s per IPTS, Max. 850 Mbit/s total
IP-Input protocol	-
IP-Output protocol	UDP/RTP/RTP+FEC Unicast and Multicast, IGMP v2 and v3
IP-TS-Input format	-
IP-TS-Output format	SPTS CBR/VBR, MPTS CBR
IP-FEC Inputs	-
IP-FEC Outputs	32, with GTFEC License
IP-FEC compliance	SMPTE 2022-1, SMPTE 2022-2
IP-Packet format	MPEG over UDP/IP and RTP/IP
IP-Packet size	188 Byte
IP-PCR restamping	
Processing	

Technical data	
Service remultiplexing	Yes, with GTMUX Software option
PID filtering and remapping	Yes
PCR correction and de-jitter	Yes
Basic PSIP regeneration	-
Encryption	Yes, DVB-CSA, AES, Samsung LYNK
Encryption throughput	Max. 600 Mbps total
Decryption	Yes, BISS (GTBISS)
Decryption throughput	Max. 300 Mbps total
Compliance	ETSI EN 300 468
Processing bitrate	Max. 1200 Mbps total
Number of PIDs	Max. 4000 PIDs total
Connectors	
RJ45	1 pcs.
F connector RF input	4 pcs.
General data	
Power consumption max.	<12 W (max.)
Operating temperature range	-5°C...+45°C, 23°F...113°F, (ETSI EN 300 019-1-3 Class 3.1)
Max. humidity, non condensing	95 %
Electro Magnetic Compatibility (EMC)	EN 50083-2
Safety standards	UL/CSA/CAN 60950-1
Signalling	Multicolor LEDs (Power on - green, Error - red)
Operation Mode	-
Hardware revision	1001
Software version	3.0
Tuner	-

Modules

GT 34

8x/16x DVB-S/S2 - IP Gateway

Technical data	
RF-Inputs DVB-S/S2	
Number of tuner	16 pcs. (8 tuner reception enabled by hardware, additional 8 tuner will be enabled by GTOS2 software option)
Modulation type	DVB-S/S2
Frequency range	950...2150 MHz
Level range	62...100 dBµV, -46...-8 dBm
Symbol rate	1...45 Mbaud (<100 Mbit)
FEC inner DVB-S	1/2, 2/3, 3/4, 5/6, 7/8
FEC inner DVB-S2	LDPC ¼, 1/3, 2/5, 1/2, 3/5, 2/3, ¾, 4/5, 5/6, 8/9, 9/10
Return loss	>10 dB
DiSEqC	DiSEqC 1.0
LNB electrical power supply	0.4 A (max. 13/18 V)
Streaming-In-/Output	
IP-Inputs	0 pcs.
IP-Outputs	64 o. 128 pcs. (128 with GTSTRX software option)
IP-Compliance	ISO/IEC 13818
IP-Input bitrate	-
IP-Output bitrate	Max. 425 Mbit/s per IPTS, Max. 850 Mbit/s total
IP-Input protocol	-
IP-Output protocol	UDP/RTP/RTP+FEC Unicast and Multicast, IGMP v2 and v3
IP-TS-Input format	-
IP-TS-Output format	SPTS CBR/VBR, MPTS CBR
IP-FEC Inputs	-
IP-FEC Outputs	32 pcs. (with GTFEC Software option)
IP-FEC compliance	-
IP-Packet format	MPEG over UDP/IP and RTP/IP
IP-Packet size	188 Byte
IP-PCR restamping	Yes
Processing	

Technical data	
Service remultiplexing	Yes, with GTMUX Software option
PID filtering and remapping	
PCR correction and de-jitter	Yes
Advanced PSI/SI regeneration	Yes
NIT generation	No
Encryption	-
Encryption throughput	-
Decryption	No
Decryption throughput	-
Compliance	ETSI EN 300 468
Processing bitrate	Max. 1200 Mbps total
Number of PIDs	Max. 2000 PIDs total
Connectors	
RJ45	1 pcs.
F connector RF input	4 pcs.
General data	
Power consumption max.	max. ≤25 W
Operating temperature range	-5°C...+45°C, 23°F...113°F, (ETSI EN 300 019-1-3 Class 3.1)
Max. humidity, non condensing	95 %
Electro Magnetic Compatibility (EMC)	DIN EN 55022:2008-05
Safety standards	-
Signalling	Multicolor LEDs (Power on - green, Error - red)
Operation Mode	-
Hardware revision	1000
Software version	3.0
Tuner	73
Weight	kg

Modules

GT 41

IP Processing Module
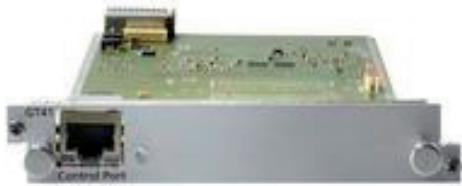
The GT41 module is part of the TANGRAM product portfolio. GT41 is a universal IP processing module for multiplexing/re-multiplexing MPTS <> SPTS streams and scrambling of content. TANGRAM is a very high density and highly flexible solution for all kinds of networks. The WISI Tangram chassis uses a fully redundant concept.

Technical data	
Streaming-In-/Output	
IP-Inputs	32 or 64 or 128 pcs. (128 with GTSTRX Software option)
IP-Outputs	32 or 64 or 128 pcs. (128 with GTSTRX Software option)
IP-Compliance	ISO/IEC 13818
IP-Input bitrate	Max. 425 Mbit/s per IPTS, Max. 850 Mbit/s total
IP-Output bitrate	Max. 425 Mbit/s per IPTS, Max. 850 Mbit/s total
IP-Input protocol	UDP/RTP/RTP+FEC Unicast and Multicast, IGMP v2 and v3
IP-Output protocol	UDP/RTP/RTP+FEC Unicast and Multicast, IGMP v2 and v3
IP-TS-Input format	SPTS CBR/VBR, MPTS CBR
IP-TS-Output format	SPTS CBR/VBR, MPTS CBR
IP-FEC Inputs	32 or 64 or 128 pcs. (with GTFEC Software option)
IP-FEC Outputs	32 pcs. (with GTFEC Software option)
IP-FEC compliance	SMPTE 2022-1, SMPTE 2022-2
IP-Packet format	MPEG over UDP/IP and RTP/IP
IP-Packet size	188 Byte
IP-PCR restamping	Yes
IP-Dejittering	Yes, per default 100ms, individual adjustable
Processing	
Service remultiplexing	Yes (GTMUX functionality is included)
PID filtering and remapping	Yes
PCR correction and de-jitter	Yes
Advanced PSI/SI regeneration	Yes
Encryption	Yes, DVB-CSA, AES-128 (CBC, ECB-L, ECB-T), Samsung LYNK, Pro:Idiom, IDSA/ATIS-0800006, DVB-CISSA
Encryption throughput	max. 850 Mbps total
Decryption	Yes, BISS

Technical data	
Bulk decryption	-
Decryption throughput	max. 850 Mbps total
Compliance	ETSI EN 300 468
Processing bitrate	Max. 1700 Mbps total
Number of PIDs	
Connectors	
RJ45	1 pcs.
F connector RF input	0 pcs.
General data	
Power consumption max.	<5 W (max.)
Operating temperature range	-5°C...+45°C, 23°F...113°F, (ETSI EN 300 019-1-3 Class 3.1)
Max. humidty (non condensing)	95 %
Electro Magnetic Compatibility (EMC)	EN 50083-2
Safety compliance	UL/CSA/CAN 60950-1
Signalling	Multicolor LEDs (Power on - green, Error - red)
Operation Mode	Scrambling, Descrambling, Pro:Idiom
Hardware revision	1001
Software version	3.0.1
Tuner	- pcs.

characteristics

- MPTS <-> SPTS IP Gateway
- DVB, AES, Pro:Idiom or Samsung LYNK scrambling for IPTV out
- DVB/ARIB transport stream processing
- SPTS/MPTS Streaming and Reception via IP (CBR or VBR)
- Dedicated Ethernet interface for CAS connection
- High flexibility scrambling on PID Level

Scope of delivery

- 1x GT41 module
- 1x Quick Guide

Modules

GT 42 W
Universal decryption module

The GT 42 module is part of the Tangram product portfolio. The GT 42 W CI module is designed as descrambler to be optionally combined with other Tangram modules. All Common Interfaces can be cascaded to reduce costs by using standard CAMs. Tangram is a very high density and highly flexible solution for all kinds of networks. The WISI Tangram chassis uses a fully redundant concept (n+1, 1+1).

Technical data	
Streaming-In-/Output	
IP-Inputs	32 or 64 or 128 pcs. (128 with GTSTRX Software option)
IP-Outputs	64 or 128 pcs. (128 with GTSTRX Software option
IP-Compliance	ISO/IEC 13818
IP-Input bitrate	Max. 425 Mbit/s per IPTS, Max. 850 Mbit/s total
IP-Output bitrate	Max. 425 Mbit/s per IPTS, Max. 850 Mbit/s total
IP-Input protocol	UDP/RTP/RTP+FEC Unicast and Multicast, IGMP v2 and v3
IP-Output protocol	UDP/RTP/RTP+FEC Unicast and Multicast, IGMP v2 and v3
IP-TS-Input format	SPTS CBR/VBR, MPTS CBR
IP-TS-Output format	SPTS CBR/VBR, MPTS CBR
IP-FEC Inputs	32 or 128 pcs. (with GTFEC Software option)
IP-FEC Outputs	32 pcs. (with GTFEC Software option)
IP-FEC compliance	SMPTE 2022-1, SMPTE 2022-2
IP-Packet format	MPEG over UDP/IP and RTP/IP
IP-Packet size	188 Byte
IP-PCR restamping	Yes
IP-Dejittering	Yes, per default 100ms, individual adjustable
Processing	
Service remultiplexing	Yes, with GTMUX Software option
PID filtering and remapping	Yes
PCR correction and de-jitter	Yes
Advanced PSI/SI regeneration	Yes
Encryption	-
Encryption throughput	-
Decryption	Yes, with CAM and Smart Card
Decryption throughput	Depending of the CAM, max. 850 Mbps total
Compliance	ETSI EN 300 468
Processing bitrate	Max. 1200 Mbps total

Technical data	
Number of PIDs	Max. 4000 PIDs total
CI and decryption	
Bit rate	55/62/70/82/98 Mbps
Service remultiplexing before decryption	Yes, with GTMUX Software option
Watch dog decryption	Yes
CA PMT mode	Yes, normal or first PMT or with the lowest program number
Multichannel decryption	Yes
Service level decryption	Yes
PID level decryption	Yes
Compliance	EN 50221
Connectors	
RJ45	1 pcs.
Common Interface for Descrambling	4 pcs.
General data	
Power consumption max.	max. <10 W
Operating temperature range	-5°C...+45°C, 23°F...113°F, (ETSI EN 300 019-1-3 Class 3.1)
Max. humidty (non condensing)	95 %
Electro Magnetic Compatibility (EMC)	EN 50083-2
Safety compliance	UL/CSA/CAN 60950-1
Signalling	Multicolor LEDs (Power on - green, Error - red)
Operation Mode	-
Hardware revision	1301
Software version	3.1.1
Tuner	- pcs.

characteristics
- 4 Common Interface (DVB-CI) slots per module
- CAM watchdog - auto reset on descrambling failures
- Support for all major CA systems and CAMs
- DVB/ARIB transport stream processing
- SPTS and MPTS streaming (CBR or VBR)
- Demultiplex MPEG-2/MPEG-4 signals for SPTS transmission
- High density descrampling 24 CA modules per 1RU chassis
- FEC output support - IP error protection

Power supplies

GT 55 W 0048

Additional power supply 48 VDC for redundancy

GT 55 W 0110

Additional power supply 110 VAC for redundancy

GT 55 W 0230

Additional power supply 230 VAC for redundancy

Technical data			
Connectors			
Cold-device plug, IEC 60320-C14	0 pcs.	1 pcs.	1 pcs.
DC-connetors	1 pcs.	0 pcs.	0 pcs.
General data			
Primary voltage	-45...-75 V DC	90...145 V AC	180...265 V AC
Frequency range	- Hz	47...63 Hz	47...63 Hz
Secondary voltage	12 V DC	12 V DC	12 V DC
Power consumption	220 W	220 W	220 W
Efficiency	≥90 %	≥90 %	≥90 %
Dimensions (width x height x depth)	100 x 44 x 217 mm	100 x 44 x 217 mm	100 x 44 x 217 mm
Environmental parameters	-20...+55 °C	-20...+55 °C	-20...+55 °C
Protection class	IP30	IP30	IP30

Software options

GT M1

Software option for additional 1 year SUA extension

GT M3

Software option for additional 3 year SUA extension

Technical data	
SUA Service License Agreement	
SUA Validity	SUA validity Indicated in the TANGRAM UI, and at www.wisiconnect.tv
Initial SUA period	One year SUA from the date of registration at www.wisiconnect.tv
Initial SUA	SUA one year included in the HW purchase
SUA function	Valid SUA allowing upload of new firmware releases
SUA expiry consequences	Upload of new firmware will be possible until the expiry of the SUA.
Value Proposition of the SUA	Access to the newest software release and the possibility to update the firmware on the GTx Equipment. Access to the update release and the possibility to update the firmware on the GTx Equipment. Access to Knowledge base and technical documentation www.wisiconnect.tv

Technical data	
SUA Service License Agreement	
SUA Validity	SUA validity Indicated in the TANGRAM UI, and at www.wisiconnect.tv
Initial SUA period	One year SUA from the date of registration at www.wisiconnect.tv
Initial SUA	SUA one year included in the HW purchase
SUA function	Valid SUA allowing upload of new firmware releases
SUA expiry indication	Expired SUA indicated in the TANGRAM UI, and at www.wisiconnect.tv. Not allowed to upload firmware with release date prior to SUA expiry date
SUA expiry consequences	No restriction for the current operation or functionality SW options remaining
Value Proposition of the SUA	Upload of new firmware will be possible until the expiry of the SUA.

The TANGRAM product platform is continuously evolved and developed with new or extended functionalities. To benefit from the development, you can upload new firmware versions in your existing installations. To be allowed to upgrade to a new firmware version, you must have avalid Software Update Agreement (SUA-> http://page.wisi.de/sua-faq). All TANGRAMs get a one year SUA from the date of registration on www.wisiconnect.tv. To extend the SUA, you buy the SW option GTM1 (1 year extension) or GTM3 (3 years extension). The WISI TANGRAM video platform is a highdensity digital TV headend for contribution of digital TV via IP networks and end-to-end IPTV solutions such as video-on-demand, connected TV and OTT (Over The Top) or Web TV.

The TANGRAM product platform is continuously evolved and developed with new or extended functionalities. To benefit from the development, you can upload new firmware versions in your existing installations. To be allowed to upgrade to a new firmware version, you must have avalid Software Update Agreement (SUA-> http://page.wisi.de/sua-faq). All TANGRAMs get a one year SUA from the date of registration on www.wisiconnect.tv. To extend the SUA, you buy the SW option GTM1 (1 year extension) or GTM3 (3 years extension). The WISI TANGRAM video platform is a highdensity digital TV headend for contribution of digital TV via IP networks and end-to-end IPTV solutions such as video-on-demand, connected TV and OTT (Over The Top) or Web TV.

Software options

GT DOL

Software option for Dolby Digital audio decoding

GT MUX

Software option for enabling the muliplexer

Technical data	
Dolby decoding	
Number of audio decodings	Up to 6 Dolby audio in to analogue audio out
Supported formats	AC-3 (Dolby Digital)

The TANGRAM Dolby decoding is enabled by the SW option GTDOL. The Dolby decoding allows reception of Dolby audio sound and decoding to support the different audio output formats for analogue (PAL and SECAM) modulation.The GTDOL software option requires a Dolby enabled TANGRAM HW. The WISI TANGRAM video platform is a high-density TV headend for contribution of digital TV via IP networks and end-to-end IPTV solutions such as video-on-demand, connected TV and OTT (Over The Top) or Web TV.

Technical data	
Remultiplexing and PSI / SI	
Service remultiplexing	Yes
PID filtering and PID remapping	Yes
PID/SID auto anti-clash	Yes
PCR correction and de-jitter	Yes
Dynamic PSI/SI processing	Yes
Advanced PSI/SI regeneration	Yes
Supported tables	PAT, CAT, PMT, TSDT, NIT, SDT, EIT, TDT, TOT
DVB compliance	ETSI EN 300 468

Remultiplexing and PSI / SI handling in the TANGRAM platform and in a system of TANGRAMs are enabled by the software options GTMUX (remultiplexing in a single TANGRAM), GTPSISI (enabling PSI/SI sharing between TANGRAMs), and GTSYMUX(remultiplexing in a system of TANGRAMs).

Software options

GT NRED

Software option for N+1, 1+1 module redundancy

GT PSISI

Software option for PSI/SI sharing and regeneration

Technical data	
N+1 Redundancy	
Number of Redundancy groups	3
Number of operational units	max. 5 (1 redundancy group with 1 TANGRAM GTx module)
Auto fail-over	Yes
Recovery	Manual recovery

The N+1 module redundancy for GT01Wx is enabled by the SW option GTNRED. The N+1 redundancy for GT01Wx provides the functionality to set up redundancy group, and assigning TANGRAM modules as a „master" or „reserve" or „none" for a group. The „reserve" TANGRAM in a redundancy group is kept „offline" until it needs to be used due to a failure in an operational TANGRAM. The WISI TANGRAM video platform is a high-density digital TV headend for contribution of digital TV via IP networks and end-to-end IPTV solutions such as video-on-demand, connected TV and OTT (Over The Top) or Web TV.

Technical data	
Remultiplexing and PSI / SI	
Service remultiplexing	Yes
PID filtering and PID remapping	Yes
PID/SID auto anti-clash	Yes
PCR correction and de-jitter	Yes
Dynamic PSI/SI processing	Yes
Advanced PSI/SI regeneration	Yes
Supported tables	PAT, CAT, PMT, TSDT, NIT, SDT, EIT, TDT, TOT
DVB compliance	ETSI EN 300 468

Remultiplexing and PSI / SI handling in the TANGRAM platform and in a system of TANGRAMs are enabled by the software options GTMUX (remultiplexing in a single TANGRAM), GTPSISI (enabling PSI/SI sharing between TANGRAMs), and GTSYMUX(remultiplexing in a system of TANGRAMs).

Software options

GT RED

IP input stream redundancy

GT SYMUX

Software option for multiplexing and PSI/SI sharing

Technical data	
IP input stream redundancy	
Input modes supported	IP Inputs
Number of alternative inputs	One main input and up to 3 alternative inputs
Fail-over triggering	Bit rate = 0
Multicast and UDP source selection	Yes
Source address selection	Yes

Technical data	
Remultiplexing and PSI / SI	
Service remultiplexing	Yes
PID filtering and PID remapping	Yes
PID/SID auto anti-clash	Yes
PCR correction and de-jitter	Yes
Dynamic PSI/SI processing	Yes
Advanced PSI/SI regeneration	Yes
Supported tables	PAT, CAT, PMT, TSDT, NIT, SDT, EIT, TDT, TOT
DVB compliance	ETSI EN 300 468

IP input redundancy in the TANGRAM is enabled by the SW options GTRED. The IP input redundancy handles switching between sources carrying identical information, e.g. dual sources for securing operation also for cases where one source fails completely. The WISI TANGRAM video platform is a high-density digital TV headend for contribution of digital TV via IP networks and end-to-end IPTV solutions such as video-on-demand, connected TV and OTT (Over The Top) or Web TV.

Remultiplexing and PSI / SI handling in the TANGRAM platform and in a system of TANGRAMs are enabled by the software options GTMUX (remultiplexing in a single TANGRAM), GTPSISI (enabling PSI/SI sharing between TANGRAMs), and GTSYMUX(remultiplexing in a system of TANGRAMs).

Software options

GT FEC

Software option for IP streaming with FEC Error correction or protection

GT SCR

Software option for DVB-Simulcrypt-Scrambling

Technical data	
FEC Error Correction IP inputs	
Standards	SMPTE 2022-1-2007, ProMPEG CoP#3
Input protocol	RTP/ IP
Matrix size, L	in 1D mode: 1 ... 20 / in 2D mode: 4 ... 20
Matrix size, D	4 ... 20
Matrix size, L*D	≤100
FEC Error Protection IP outputs	
Standards	SMPTE 2022-1-2007, ProMPEG CoP#3
Output protocol	RTP/ IP
Matrix size, L	in 1D mode: 1 ... 20 / in 2D mode: 4 ... 20
Matrix size, D	4 ... 20
Matrix size, L*D	≤100

Technical data	
DVB-CSA / Simulcrypt interface	
Interface	IP
Number of encrypted Services	up to 32 with GTSCR and up to 128 with GTSCR + GTSCRX
Number of encrypted PIDs	up to 128 with GTSCR and up to 512 with GTSCR + GTSCRX
Unterstützung Verschlüsselungs-keys	Max. 150 per module (shared key memory)
Maximaler Verschlüsselungs-Datendurchsatz	Max. 850 Mbps
Scramblable outputs	IP, DVB-C (QAM), DVB-T (COFDM)
Interface protocol version support	ECMG <=> SCG: V2 and V3 / EMMG/PDG <=> MUX: V2 and V3
DVB compliance	DVB-Simulcrypt (ETSI TS 103 197)
Support of selective scrambling	Yes, individual configurable (10%, 25%, 50%, 75%, 100%)

The TANGRAM GTFEC SW option provides an advanced error correction and error protection for IP Streams. For IP SPTS or MPTS streaming reception is FEC useful to correct errors in the packets and improving the quality of service. FEC for output streaming with error protection enables TV operators to deliver high-quality error resistant IP streams from the headend. The WISI TANGRAM video platform is a highdensity digital TV headend for contribution of digital TV via IP networks and end-to-end IPTV solutions such as video-on-demand, connectedTV and OTT (Over The Top) or Web TV.

DVB-CSA Scrambling in the TANGRAM is enabled by the Software option GTSCR (Simulcrypt scrambling). The GTSCR SW option allows you to use the TANGRAM as a scrambler for encryption of the output services by connecting to a Conditional Access Server (CAS) via the IP interface. Together with the TANGRAM scrambler and the CAS you can built your solution for protect the copyrighted content. The extension SW option GTSCRX enables the maximum number of scrambled service.

Software options

GT SCRX

Software option for DVB-Simulcrypt-Scrambling

GT T2MIDE

T2-MI de-encapsulation

Technical data	
DVB-CSA / Simulcrypt interface	
Interface	IP
Number of encrypted Services	up to 32 with GTSCR and up to 128 with GTSCR + GTSCRX
Number of encrypted PIDs	up to 128 with GTSCR and up to 512 with GTSCR + GTSCRX
Unterstützung Verschlüsselungs-keys	Max. 150 per module (shared key memory)
Maximaler Verschlüsselungs-Datendurchsatz	Max. 850 Mbps
Scramblable outputs	IP, DVB-C (QAM), DVB-T (COFDM)
Interface protocol version support	ECMG <=> SCG: V2 and V3 / EMMG/PDG <=> MUX: V2 and V3
DVB compliance	DVB-Simulcrypt (ETSI TS 103 197)
Support of selective scrambling	Yes, individual configurable (10%, 25%, 50%, 75%, 100%)

DVB-CSA Scrambling in the TANGRAM is enabled by the Software option GTSCR (Simulcrypt scrambling). The GTSCR SW option allows you to use the TANGRAM as a scrambler for encryption of the output services by connecting to a Conditional Access Server (CAS) via the IP interface. Together with the TANGRAM scrambler and the CAS you can built your solution for protect the copyrighted content. The extension SW option GTSCRX enables the maximum number of scrambled service.

Technical data	
Number of de-encapsulators	1
Number of PLPs	2
DVB-Compliance	T2-MI EN TS 102 733

The TANGRAM T2-MI de-encapsulation is enabled by the SW options GTT2MIDE (1 de-encapsulator with up to 2 PLPs), GTDT-2MIDE (2 de-encapsulator with up to 4 PLPs) and GTQT2MIPL (4 additional PLPs). Complying with the T2- MI EN TS 102 773, the TANGRAM T2-MI de-encapsulator gives professional T2-MI inputs and sizes of cable networks.

Software options

GT QT2MIPL
T2-MI de-encapsulation

GT DT2MIDE
T2-MI de-encapsulation

Technical data	
Number of PLPs	4
DVB-Compliance	T2-MI EN TS 102 733

Technical data	
Number of de-encapsulators	2
Number of PLPs	4
DVB-Compliance	T2-MI EN TS 102 733

The TANGRAM T2-MI de-encapsulation is enabled by the SW options GTT2MIDE (1 de-encapsulator with up to 2 PLPs), GTDT-2MIDE (2 de-encapsulator with up to 4 PLPs) and GTQT2MIPL (4 additional PLPs). Complying with the T2- MI EN TS 102 773, the TANGRAM T2-MI de-encapsulator gives professional T2-MI inputs and sizes of cable networks.

The TANGRAM T2-MI de-encapsulation is enabled by the SW options GTT2MIDE (1 de-encapsulator with up to 2 PLPs), GTDT-2MIDE (2 de-encapsulator with up to 4 PLPs) and GTQT2MIPL (4 additional PLPs). Complying with the T2- MI EN TS 102 773, the TANGRAM T2-MI de-encapsulator gives professional T2-MI inputs and sizes of cable networks.

Software options

GT LYNKX

Software option for Samsung LYNK scrambler

Samsung LYNK Scrambling in the TANGRAM is enabled by the Software option GTLYNK. The GTLYNK software option allows you to use the TANGRAM as a scrambler for encryption of the output services by connecting to a Conditional Access Server (CAS) via the IP interface. Before you are using TANGRAM as a scrambler with the Samsung LYNK Digital Right Management (DRM) you must purchase a Samsung LYNK DRM license. Samsung LYNK is a fully software based DRM solution and can be installed at a standard server. Together with the TANGRAM scrambler and the Samsung digital CAS you can built your solution for protect the copyrighted content. The extension SW option GTLYNKX enables the maximum number of scrambled service.

Technical data	
Samsung LYNK Scrambler Interface	
Number of encrypted Services	up to 32 with GTLYNK and up to 128 mit GTLYNK + GTLYNKX
Number of encrypted PIDs	up to 128 with GTLYNK and up to 512 with GTLYNK + GTLYNKX
Maximaler Verschlüsselungs-Datendurchsatz	Max. 850 Mbps
Unterstützung Verschlüsselungs-keys	Max. 150 per module (shared key memory)
Interface CAS	IP
Interface protocol version support	ECMG <=> SCG: V2 and V3 / EMMG/PDG <=> MUX: V2 and V3
DVB compliance	DVB-SimulCrypt (ETSI TS 101 197)
Support of selective scrambling	Yes, individual configurable (10%, 25%, 50%, 75%, 100%)

characteristics

- Samsung LYNK Scrambling
- Excellent Pay-TV Content Protection solution
- Descrambling without CAM and Smartcard
- Multiple service scrambling
- PID level scrambling
- Support scrambling of MPEG-2 and H.264 in SD and HD
- EMMG and ECMG connection IP-interface

Scope of delivery
- After buying the software option you can download the enitlement file which includes the software option on www.wisiconnect.tv.

Software options

GT VMX
Verimatrix Bulk Decryption

GT VMXX
Verimatrix Bulk Decryption

Technical data	
Bulk descrambling interface	
Interface	IP, software based smard card
Number of service	Up to 32 with GTVMX and up to 128 with GTVMX and GTVMXX
Number of PIDs	Up to 128 with GTVMX and up to 512 with GTVMX and GTVMXX
Descrambling throughput	Max. 850 Mbps
Supported scrambling algorithms	AES-128 CBC, ECB-L, ECB-T and DVB-CSA
DVB compliance	DVB-Simulcrypt (ETSI TS 103 197)

Technical data	
Bulk descrambling interface	
Interface	IP, software based smard card
Number of service	Up to 32 with GTVMX and up to 128 with GTVMX and GTVMXX
Number of PIDs	Up to 128 with GTVMX and up to 512 with GTVMX and GTVMXX
Descrambling throughput	Max. 850 Mbps
Supported scrambling algorithms	AES-128 CBC, ECB-L, ECB-T and DVB-CSA
DVB compliance	DVB-Simulcrypt (ETSI TS 103 197)

The smart card less Verimatrix bulk decryption in the TANGRAM will be enabled by the SW options GTVMX (up to 32 services) and GTVMXX (extension, up to 128 services). The GTVMX SW option allows you to use the TANGRAM as a bulk descrambler for descrambling the delivered protected content with the Verimatrix Conditional Access Server (VCAS). The extension SW option GTVMXX enables the maximum number of descrambled service per module.

The smart card less Verimatrix bulk decryption in the TANGRAM will be enabled by the SW options GTVMX (up to 32 services) and GTVMXX (extension, up to 128 services). The GTVMX SW option allows you to use the TANGRAM as a bulk descrambler for descrambling the delivered protected content with the Verimatrix Conditional Access Server (VCAS). The extension SW option GTVMXX enables the maximum number of descrambled service per module.

CHAMELEON
SOFTWARE-BASED HEADEND PLATFORM

The unique head end concept

Reducing system complexity by **high density function blocks**

Low power consumption
reduces operating costs

Pro:Idiom encoding
to protect premium content

High scalability
from applications in
hotels to city carriers

Activation of new functionality
by upload via software option

Channel processing Chameleon

Software-based headend solution

WISI Chameleon is an extremely flexible headend system, with only a single module type. The integrated blocks can change their function according to your needs. They are prepared for all current and future applications and are ideal for both the Transition from analogue to the digital world as well as to feed HFC and IP distribution platforms.

Extended
PSI / SI reprocessing

WISI Chameleon at a glance:

- One hardware for all applications
- Flexibility through software applications
- Scalability in function and installation size
- Operational stability
- Easy installation, commissioning and operation
- Excellent performance, also suitable for large network operators
- Redundant power supplies ensure the overall availability of the system

WINNER
TECHNOLOGY INNOVATION
AWARD 2013
"BEST DIGITAL
PROCESSING SOLUTION"
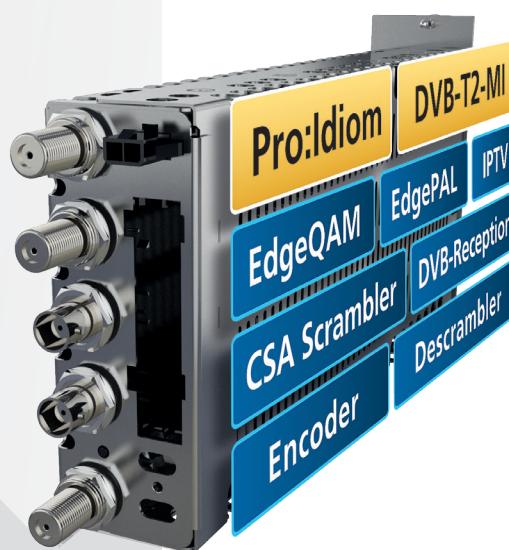
Base units

GN 40 W 0230

Chameleon base unit, 230 V AC, 19", 4 HE, for 10 modules

Technical data	
Connectors	
Module slots	10 pcs.
Power supply	
Power supplies	1 pcs.
General data	
Operating voltage AC	180... 265 V (47...63 Hz)
Power consumption	<245 W
Dimensions (width x height x depth)	443 x 176 x 270 mm (4 HE, 19"-rack)
Operating temperature range	-20...+50 °C

The Chameleon GN 40 W 0230 is a 19″ 4HE basic unit for up to 10 Chameleon modules. The GN 40 W 0230 has an integrated power supply and ventilation system.

GN 50 W 0048

Chameleon base unit, 48 V DC, 19", 3 HE, for 10 modules, embedded switch

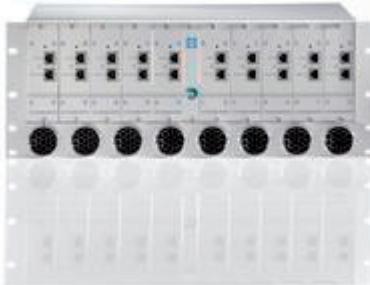| Technical data	
Switch/Controller	
Streaming ports	4 pcs. (1 Gbit/s)
Control ports	1 pcs. (1 Gbit/s)
Category	Layer 2+
Multicast	IGMP V2 + V3
Protocols	RTP, UDP, Multicast / Unicast
Redundancy	N+1 module redundancy
Connectors	
Module slots	10 pcs.
RJ45	5 pcs.
Power supply	
Power supplies	1 pcs.
Optional redundant power supply unit	1 pcs.
General data	
Operating voltage DC	48 V DC
Power consumption	<245 W
Dimensions (width x height x depth)	443 x 132 x 475 mm (3 HE, 19"-Rack)
Operating temperature range	-20...+50 °C

The Chameleon GN 50 W 0048 is a 19″ 3HE basic unit for up to 10 Chameleon modules. The GN 50 W 0048 has an integrated power supply and ventilation system. The Chameleon GN 50 W 0048 can be used alone or in connection with an existing installation to add additional Chameleon modules. A redundant power supply unit and a IP switch can be integrated.

Base units

GN 50 W 0230

Chameleon base unit, 230 V AC, 19", 3 HE, for 10 modules, embedded switch

GN 50 W 0110

Chameleon base unit, 110 V AC, 19", 3 HE, for 10 modules, embedded switch

Technical data	
Switch/Controller	
Streaming ports	4 pcs. (1 Gbit/s)
Control ports	1 pcs. (100 Mbit/s)
Category	Layer 2+
Multicast	IGMP V2 + V3
Protocols	RTP, UDP, Multicast / Unicast
Redundancy	N+1 module redundancy
Connectors	
Module slots	10 pcs.
RJ45	5 pcs.
Power supply	
Power supplies	1 pcs.
Optional redundant power supply unit	1 pcs.
General data	
Operating voltage AC	180... 265 V (47...63 Hz)
Power consumption	<245 W
Dimensions (width x height x depth)	443 x 132 x 475 mm (3 HE, 19"-Rack)
Operating temperature range	-20...+50 °C

Technical data	
Switch/Controller	
Streaming ports	4 pcs. (1 Gbit/s)
Control ports	1 pcs. (100 Mbit/s)
Category	Layer 2+
Multicast	IGMP V2 + V3
Protocols	RTP, UDP, Multicast / Unicast
Redundancy	N+1 module redundancy
Connectors	
Module slots	10 pcs.
RJ45	5 pcs.
Power supply	
Power supplies	1 pcs. GN 55 W 0110
Optional redundant power supply unit	1 pcs. GN 55 W 0110
General data	
Power consumption	≤40 W (without modules, purely chassis)
Operating voltage AC	110 V (50/60 Hz)
Operating temperature range	-20...+50 °C
Max. humidity, non condensing	95 %
Electro Magnetic Compatibility (EMC)	EN 50083-2
Safety compliance	UL/CSA/CAN 60950-1
Dimensions (width x height x depth)	443 x 132 x 475 mm (3 HE, 19"-Rack)

The Chameleon GN 50 W 0230 a 19˝ 3HE basic unit for up to 10 Chameleon modules. The GN 50 W 0230 has an integrated power supply and ventilation system. The Chameleon GN 50 W 0230 can be used alone or in connection with an existing installation to add additional Chameleon modules. A redundant power supply unit and a IP switch can be integrated.

The Chameleon GN 50 W 0110 a 19" 3HE basic unit for up to 10 Chameleon modules. The GN 50 W 0110 has an integrated power supply and ventilation system. The Chameleon GN 50 W 0110 can be used alone or in connection with an existing installation to add additional Chameleon modules. A redundant power supply unit and a IP switch can be integrated.

Base units

GN 20 B

Chameleon base unit, 230 V AC, 19", 1 HE, for 2 modules

GN 20 R

Chameleon base unit, 230 V AC, 19", 1 HE, for 2 modules

Technical data	
Module slots	2 pcs.
Dimensions (width x height x depth)	482,6 x 44,45 x 235 mm
Power supply	Single PSU, approx. 60 W
Embedded fans	Yes

Technical data	
Module slots	2 pcs.
Dimensions (width x height x depth)	482,6 x 44,45 x 235 mm
Power supply	Dual redundant PSU, approx. 2x60 W
Embedded fans	Yes

The GN20 base unit is a professional 1 HU 19 inch base unit for up to 2 Chameleon modules. The GN20 B base unit has a single power supply unit, and embedded fans. The Chameleon modules in GN20 B are managed via the Chameleon RJ45 management ports, and streaming to/from Chameleons is done via the Chameleon RJ45 streaming ports.

The GN20 base unit is a professional 1 HU 19 inch base unit for up to 2 Chameleon modules. The GN20 R base unit has dual redundant power supplies, and embedded fans. The Chameleon modules in GN20 R are managed via the Chameleon RJ45 management ports, and streaming to/from Chameleons is done via the Chameleon RJ45 streaming ports.

Modules

GNHWUW2

Chameleon Processor (DVB-C/T/T2/S/S2/S2X and ISDB-T Receiver)

Chameleon a Software-Based Headend Platform. The Chameleon headend platform is designed with all current and future applications in mind. It is superbly suited for the transition from the analog to the digital environment, and has a unique flexibility that allows you to change functionality by the click of a button. The CHAMELEON product line covers the functionality needs for all types of installations. These can easily be extended, in size by adding more units, and in functionality by adding software options. The software functionality can be modified and upgraded at any time, without changing the hardware. This Chameleon version (GNHWUW2) is equipped with multituner support for DVB-C/T/T2/S/S2/S2X and ISDB-T reception.

Technical data	
RF-Inputs DVB-S/S2/S2X	
Number of tuner	2 pcs.
Modulation type	DVB-S/S2/S2X
Frequency range	950...2150 MHz
Level range	35...90 dBµV (-74...-19 dBm)
Symbol rate	1...45 MS/s (<100 Mbit)
FEC inner DVB-S2	LDPC 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
Return loss	>12 dB
DiSEqC	DiSEqC 1.0
LNB electrical power supply	0.4 A 13/ 18 V max.
Compliance	DVB-S (EN 300 421), DVB-S2 (EN 302 307-1), DVB-S2X (EN 302 307-2)
RF-Inputs DVB-T/T2	
Number of tuner	2 pcs.
Modulation type	DVB-T/T2
Frequency range	47...862 MHz
Level range	39...79 dBµV (-70...-30 dBm)
COFDM-Spectrum DVB-T	2 k and 8 k FFT
Guard Interval	1/32, 1/16, 1/8, 1/4
FEC inner code DVB-T/T2	Conv., K=7, G=1/2, 2/3, 3/4, 4/5, 5/6, 7/8
Bandwidth DVB-T/T2	6/7/8 MHz, 1.7/5/6/7/8 MHz
DVB-T2 PLP	automatic/manuell
Return loss	>18 dB @ 47 MHz, >12 dB @ 862 MHz
Compliance	DVB-T (EN 300 744), DVB-T2 (ETSI EN 302 755)
RF-Inputs ISDB-T	
Number of tuner	2 pcs.
Modulation type	ISDB-T
Frequency range	47...862 MHz
Level range	38...90 dBµV (-71...-19 dBm)
Bandwidth ISDB-T	6/7/8 MHz

Technical data	
RF-Inputs DVB-C/QAM J.83 Annex A	
Number of tuner	2 pcs.
Modulation type	DVB-C/QAM
Frequency range	47...862 MHz
Level range	45...90 dBµV (-64...-19 dBm)
Symbol rate	1...7.2 Mbaud
Constellations	16-, 32-, 64-, 128-, 256-QAM
Return loss	>18 dB @ 47 MHz, >12 dB @ 862 MHz
Bandwidth	06-08-2018 00:00:00 MHz
Compliance	DVB-C (EN 300 429), ITU-T J.83 Annex A
RF-Inputs QAM J.83 Annex B/C	
Number of tuner	2 pcs.
Modulation type	QAM Modulations
Frequency range	47...862 MHz
Level range	45...90 dBµV (-64...-19 dBm)
Symbol rate	5.057 and 5.361 Mbaud l 1-5.3097 Mbaud
QAM mode	64-, 256-QAM
Return loss	>18 dB @ 47 MHz, >12 dB @ 862 MHz
Bandwidth	6 MHz
Compliance	ITU-T J.83 Annex B/C
ASI-In-/Output	
ASI-Inputs	max. 2 pcs.
ASI-Outputs	max. 2 pcs.
ASI-Impedance	75 Ω
ASI-Frequency range	<270 MHz
ASI-Return loss	>17 dB (27...270 MHz)
ASI-Compliance	EN 50083-9:2002
ASI-Packet size Input/Output	188, 204/188 Byte
ASI-PCR restamping	Yes
ASI-Input/Output max. payload bit rate	Typ. 200 Mbit/s

Modules

GNHWTNCW
Transcoder module

The GNHWTNCW module is part of the CHAMELEON product portfolio. The GNHWTNCW SD/HD transcoder module is able to transcode Video/Audio signals to different MPEG codecs.

Technical data	
Streaming-In-/Output	
IP-Inputs	2 pcs. CBR
IP-Outputs	3 pcs. CBR
IP-Compliance	ISO/IEC 13818
IP-Input bitrate	max. 100 Mbps per IPTS, max. 400 Mbps total
IP-Output bitrate	max. 110 Mbps per IPTS, max. 400 Mbps total
IP-Input protocol	UDP/RTP Multicast, IGMP v2 and v3
IP-Output protocol	UDP/RTP/RTP+FEC Unicast and Multicast, IGMP v2 and v3
IP-TS-Input format	CBR
IP-TS-Output format	CBR
IP-Packet format	MPEG over UDP/IP and RTP/IP
IP-Packet size	188 Byte
IP-PCR restamping	Yes
ASI-In-/Output	
ASI-Inputs	2 pcs.
ASI-Outputs	1 pcs.
ASI-Compliance	EN 50083-9:2002
In-/Output max. payload bitrate	200 Mbit/s
ASI-PCR restamping	Yes
Processing/Transcoding	
Transcoding	Up to 4 HD or SD channels
Supported video formats	MPEG-2 SD, MPEG-2 HD, MPEG2 MP@ML, MPEG2 MP@HL, MPEG-4 AVC SD, MPEG-4 AVC HD, MPEG-4 AVC MP@L4.0, MPEG-4 AVC HP@L4.0
Supported audio formats	MPEG 1 layer II, AAC, max. 2 audio streams per stream
Supported resolutions	1080i, 720p, 576i, 480i
Supported tables	PAT and PMT
PCR correction and de-jitter	Yes
Connectors	
F-socket ASI-output	1 pcs.

Technical data	
BNC-socket ASI-input	2 pcs.
RJ45	pcs.
General data	
Power consumption max.	< 15 W
Operating temperature range	-5°C...+45 °C (ETSI EN 300 019-1-3 Class 3.1)
Electro Magnetic Compatibility (EMC)	EN 50083-2
Max. humidty (non condensing)	95 %
Signalling	Multicolor LEDs (Power on - green, Error - red)

characteristics
- Transcoding of up to 4 HD or 4 SD channels per module
- Transcoding MPEG-4/AVC <--> MPEG-2
- Supports MPEG-2 H.262 and MPEG-4 H.264
- Supported formats: 1080i, 720p, 576i, 480i
- Inputs options for transcoding: ASI or IP Multicast
- Outputs options for Transcoding: ASI or IP Multicast/Unicast
- High density: Transcodes up to 24 HD or SD channels in 1 RU
- Full decode and re-encode transcoder architecture

Scope of delivery
- 1x GNHWTNCW module
- 1x Quick Guide

Modules

GNHWENC2H

Chameleon HD/SD encoder for HDMI inputs

Technical data	
HDMI-Input	
HDMI number of ports	4 pcs. (HDMI)
Input format HDMI	1080i50/60/59.94, 720p50/60/59.94, 576p50, 480p60/59.94, 576i50, 480i60/59.94
Input format Audio	PCM (Pulse code modulation)
Compliance	HDMI 1.4a (no scaling)
HDCP Support	No
Video Encoding	
Encoding capacity	4x HD/SD MPEG-2/MPEG-4
Video system	MPEG-2 HD/SD and MPEG-4 HD/SD (H.264/AVC)
Picture size	1080i50/60/59.94, 720p50/60/59.94, 576p50, 480p60/59.94, 576i50, 480i60/59.94
Profile MPEG-4	Baseline, Main, High
Bit rate	MPEG-2 10-19Mbps, MPEG-4 6-13Mbps @ 1080i50/60/59.94, 720p50/60/59.94; MPEG-2 4-12Mbps, MPEG-4 2-6Mbps @ 576p50, 480p60/59.94; MPEG-2 2-8Mbps, MPEG-4 1-4Mbps @ 576i50, 480i60/59.94
Chroma sample	00-00-0000 04:02:00
Aspect ratio	16:9 for HD; 4:3 for SD
Subtitle DVB Support	No
Subtitle OP47 Support	No
Picture size conversion	Downscaling yes, Upscaling no
Frame rate conversion	No
Test pattern	No
Audio Encoding	
Audio-system	ISO 11173-3 (MPEG-1 L2), MPEG-2 AAC (LC)
Number of audio channels	1 per video input @ 4x HD/SD MPEG-2/MPEG-4;2 per video input @ 2x HD/SD MPEG-2/MPEG-4
Sampling frequency	44.1, 48 kHz

Technical data	
Bit rate	64...288 Kbps (max. MPEG1 L2/AAC)
Audio modes	Stereo
Sampling rate conversion	No
Streaming-In-/Output	
IP-Inputs	0 or 32 pcs. (32 with GNSTR software option)
IP-Outputs	4 or 32 pcs. (32 with GNSTR software option)
IP-Compliance	
IP-Input bitrate	Max. 425 Mbit/s per IPTS, Max. 850 Mbit/s total
IP-Output bitrate	Max. 425 Mbit/s per IPTS, Max. 850 Mbit/s total
IP-Input protocol	UDP/RTP/RTP+FEC Unicast and Multicast, IGMP v2 and v3
IP-Output protocol	UDP/RTP/RTP+FEC Unicast and Multicast, IGMP v2 and v3
IP-TS-Input format	SPTS CBR/VBR, MPTS CBR
IP-TS-Output format	SPTS CBR/VBR, MPTS CBR
IP-FEC Inputs	0 or 32 pcs. (with GNSTREC software option)
IP-FEC Outputs	4 or 32 pcs. (with GNSTREC software option)
IP-FEC compliance	SMPTE 2022-1, SMPTE 2022-2
IP-Packet format	MPEG over UDP/IP and RTP/IP
IP-Packet size	188 Byte
IP-PCR restamping	Yes
Processing	
Service remultiplexing	Yes (GNSYMUX functionality is included)
PID filtering and remapping	Yes
PCR correction and de-jitter	Yes
Advanced PSI/SI regeneration	Yes
NIT generation	No
Compliance	ETSI EN 300 468
Processing bitrate	Max. 1200 Mbps total
Number of PIDs	Max. 2000 PIDs total

Technical data	
Connectors	
RJ45	2 pcs. (1x Management, 1x Streaming)
F-socket RF- output	1 pcs. (not in operation, only for mounting in GN40 base unit)
HDMI input	4 pcs. (for type A connector)
GigE/Control/Power supply (Backplane)	CompactPCI Type C (SGMII)
General data	
Power consumption	max. ≤18 W
Operating temperature range	-5°C...+45°C, 23°F...113°F, (ETSI EN 300 019-1-3 Class 3.1)
Max. humidity, non condensing	95 %
Electro Magnetic Compatibility (EMC)	DIN EN 55022:2008-05
Safety compliance	-
HDMI status LED	green, red
Operation Mode	
Hardware revision	1000
Software version	3.0

Modules

GNHWENC2S

Chameleon HD/SD encoder for HD/SD-SDI or A/V inputs

Technical data	
HD-SDI Input	
Number of ports	4 pcs. (3x BNC, 1x F-connector)
Video input	HD-SDI, Audio embedded
Audio input	Stereo
Input format HD-SDI	1080i50/60/59.94, 720p50/60/59.94
Impedance	75 Ω
Compliance	HD-SDI SMPTE 292M, SMPTE 299M
SD-SDI input	
Number of ports	4 pcs. (3x BNC, 1x F-connector)
Video input	SD-SDI, Audio embedded
Audio input	Stereo
Input format SD-SDI	576i50, 480i59.94
Impedance	75 Ω
Compliance	SD-SDI SMPTE 259M-C, SMPTE 291M
Analog video input	
Number of ports	4 pcs. 3,5 mm jack socket
Input format	Composite FBAS-signal (PAL/NTSC/SECAM)
Impedance	75 Ω
Input level	1 Vss (±0,4 V)
Input frequency range	20 Hz...5 MHz
Frequency response	≤ ±2 dB (20 Hz...4 MHz)
Analog input audio	
Input format	Left, Right asymmetrical
Impedance	600 Ω/15 kΩ (switchable)
Input level	-4 dBm / 500 mVeff
Input level range	-18...+18 dB
Input frequency range	40 Hz...15 kHz
Video Encoding	
Encoding capacity	4x HD/SD MPEG-2/MPEG-4
Picture size	1080i50/60/59.94, 720p50/60/59.94, 576p50, 480p60/59.94, 576i50, 480i60/59.94

Technical data	
Profile MPEG-4	Baseline, Main, High
Bit rate	MPEG-2 10-19Mbps, MPEG-4 6-13Mbps @ 1080i50/60/59.94, 720p50/60/59.94; MPEG-2 4-12Mbps, MPEG-4 2-6Mbps @ 576p50, 480p60/59.94; MPEG-2 2-8Mbps, MPEG-4 1-4Mbps @ 576i50, 480i60/59.94
Chroma sample	00-00-0000 04:02:00
Aspect ratio	16:9 for HD; 4:3 for SD
Subtitle DVB Support	No
Subtitle OP47 Support	No
Picture size conversion	Downscaling yes, Upscaling no
Frame rate conversion	No
Test pattern	Yes
Audio Encoding	
Audio-system	ISO 11173-3 (MPEG-1 L2), MPEG-2 AAC (LC)
Number of audio channels	1 per video input @ 4x HD/SD MPEG-2/MPEG-4;2 per video input @ 2x HD/SD MPEG-2/MPEG-4
Sampling frequency	48 kHz
Bit rate	64...288 Kbps (max. MPEG1 L2/AAC)
Audio modes	Stereo
Sampling rate conversion	No
Streaming-In-/Output	
IP-Inputs	0 or 32 pcs. (32 with GNSTR software option)
IP-Outputs	4 or 32 pcs. (32 with GNSTR software option)
IP-Compliance	ISO/IEC 13818
IP-Input bitrate	Max. 425 Mbit/s per IPTS, Max. 850 Mbit/s total
IP-Output bitrate	Max. 425 Mbit/s per IPTS, Max. 850 Mbit/s total
IP-Input protocol	UDP/RTP/RTP+FEC Unicast and Multicast, IGMP v2 and v3

Technical data	
IP-Output protocol	UDP/RTP/RTP+FEC Unicast and Multicast, IGMP v2 and v3
IP-TS-Input format	SPTS CBR/VBR, MPTS CBR
IP-TS-Output format	SPTS CBR/VBR, MPTS CBR
IP-FEC Inputs	0 or 32 pcs. (with GNSTREC software option)
IP-FEC Outputs	4 or 32 pcs. (with GNSTREC software option)
IP-FEC compliance	SMPTE 2022-1, SMPTE 2022-2
IP-Packet format	MPEG over UDP/IP and RTP/IP
IP-Packet size	188 Byte
IP-PCR restamping	Yes
Processing	
Service remultiplexing	Yes (GNSYMUX is included)
PID filtering and remapping	Yes
PCR correction and de-jitter	Yes
Advanced PSI/SI regeneration	Yes
NIT generation	No
Compliance	ETSI EN 300 468
Processing bitrate	Max. 1200 Mbps total
Number of PIDs	Max. 2000 PIDs total
Connectors	
RJ45	2 pcs. (1x Management, 1x Streaming)
Analog audio input	4 pcs. 3,5 mm jack socket
Video input	4 pcs. (3x BNC, 1x F-connector)
GigE/Control/Power supply	CompactPCI Type C (SGMII)
General data	
Power consumption	max. ≤18 W
Operating temperature range	
Max. humidity, non condensing	95 %
Electro Magnetic Compatibility (EMC)	DIN EN 55022:2008-05
Safety compliance	-
Hardware revision	2000
Software version	3.1

Modules

GNHWA

Chameleon Processor (ATSC and QAM J.83 Annex B Receiver)

Chameleon a Software-Based Headend Platform. The Chameleon headend platform is designed with all current and future applications in mind. It is superbly suited for the transition from the analog to the digital environment, and has a unique flexibility that allows you to change functionality by the click of a button. The CHAMELEON product line covers the functionality needs for all types of installations. These can easily be extended, in size by adding more units, and in functionality by adding software options. The software functionality can be modified and upgraded at any time, without changing the hardware. This Chameleon version (GNHWA) is equipped with multiuner support for ATSC and QAM J.83 Annex B reception.

Technical data	
RF-Inputs ATSC 8 VSB	
Number of tuner	2 pcs.
Modulation type	ATSC 8-VSB
Frequency range	47...1002 MHz
Level range	45...90 dBμV (-64...-19 dBm)
COFDM-Spectrum DVB-T	2 k and 8 k FFT
Guard Interval	1/32, 1/16, 1/8, 1/4
FEC inner code ATSC	Conv., K=7, G=1/2, 2/3, 3/4, 4/5, 5/6, 7/8
Return loss	>16 dB @ 47 MHz, -1,5 dB/Oktave, > 12 dB
Bandwidth	6/7/8 MHz
RF-Inputs QAM J.83 Annex B	
Number of tuner	2 pcs.
Modulation type	QAM Modulations
Frequency range	47...862 MHz
Level range	45...90 dBμV (-64...-19 dBm)
Symbol rate	5.057 and 5.361 Mbaud l 1-5.3097 Mbaud
QAM mode	64-, 256-QAM
Return loss	>18 dB @ 47 MHz, >12 dB @ 862 MHz
Bandwidth	6 MHz
Compliance	ITU-T J.83 Annex B/C
ASI-In-/Output	
ASI-Inputs	max. 2 pcs.
ASI-Outputs	max. 2 pcs.
ASI-Impedance	75 Ω
ASI-Frequency range	<270 MHz
ASI-Return loss	>17 dB (27...270 MHz)
ASI-Compliance	EN 50083-9:2002
ASI-Packet size Input/Output	188, 204/188 Byte
ASI-PCR restamping	Yes
ASI-Input/Output max. payload bit rate	
Streaming-In-/Output	
IP-Inputs	32, 64, 128 pcs. (depends of operation mode)

Technical data	
IP-Outputs	32, 128 pcs. (depends of operation mode)
IP-Compliance	ISO/IEC 13818
IP-Input bitrate	Max. 425 Mbit/s per IPTS, Max. 850 Mbit/s total
IP-Output bitrate	Max. 425 Mbit/s per IPTS, Max. 850 Mbit/s total
IP-Input protocol	UDP/RTP/RTP+FEC Unicast and Multicast, IGMP v2 and v3
IP-Output protocol	UDP/RTP/RTP+FEC Unicast and Multicast, IGMP v2 and v3
IP-TS-Input format	SPTS CBR/VBR, MPTS CBR
IP-TS-Output format	SPTS CBR/VBR, MPTS CBR
IP-FEC Inputs	20 or 32 or 64 or 128 pcs. (with GNSTREC software option, number depends of operation mode)
IP-FEC Outputs	32 pcs. (with GNSTREC, Streaming mode)
IP-FEC compliance	SMPTE 2022-1, SMPTE 2022-2
IP-Packet format	MPEG over UDP/IP and RTP/IP
IP-Packet size	188 Byte
IP-PCR restamping	Yes
IP-Dejittering	Yes, per default 100ms, individual adjustable
HD-SDI Output	
Number of outputs	1 pcs.
Video formats	1920x1080i@50/60, 1280x720p@50/60
Stereo mode	Stereo, Dual mono, Dual left/right
OSD Test pattern	Yes
Audio sampling frequence	32/44,1/48 kHz
Compliance SDI-HD	SMPTE 292M, SMPTE 299M, SMPTE 291
Connector	BNC connector 2
SD-SDI Output	
Number of outputs	2 pcs.
Video formats	720x576i@50, 720x480i@59.94
Connector	BNC connector 1 and/or 2

Power supplies

GN 55 W 0230

Additional power supply 230 VAC for redundancy

GN 55 W 0048

Additional power supply 48 VDC for redundancy

GN 55 W 0110

Additional power supply 110 VAC for redundancy

Technical data			
Connectors			
Cold-device plug, IEC 60320-C14	1 pcs.	0 pcs.	1 pcs.
General data		1 pcs.	0 pcs.
Primary voltage	180...265 V AC		
Secondary voltage	12 V DC	-45...-75 V DC	90...145 V AC

Software options

GNASI

Software licence for one ASI Interface

GNCI

Software licence for one CI interface

Technical data	
Number of ports	pcs. 2 BNC ports, configurable for in/out via UI
Input/Output max. payload bit rate	Typ. 200 Mbit/s
PCR restamping	Yes
Packet size Input/Output	188 Byte
Compliance	EN 50083-9:2002, ASI-C

Technical data	
Number of CI slots	1 pcs. (accessible from rear)
Bit rate	55/62/72 Mbps
Multichannel decryption	Yes
Service level decryption	Yes
PID level decryption	Yes
Compliance	EN 50221

The CHAMELEON ASI inputs and outputs are enabled by the SW options GNASI (single ASI in/out). Complying to the EN 50083-9:2002, ASI-C, the Chameleon ASI inputs and outputs provides professional interconnection between Chameleon modules as well as interconnection to other Headend equipment.

The CHAMELEON decryption via Common Interface are enabled by the SW option GNCI (single Common Interface). The CHAMELEON module has two Common Interface slots accessible from the rear of the module. Complying to the EN 50221, and supporting multiservice decryption via proffessional CAMs the CHAMELEON CI implementation gives proffessional decryption for all types and sizes of Headends.

Software options

GNCMOD

Software licence for one DVB-C output

GNDASI

Software licence for two ASI interfaces

Technical data	
Symbol rate	2.4-13.6 MS/s
DVB compliance	DVB-C (EN 300 429, Appendix A)
Output frequency	40-860 MHz

The CHAMELEON DVB-C modulators are enabled by the SW options GNCMOD (single DVB-C out). Complying to the DVB-C EN 300 429 Annex A, the Chameleon QAM modulators gives professional DVB-C outputs for all types and sizes of cable networks.

Technical data	
Number of ports	pcs. 2 BNC ports, configurable for in/out via UI
Input/Output max. payload bit rate	Typ. 200 Mbit/s
PCR restamping	Yes
Packet size Input/Output	188 Byte
Compliance	EN 50083-9:2002, ASI-C

The CHAMELEON ASI inputs and outputs are enabled by the SW options GNDASI (dual ASI in/out). Complying to the EN 50083-9:2002, ASI-C, the Chameleon ASI inputs and outputs provides professional interconnection between Chameleon modules as well as interconnection to other Headend equipment.

Software options

GNDCI

Software licence for two CI interfaces

GNDCMOD

Software licence for two DVB-C outputs

Technical data	
Number of CI slots	2 pcs. (accessible from rear)
Bit rate	55/62/72 Mbps
Multichannel decryption	Yes
Service level decryption	Yes
PID level decryption	Yes
Compliance	EN 50221

Technical data	
Symbol rate	2.4- 13.6 MS/s
DVB compliance	DVB-C (EN 300 429, Appendix A)
Output frequency	40- 860 MHz

The CHAMELEON decryption via Common Interface are enabled by the SW option GNDCI (dual Common Interface). The CHAMELEON module has two Common Interface slots accessible from the rear of the module. Complying to the EN 50221, and supporting multiservice decryption via proffessional CAMs the CHAMELEON CI implementation gives proffessional decryption for all types and sizes of Headends.

The CHAMELEON DVB-C modulators are enabled by the SW options GNDCMOD (dual DVB-C out). Complying to the DVB-C EN 300 429 Annex A, the Chameleon QAM modulators gives professional DVB-C outputs for all types and sizes of cable networks.

Software options

GNDOL

Software license for enabling the Dolby Digital decoder

Technical data	
Number of audio decodings	Up to 2 Dolby audio into analogue audio out
Supported formats	AC-3 (Dolby Digital)

The CHAMELEON Dolby decoding for analogue output is enabled by the SW option GNDOL. The Dolby decoding allows reception of Dolby audio sound and decoding to support the different audio output formats for analogue (PAL and SECAM) modulation. The GNDOL SW option requires a Dolby enabled Chameleon HW.

GNDSDI

Software licence for two SD-SDI outputs

Technical data	
Video output	SDI, Audio embedded
Audio output	Stereo, joint stereo, dual, mono
Bit rate	270 Mbps
Compliance	SMPTE 259M, SMPTE 272M
Connector type	2x BNC (Connectors shared with ASI)

The CHAMELEON SDI outputs are enabled by the SW option GNDSDI (dual SDI output). Complying to the SMPTE 259M and SMPTE 272M, the Chameleon SDI outputs gives access to broadcast grade video and audio for professional applications in all types and sizes of Headends.

Software options

GNDTMOD

Software licence for two DVB-T outputs

Technical data	
COFDM-Mode	2k, 8k switchable
Guard Interval	1/4, 1/8, 1/16, 1/32
FEC	1/2, 2/3, 3/4, 5/6, 7/8
MER	More than 38 dB, typical 40 dB
Modulation	QPSK, 16QAM, 64QAM
Output frequency	40...860 MHz MHz

The Chameleon DVB-T modulators are enabled by the SW option GNDTMOD (dual DVB-T out). The DVB-T modulator supports both 2k and 8k mode, and all defined settings for modulation, FEC and Guard Interval. Complying to the DVB-T EN 300 744, the Chameleon DVB-T modulator gives professional DVB-T outputs for all types and sizes of cable networks.

GNDVMOD

Software licence for two analogue TV output

Technical data	
Standards	PAL B/G, D/K, I, SECAM D/K, B/G, L
Output frequency	48...855 MHz
S/N Video, weighted (CCIRrec. 567-1)	> 65 dB
C/N, broadband	Typ. 75 dB (72 dB typical at adjacent channel)

The Chameleon analogue modulators are enabled by the SW option GNDVMOD (dual analogue RF out). The analogue RF modulators supports PAL and SECAM modulation.

Software options

GNM1

Software option for additional 1 year SUA extension

GNASE

Software option for basic transort stream monitoring and INCA ASE integration

The CHAMELEON product platform is continuously evolved and developed with new or extended functionalities. To benefit from the development, you can upload new firmware versions in your existing installations. To be allowed to upgrade to a new firmware version, you must have avalid Software Update Agreement (SUA-> http://page.wisi.de/sua-faq). All CHAMELEONs get a one year SUA from the date of registration on www.wisiconnect.tv. To extend the SUA, you buy the SW option GNM1 (1 year extension) or GNM3 (3 years extension). The WISI CHAMELEON video platform is a highdensity digital TV headend for contribution of digital TV via IP networks and end-to-end IPTV solutions such as video-on-demand, connected TV and OTT (Over The Top) or Web TV.

Technical data	
Basic Transport stream monitoring	
Contiously real time monitoring	Yes
Monitoring capacity	up to 128 transport stream inputs
Monitoring data throughput	Max. 850 Mbps
Monitoring	TS, Service and PID level
Provides thumbnail	Yes, for each video in a SPTS. For a MPTS only for the first video.
Logging	Yes, in the INCA ASE. Not in the web ui of the module.
Supported errors for TR 101290 priority 1	PAT error, PAT error 2, CC error, PMT error, PMT error 2
Supported errors for TR 101290 priority 2	TEI error
Supported errors for ATSC A/78	PAT error, PMT error, CC error, TEI error
Supported Interface	Forwarding data (thumbnails, stream TS analyse, PIDs, bandwitdh) via Management interface to the INCA All Seeing Eye
Compliance	ETSI TR 101290 and ATSC A/78 Standard

The basic input transport stream monitoring and video thumbnail generation for providing the data to the INCA All Seeing Eye will enabled with the Software option GNASE. The INCA All Seeing Eye 5420 (ASE) provides sophisticated visual video monitoring and an overview mosaic of IP video streams, giving operators the ability to check the performance of the CHAMELEON headend in any web browser. The integrated probe functionality in in each CHAMELEON module provides a detailed stream analysis, stream statistics, including PID and payload details and offers in combination with the ASE an efficient troubleshooting and monitoring solution.

Software options

GNM3

Software option for additional 3 year SUA extension

GNOCTFM

Software licence for eight FM radio outputs

The CHAMELEON product platform is continuously evolved and developed with new or extended functionalities. To benefit from the development, you can upload new firmware versions in your existing installations. To be allowed to upgrade to a new firmware version, you must have avalid Software Update Agreement (SUA-> http://page.wisi.de/sua-faq). All CHAMELEONs get a one year SUA from the date of registration on www.wisiconnect.tv. To extend the SUA, you buy the SW option GNM1 (1 year extension) or GNM3 (3 years extension). The WISI CHAMELEON video platform is a highdensity digital TV headend for contribution of digital TV via IP networks and end-to-end IPTV solutions such as video-on-demand, connected TV and OTT (Over The Top) or Web TV.

Technical data	
audio decoding	MPEG-1 Layer I/II
Modulation	FM (Referenz ITU-R BS.450-3)
RDS insertion	Yes (Reference EN50067)
Output frequency	87.5- 108 MHz, 100 kHz step size MHz
S/N	> 60 dB (mono)/ > 55 dB (stereo) dB
C/N, broadband	Typical 65 dB / Typical 60 dBc (FM band 87.5- 108 MHz) dB

The CHAMELEON FM modulators are enabled by the SW option GNOCTFM (8 FM out). The FM modulators supports mono, stereo and joint stereooutput, and can handle RDS insertion. Complying to ITU-R BS.450-3, the Chameleon FM modulator gives you high quality FM output for any size of cable network.

Software options

GNQCMOD

Software licence for four DVB-C outputs

GNSCR

Software option for DVB-Simulcrypt-Scrambling

Technical data	
Symbol rate	2.4- 13.6 MS/s
DVB compliance	DVB-C (EN 300 429, Appendix A)
Output frequency	40-860 MHz

The CHAMELEON DVB-C modulators are enabled by the SW option GNQCMOD (quadruple DVB-C out). Complying to the DVB-C EN 300 429 Annex A, the Chameleon QAM modulators gives professional DVB-C outputs for all types and sizes of cable networks.

Technical data	
DVB-CSA / Simulcrypt interface	
Interface CAS	IP
Number of encrypted Services	up to 32 with GNSCR and up to 128 with GNSCR + GNSCRX
Number of encrypted PIDs	up to 128 with GNSCR and up to 512 with GNSCR + GNSCRX
Maximaler Verschlüsselungs-Datendurchsatz	Max. 850 Mbps
Unterstützung Verschlüsselungs-keys	Max. 150 per module (shared key memory)
Scramblable outputs	IP, DVB-C (QAM), DVB-T (COFDM)
Interface protocol version support	ECMG <=> SCG: V2 and V3 / EMMG/PDG <=> MUX: V2 and V3
DVB compliance	DVB-Simulcrypt (ETSI TS 103 197)
Support of selective scrambling	Yes, individual configurable (10%, 25%, 50%, 75%, 100%)

DVB-CSA Scrambling in the CHAMELEON is enabled by the Software option GNSCR (Simulcrypt scrambling). The GNSCR SW option allows you to use the TANGRAM as a scrambler for encryption of the output services by connecting to a Conditional Access Server (CAS) via the IP interface. Together with the CHAMELEN scrambler and the CAS you can built your solution for protect the copyrighted content. The extension SW option GNSCRX enables the maximum number of scrambled service.

Software options

GNSCRX

Software option for DVB-Simulcrypt-Scrambling

GNSSDI

Software licence for one SD-SDI output

Technical data	
DVB-CSA / Simulcrypt interface	
Interface CAS	IP
Number of encrypted Services	up to 32 with GNSCR and up to 128 with GNSCR + GNSCRX
Number of encrypted PIDs	up to 128 with GNSCR and up to 512 with GNSCR + GNSCRX
Maximaler Verschlüsselungs-Datendurchsatz	Max. 850 Mbps
Unterstützung Verschlüsselungs-keys	Max. 150 per module (shared key memory)
Scramblable outputs	IP, DVB-C (QAM), DVB-T (COF-DM)
Interface protocol version support	ECMG <=> SCG: V2 and V3 / EMMG/PDG <=> MUX: V2 and V3
DVB compliance	DVB-Simulcrypt (ETSI TS 103 197)
Support of selective scrambling	Yes, individual configurable (10%, 25%, 50%, 75%, 100%)

Technical data	
Video output	SDI, Audio embedded
Audio output	Stereo, joint stereo, dual, mono
Bit rate	270 Mbps
Compliance	SMPTE 259M, SMPTE 272M
Connector type	2x BNC (Connectors shared with ASI)

The CHAMELEON SDI outputs are enabled by the SW options GNSSDI (single SDI output). Complying to the SMPTE 259M and SMPTE 272M, the Chameleon SDI outputs gives access to broadcast grade video and audio for professional applications in all types and sizes of Headends.

DVB-CSA Scrambling in the CHAMELEON is enabled by the Software option GNSCR (Simulcrypt scrambling). The GNSCR SW option allows you to use the TANGRAM as a scrambler for encryption of the output services by connecting to a Conditional Access Server (CAS) via the IP interface. Together with the CHAMELEN scrambler and the CAS you can built your solution for protect the copyrighted content. The extension SW option GNSCRX enables the maximum number of scrambled service.

Software options

GNSTR

Software licence for IP streaming interface

GNSTREC

Software option for IP streaming with FEC Error correction or protection

Technical data	
Input bitrate	Mbit max. 110 Mbit/s pro IPTS, max. 200 Mbit/s total
Output bitrate	Mbit max. 110 Mbit/s pro IPTS, max. 200 Mbit/s total
Connector type	RJ45 (GigE); SGMII (Backplane for GN50)
Output protocol	UDP/RTP Multicast/Unicast
Input protocol	UDP/RTP Multicast/Unicast
IPTV TS Input format	CBR, 20 TS (MPTS oder SPTS)
IPTV TS Output format	CBR/VBR, max. 20 SPTS/MPTS
Time stamp and de-jitter	Yes

Technical data	
Input bitrate	Mbit max. 110 Mbit/s pro IPTS, max. 200 Mbit/s total
Output bitrate	Mbit max. 110 Mbit/s pro IPTS, max. 200 Mbit/s total
Input protocol	UDP/RTP Multicast/Unicast
Output protocol	UDP/RTP Multicast/Unicast
Connector type	RJ45 (GigE); SGMII (Backplane for GN50)
IPTV TS Input format	CBR, 20 TS (MPTS oder SPTS)
IPTV TS Output format	CBR/VBR, max. 20 SPTS/MPTS
Time stamp and de-jitter	Yes

The CHAMELEON IP streaming inputs and outputs are enabled by the SW options GNSTR (IP streaming in/out) and GNSTREC (IP streaming in/out with FEC in). The IP streaming in/out allows you to use the Chameleon as a streaming device (tuner in to IP out) or as an Edge device (IP in and RF modulated analogue or digital output).

The CHAMELEON IP streaming inputs and outputs are enabled by the SW option GNSTREC (IP streaming in/out with FEC in). The IP streaming in/out allows you to use the Chameleon as a streaming device (tuner in to IP out) or as an Edge device (IP in and RF modulated analogue or digital output).

Software options

GNSYMUX

GNSYMUX LICENSE SYSTEM REMUX

GNSYSMG

Software licence for system-wide module and transportstream overview

Technical data	
Service remultiplexing	Yes
PID filtering and PID remapping	Yes
PID/SID auto anti-clash	Yes
PCR correction and de-jitter	Yes
Dynamic PSI/SI processing	Yes
Advanced PSI/SI regeneration	Yes
Supported tables	PAT, CAT, PMT, TSDT, NIT, SDT, EIT, TDT, TOT, RST, ST
DVB compliance	ETSI EN 300 468

Remultiplexing and PSI/SI handling in the CHAMELEON and in a system of CHAMELEONS are enabled by the SW options GNSY-MUX (remultiplexing in a system of CHAMELEONS).. Complying to the ETSI EN 300 468, the CHAMELEON remultiplexing automatically creates the PSI/SI table structure and table data entries.

The system management SW option GNSYMUX enables the system UI for all Chameleons interconnected via a Headend System Group. The System UI gives an overview of interconnected Chameleons in a single web interface via the GN50 embedded switch GT11. Apart from the overview in the System mode, the UI of each individual Chameleon can be reached directly from a drop-down list.

Software options

GNTCMOD

Software licence for three DVB-C outputs

The CHAMELEON DVB-C modulators are enabled by the SW option GNTCMOD (triple DVB-C out). Complying to the DVB-C EN 300 429 Annex A, the Chameleon QAM modulators gives professional DVB-C outputs for all types and sizes of cable networks

GNTMOD

Software licence for one DVB-T output

Technical data	
COFDM-Mode	2 k/8 k
Guard Interval	1/4, 1/8, 1/16, 1/32
FEC	1/2, 2/3, 3/4, 5/6, 7/8
MER	More than 38 dB, typical 40 dB
Modulation	QPSK, 16QAM, 64QAM
Output frequency	40-860 MHz

The Chameleon DVB-T modulators are enabled by the SW option GNTMOD (single DVB-T out). The DVB-T modulator supports both 2k and 8k mode, and all defined settings for modulation, FEC and Guard Interval. Complying to the DVB-T EN 300 744, the Chameleon DVB-T modulator gives professional DVB-T outputs for all types and sizes of cable networks.

Software options

GNVMOD

Software licence for one analogue TV output

GNMON

Basic TS Monitoring and Logging

Technical data	
Standards	PAL B/G, D/K, I, SECAM D/K, B/G, L
Output frequency	48...855 MHz
S/N Video, weighted (CCIRrec. 567-1)	> 65 dB
C/N, broadband	Typical 75 dB (72 dB typical at adjacent channel)

The Chameleon analogue modulators are enabled by the SW option GNVMOD (single analogue RF out). The analogue RF modulators supports PAL and SECAM modulation.

Technical data	
Basic TS Monitoring and Logging	
Contiously real time monitoring	Yes
Monitoring capacity	up to 128 transport stream inputs
Monitoring data throughput	Max. 850 Mbps
Monitoring and logging level	TS, Service and PID level
Detailed error message	Yes, with PID information
Start and end date message	Yes
Supported errors for TR 101290 priority 1	PAT error, PAT error 2, CC error, PMT error, PMT error 2
Supported errors for TR 101290 priority 2	TEI error
Supported errors for ATSC A/78	PAT error, PMT error, CC error, TEI error
Supported Interface	Web-UI logging, SNMP trap and set, Syslog
Compliance	ETSI TR 101290 and ATSC A/78 Standard

The basic transport stream monitoring and logging in the CHAMELEON will enabled by the Software option GNMON. The GNMON SW option allows you to monitor and analyze all IP, ASI or RF input stream continuously. The embedded transport stream analyze tool is ideal for monitoring service availability and performing basic monitoring of transport streams. The integrated monitoring and logging solution is an optimized, effective method for reliably and cost-effectively troubleshooting of digital TV transport stream errors.

Software options

GNAES
Software option for AES scrambler

GNAESX
Software option for AES scrambler

Technical data	
AES Scrambler Interface	
Number of encrypted Services	up to 32 with GNAES and up to 128 with GNAES + GNAESX
Number of encrypted PIDs	up to 128 with GNAES and up to 512 with GNAES + GNAESX
Maximaler Verschlüsselungs-Datendurchsatz	Max. 850 Mbps
Unterstützung Verschlüsselungs-keys	Max. 150 per module (shared key memory)
Interface CAS	IP
Interface protocol version support	ECMG <=> SCG: V2 and V3 / EMMG/PDG <=> MUX: V2 and V3
DVB compliance	DVB-Simulcrypt (ETSI TS 103 197)
Support of selective scrambling	Yes, individual configurable (10%, 25%, 50%, 75%, 100%)

Technical data	
AES Scrambler Interface	
Number of encrypted Services	up to 32 with GNAES and up to 128 with GNAES + GNAESX
Number of encrypted PIDs	up to 128 with GNAES and up to 512 with GNAES + GNAESX
Maximaler Verschlüsselungs-Datendurchsatz	Max. 850 Mbps
Unterstützung Verschlüsselungs-keys	Max. 150 per module (shared key memory)
Interface CAS	IP
Interface protocol version support	ECMG <=> SCG: V2 and V3 / EMMG/PDG <=> MUX: V2 and V3
DVB compliance	DVB-Simulcrypt (ETSI TS 103 197)
Support of selective scrambling	Yes, individual configurable (10%, 25%, 50%, 75%, 100%)

AES Scrambling in the Chameleon is enabled by the SW option GNAES. The GNAES SW option allows you to use the Chameleon as a scrambler for encryption of the output services by connecting to a Conditional Access Server (CAS) via the IP interface. Together with the Chameleon scrambler and the CAS you can built your solution for protect the copyrighted content. The extension SW option GNAESX enables the maximum number of scrambled service.

AES Scrambling in the Chameleon is enabled by the SW option GNAES. The GNAES SW option allows you to use the Chameleon as a scrambler for encryption of the output services by connecting to a Conditional Access Server (CAS) via the IP interface. Together with the Chameleon scrambler and the CAS you can built your solution for protect the copyrighted content. The extension SW option GNAESX enables the maximum number of scrambled service.

Software options

GNLYNK

Software option for Samsung LYNK scrambler

Technical data	
Samsung LYNK Scrambler Interface	
Number of encrypted Services	up to 32 with GNLYNK and up to 128 with GNLYNK + GNLYNKX
Number of encrypted PIDs	up to 128 with GNLYNK and up to 512 with GNLYNK + GNLYNKX
Maximaler Verschlüsselungs-Datendurchsatz	Max. 850 Mbps
Unterstützung Verschlüsselungs-keys	Max. 150 per module (shared key memory)
Interface CAS	IP
Interface protocol version support	ECMG <=> SCG: V2 and V3 / EMMG/PDG <=> MUX: V2 and V3
DVB compliance	DVB-Simulcrypt (ETSI TS 103 197)
Support of selective scrambling	Yes, individual configurable (10%, 25%, 50%, 75%, 100%)

Samsung LYNK Scrambling in the TANGRAM is enabled by the Software option GNLYNK. The GNLYNK software option allows you to use the TANGRAM as a scrambler for encryption of the output services by connecting to a Conditional Access Server (CAS) via the IP interface. Before you are using TANGRAM as a scrambler with the Samsung LYNK Digital Right Management (DRM) you must purchase a Samsung LYNK DRM license. Samsung LYNK is a fully software based DRM solution and can be installed at a standard server. Together with the TANGRAM scrambler and the Samsung digital CAS you can built your solution for protect the copyrighted content. The extension SW option GNLYNKX enables the maximum number of scrambled service.

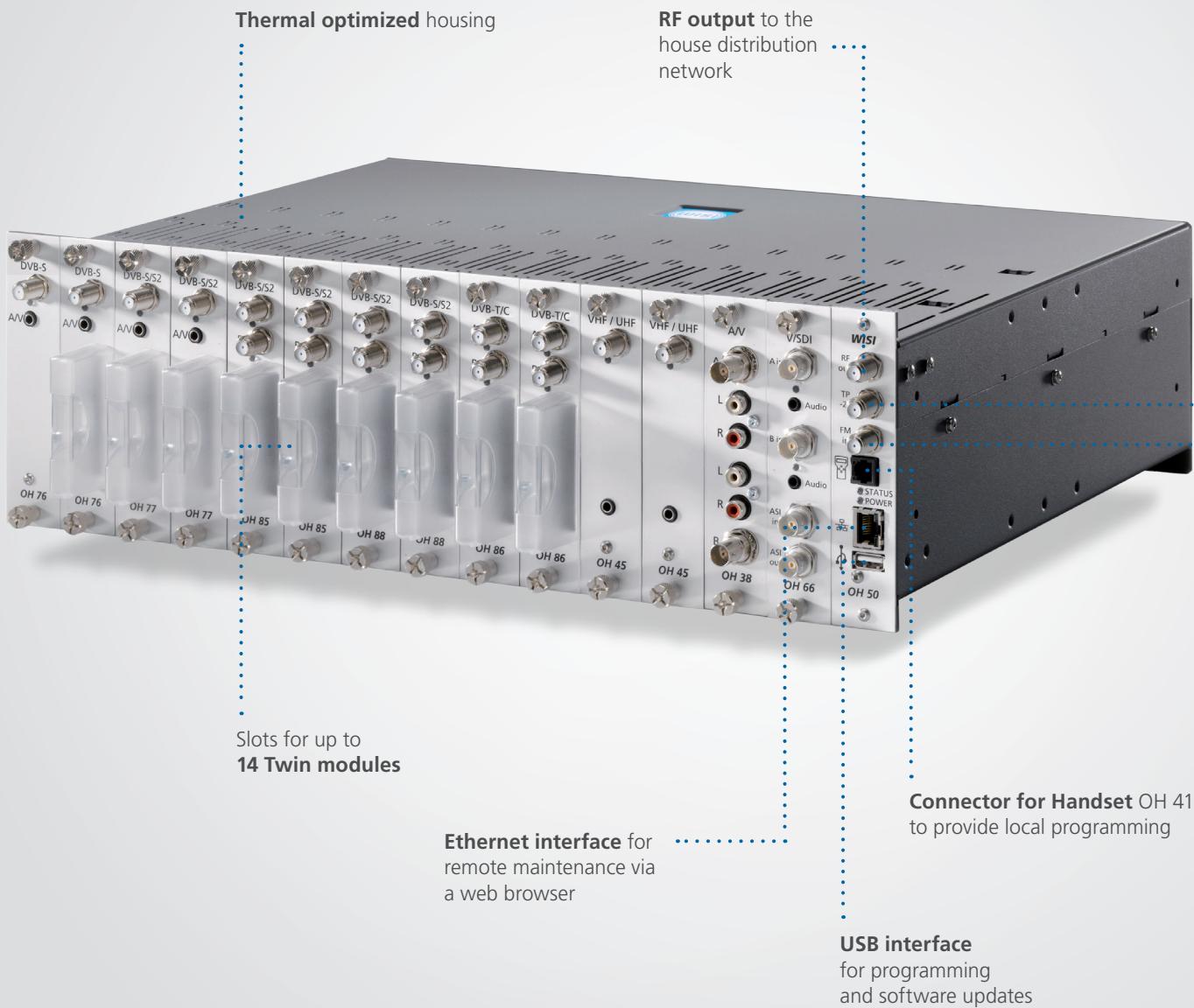## GNLYNKX

Software option for Samsung LYNK scrambler

Technical data	
Samsung LYNK Scrambler Interface	
Number of encrypted Services	up to 32 with GNLYNK and up to 128 with GNLYNK + GNLYNKX
Number of encrypted PIDs	up to 128 with GNLYNK and up to 512 with GNLYNK + GNLYNKX
Maximaler Verschlüsselungs-Datendurchsatz	Max. 850 Mbps
Unterstützung Verschlüsselungs-keys	Max. 150 per module (shared key memory)
Interface CAS	IP
Interface protocol version support	ECMG <=> SCG: V2 and V3 / EMMG/PDG <=> MUX: V2 and V3
DVB compliance	DVB-Simulcrypt (ETSI TS 103 197)
Support of selective scrambling	Yes, individual configurable (10%, 25%, 50%, 75%, 100%)

Samsung LYNK Scrambling in the TANGRAM is enabled by the Software option GNLYNK. The GNLYNK software option allows you to use the TANGRAM as a scrambler for encryption of the output services by connecting to a Conditional Access Server (CAS) via the IP interface. Before you are using TANGRAM as a scrambler with the Samsung LYNK Digital Right Management (DRM) you must purchase a Samsung LYNK DRM license. Samsung LYNK is a fully software based DRM solution and can be installed at a standard server. Together with the TANGRAM scrambler and the Samsung digital CAS you can built your solution for protect the copyrighted content. The extension SW option GNLYNKX enables the maximum number of scrambled service.

COMPACT HEADEND
FLEXIBLE HARDWARE-BASED HEADEND PLATFORM

Compact, Powerful and Extremely Flexible

Thermal optimized housing

RF output to the house distribution network

Slots for up to **14 Twin modules**

Ethernet interface for remote maintenance via a web browser

Connector for Handset OH 41, to provide local programming

USB interface for programming and software updates

Channel processing Compact Headend

Communication determines our everyday life, inform us, imparts knowledge and experiences. They help us understanding and solving problems.

WISI make every effort to provide you with the necessary tools for your communication. With fully committed, highly motivated employees and the latest technology for the communication of today and tomorrow.

Powerful in technology, compact dimensions, modular and extensible, the new **WISI Compact Headend system OH** combines all the advantages of a future-proof and economic headend.

WISI Compact Headend OH can be equipped easily with up to 14 modules, offering an optimal, space-saving channel processing up to 14 analog and 28 digital channels in a 3U 19 „rack.

WISI Compact Headend OH is equipped with a high-performance power supply. The modules have a low power consumption in order to keep operating costs low. The USB port and the RJ45 connector can be used to perform a software update of the base unit and individual modules and to store their configuration. All functions can also be set remotely via a web browser.

Test point **-20 dB**

Additional **FM input**

Wall mounting of the
WISI Compact headend OH.

Base units

OH 40 A

Compact Headend basic unit, 230 V AC, 3 HE, for 7 modules

Powerful technology, compact dimensions, modular and flexibly expandable; the WISI COMPACT HEADEND System OH combines all the advantages of an innovative and affordable headend. WISI Compact Headend OH is easy to configure. With up to 7 module slots it offers channel processing for 7 analogue or 28 digital channels in one chassis. WISI Compact Headend OH operates on a high efficiency power supply, with low consumption modules in order to make a minimum ecological impact and a low operational cost. The USB connection and the RJ45 interface can be used to execute software updates for the basic unit as well as for the modules. Furthermore, all functions can be furnished from a distance per web browser.

Technical data	
Frequency range TV	47...862 MHz (output combiner/amplifier)
Frequency range FM	87,5...108 MHz (FM-amplifier)
Input level FM	70...100 dBµV
Gain FM	25 dB
Attenuator FM	0...30 dB (1 dB-steps)
Output level	110 dBµV
Output attenuator	0...15 dB
Output test point	-20 dB
Connectors	
Module slots	7 pcs. (OH-module)
F-socket	3 pcs. (FM-input, output, output measurement socket)
USB	1 pcs. (Software-Update, Konfiguration)
RJ11	1 pcs. (OH 41)
RJ45	1 pcs. (remote monitoring and programming)
General data	
Operating voltage AC	180...265 V
Power consumption	<185 W
LNB supply voltage	12,5 V
LNB electrical power supply	1,2 A
Dimensions (width x height x depth)	276 x 159 x 385 mm
Operating temperature range	-20...+50 °C

characteristics

- Base unit for analogue and digital channel processing
- Slots for up to 7 modules (7 analog bzw. 28 digital channels)
- Wall mounting
- Integrated FM amplifier
- Programable with OH 41 hand-set
- Update via USB-connection (USB memory stick)
- Integrated remote supervision moduel OH 51 A (license optional)
- High output power

Base units

OH 50 A

Compact Headend basic unit, 230 V AC, 19", 3 HE, for 14 modules

Powerful technology, compact dimensions, modular and flexibly expandable; the WISI COMPACT HEADEND System OH combines all the advantages of an innovative and affordable headend. WISI Compact Headend OH is easy to configure. With up to 14 module slots it offers channel processing for 14 analogue or 28 digital channels in a 3 HU 19" rack chassis. WISI Compact Headend OH operates on a high efficiency power supply, with low consumption modules in order to make a minimum ecological impact and a low operational cost. The USB connection and the RJ45 interface can be used to execute software updates for the basic unit as well as for the modules. Furthermore, all functions can be furnished from a distance per web browser.

Technical data	
Frequency range TV	47...862 MHz (output combiner/amplifier)
Frequency range FM	87,5...108 MHz (FM-amplifier)
Input level FM	70...100 dBµV
Gain FM	25 dB
Attenuator FM	30 dB (1 dB-steps)
Output level	110 dBµV
Output attenuator	0...15 dB
Output test point	-20 dB
Connectors	
Module slots	14 pcs. (OH-module)
F-socket	3 pcs. (FM-input, output, output measurement socket)
USB	1 pcs. (Software-Update, Konfiguration)
RJ11	1 pcs. (OH 41)
RJ45	1 pcs. (remote monitoring and programming)
General data	
Operating voltage AC	180...265 V (47...63 Hz)
Power consumption	<185 W
LNB supply voltage	12,5 V
LNB electrical power supply	1,2 A
Dimensions (width x height x depth)	443 x 132 x 351 mm (3 HE)
Operating temperature range	-20...+50 °C

- Base unit for analogue and digital channel processing
- Slots for up to 14 modules (14 analog or 56 digital channels)
- 19" rack-mounting or wall mounting
- Integrated FM amplifier
- Simple programming with handset OH 41 (OK 41 A)
- Preprogramming via USB-connection (USB-Stick)
- Integrated remote supervision moduel OH 51 A (license optional)
- High output power

characteristics

Base units

OH 50 R

Compact Headend basic unit, 230 V AC (redundantly), 19", 3 HE, for 14 modules

Powerful technology, compact dimensions, modular and flexibly expandable; the WISI COMPACT HEADEND System OH combines all the advantages of an innovative and affordable headend. WISI Compact Headend OH is easy to configure. With up to 14 module slots it offers channel processing for 14 analogue or 28 digital channels in a 3 HU 19" rack chassis. WISI Compact Headend OH operates on a high efficiency power supply, with low consumption modules in order to make a minimum ecological impact and a low operational cost. The USB connection and the RJ45 interface can be used to execute software updates for the basic unit as well as for the modules. Furthermore, all functions can be furnished from a distance per web browser.

Technical data	
Frequency range TV	47...862 MHz (output combiner/amplifier)
Frequency range FM	87,5...108 MHz (FM-amplifier)
Input level FM	70...100 dBµV
Gain FM	25 dB
Attenuator FM	30 dB (1 dB-steps)
Output level	110 dBµV
Output attenuator	0...15 dB
Output test point	-20 dB
Connectors	
Module slots	14 pcs. (OH-module)
F-socket	3 pcs. (FM-input, output, output measurement socket)
USB	1 pcs. (Software-Update, Konfiguration)
RJ11	1 pcs. (OH 41)
RJ45	1 pcs. (remote monitoring and programming)
General data	
Operating voltage AC	180...265 V (47...63 Hz)
Redundant power supply	1 pcs.
Power consumption	<185 W
LNB supply voltage	12,5 V
LNB electrical power supply	1,2 A
Dimensions (width x height x depth)	443 x 132 x 351 mm (3 HE)
Operating temperature range	-20...+50 °C

characteristics

- Base unit OH for analog und digital channel processing headends with redundand power supply
- Slots for up to 14 modules (14 analog or 56 digital channels)
- included Additional power supply 230 VAC for redundancy
- 19" rack-mounting or wall mounting
- Integrated FM amplifier
- Simple programming with handset OH 41 (OK 41 A)
- Preprogramming via USB-connection (USB-Stick)
- Integrated remote supervision moduel OH 51 A (license optional)
- High output power

Modulators

OH 38

Twin A/V-Modulator

Powerful technology, compact dimensions, modular and flexibly expandable; the WISI COMPACT HEADEND System OH combines all the advantages of an innovative and affordable headend. WISI Compact Headend OH is easy to configure. With up to 14 module slots it offers channel processing for 14 analogue or 28 digital channels in a 3 HU 19" rack chassis. WISI Compact Headend OH operates on a high efficiency power supply, with low consumption modules in order to make a minimum ecological impact and a low operational cost. The USB connection and the RJ45 interface can be used to execute software updates for the basic unit as well as for the modules. Furthermore, all functions can be furnished from a distance per web browser.

Technical data	
Input	
Video input level	1 V (1Vss, ±0,4 V)
Video input bandwidth	20 Hz...5 MHz
Audio input impedance	600/10000 Ω
Audio input level	-4 dBm/1 kHz
Audio input level range	-6...+6 dB
Audio input bandwidth	40...15000 Hz
Output	
Output frequency range	45...862 MHz
Output frequency steps	250 kHz
Frequency stability	±0,030 MHz
Ouput channel bandwidth	7/8 MHz
Output level	90...105 dBµV
Spurious suppression	>55 dB
TV standards	B/G, D/K, I, L, M
Audio format	Mono/Stereo/Dual
S/N Video	>57 dB
S/N Audio	>50 dB
Amplitude response (O-E)	±1,5 dB
Group delay time	<80 ns
Connectors	
Chinch-socket	4 pcs.
BNC-socket	2 pcs.
General data	
Power consumption	<10 W

characteristics

- Modulation of 2 A/V signals into 2 analogue TV channels
- Multi-standard
- Stereo capable vestigial sideband modulator, independently adjustable in 250 kHz steps
- Video / audio interfaces in BNC/RCA
- Output frequency range 45...862 MHz

Channel converter

OH 45

Channel converter

Implementation of an analog TV channel in the frequency range 45…762 MHz, high IF selection through SAW-filter. Adjacent channel operating on the input and output.

Technical data	
Input	
Input frequency range	45...862 MHz
Input frequency steps	250 MHz
Channel bandwidth	7/8 MHz
Input level range	50...90 dBµV
AGC	>40 dB
Output	
Output frequency range	45...862 MHz
Output frequency steps	250 kHz
Frequency stability	>0,03 MHz
Output level	95...105 dBµV
Spurious suppression	>55 dB
S/N Video	>58 dB
S/N Audio	>50 dB
Amplitude response (O-E)	>1 dB
Group delay time	<80 ns
Connectors	
F-socket	2 pcs.
General data	
Power consumption	>10 W
Operating temperature range	-20...+55 °C

characteristics

- Implementation of an analogue TV channel in the frequency range of 45...862 MHz
- AGC 50...90 dBµV
- Deactivation of the AGC for manual amplifier setting
- High IF-selection via two cascaded SAW-filters
- Therefore neighbour channel compatible at in/output

Digital modules

OH 77

DVB-S/S2– analog-channel processing headends with CI (MPEG-4)

Powerful technology, compact dimensions, modular and flexibly expandable; the WISI COMPACT HEADEND System OH combines all the advantages of an innovative and affordable headend. WISI Compact Headend OH is easy to configure. With up to 14 module slots it offers channel processing for 14 analogue or 28 digital channels in a 3 HU 19" rack chassis. WISI Compact Headend OH operates on a high efficiency power supply, with low consumption modules in order to make a minimum ecological impact and a low operational cost. The USB connection and the RJ45 interface can be used to execute software updates for the basic unit as well as for the modules. Furthermore, all functions can be furnished from a distance per web browser.

Technical data	
Input	
Input frequency range	950...2150 MHz
Input frequency steps	1 MHz
Input level range	47...70 dBµV
AFC	±10 MHz
Modulation type	QPSK, 8PSK
Symbol rate	1...45 MS/s
FEC outer DVB-S	RS 204,16
FEC inner DVB-S	Conv. 1/2, 2/3, 3/4, 5/6, 7/8
FEC outer DVB-S2	BCH
FEC inner DVB-S2	LDPC 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
Output	
Output frequency range	45...862 MHz
Output frequency steps	250 kHz
Frequency stability	±30 MHz
Output channel bandwidth (coupelt)	7/8MHz
Output level	90...105 dBµV (1 dB-steps)
Amplitude response (O-E)	±1 dB
Spurious suppression	>58 dB
TV standards	B/G, D/K, I, L, M, N
Video Standard	PAL, SECAM, NTSC
Video formats	4:3/16:9/4:3 Zoom
Video decoder	MPEG 2 MP@ML, MPEG 4 H.264
audio decoding	MPEG 2 (L1/L2)
S/N	>57 dB
Connectors	
F-socket	2 pcs. (HF in, HF out)
Common Interface for Descrambling	1 pcs.
General data	
Power consumption	W
LNB supply voltage	12 V
LNB electrical power supply	0.8 A

Technical data	
Dimensions (width x height x depth)	29,5 x 105 x 253 mm
Operating temperature range	-20...+55 °C

characteristics

- Reception of a DVB-S/S2-Signal and modulation to an analogue TV-channel
- MPEG 2 and MPEG 4 compatible
- 1x CI slot for central decryption
- NICAM Encoder
- Input frequency range 950...2150 MHz
- Output frequency range 45...862 MHz
- Vestigial sideband modulator

Digital modules

OH 77 D

DVB-S/S2– analog-channel processing headends with CI (MPEG-4, Dolby)

Powerful technology, compact dimensions, modular and flexibly expandable; the WISI COMPACT HEADEND System OH combines all the advantages of an innovative and affordable headend. WISI Compact Headend OH is easy to configure. With up to 14 module slots it offers channel processing for 14 analogue or 28 digital channels in a 3 HU 19" rack chassis. WISI Compact Headend OH operates on a high efficiency power supply, with low consumption modules in order to make a minimum ecological impact and a low operational cost. The USB connection and the RJ45 interface can be used to execute software updates for the basic unit as well as for the modules. Furthermore, all functions can be furnished from a distance per web browser.

Technical data	
Input	
Input frequency range	950...2150 MHz
Input frequency steps	1 MHz
Input level range	47...70 dBµV
AFC	±10 MHz
Modulation type	QPSK, 8PSK
Symbol rate	1...45 MS/s
FEC outer DVB-S	RS 204,16
FEC inner DVB-S	Conv. 1/2, 2/3, 3/4, 5/6, 7/8
FEC outer DVB-S2	BCH
FEC inner DVB-S2	LDPC 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
Output	
Output frequency range	45...862 MHz
Output frequency steps	250 kHz
Frequency stability	±30 MHz
Output channel bandwidth (coupelt)	7/8MHz
Output level	90...105 dBµV (1 dB-steps)
Amplitude response (O-E)	±1 dB
Spurious suppression	>58 dB
TV standards	B/G, D/K, I, L, M, N
Video Standard	PAL, SECAM, NTSC
Video formats	4:3/16:9/4:3 Zoom
Video decoder	MPEG 2 MP@ML, MPEG 4 H.264
audio decoding	MPEG 2 (L1/L2), Dolby (AC3, EAC3)
Video-S/N	>57 dB
Audio-S/N	>50 dB
Connectors	
F-socket	2 pcs. (HF in, HF out)
Common Interface for Descrambling	1 pcs.
General data	
Power consumption	<11 W (without CAM)
LNB supply voltage	12 V

Technical data	
LNB electrical power supply	0.9 A
Dimensions (width x height x depth)	29,5 x 105 x 253 mm
Operating temperature range	-20...+55 °C

characteristics

- Reception of a DVB-S/S2-Signal and modulation to an analogue TV-channel
- MPEG 2 and MPEG 4 compatible
- Dolby digital decoding
- 1x CI slot for central decryption
- NICAM Encoder
- Input frequency range 950...2150 MHz
- Output frequency range 45...862 MHz
- Vestigial sideband modulator

Digital modules

OH 79 2

DVB-T / T2 / C analogue channel processing headends with CI (MPEG-4)

Powerful technology, compact dimensions, modular and flexibly expandable; the WISI COMPACT HEADEND System OH combines all the advantages of an innovative and affordable headend. WISI Compact Headend OH is easy to configure. With up to 14 module slots it offers channel processing for 14 analogue or 28 digital channels in a 3 HU 19" rack chassis. WISI Compact Headend OH operates on a high efficiency power supply, with low consumption modules in order to make a minimum ecological impact and a low operational cost. The USB connection and the RJ45 interface can be used to execute software updates for the basic unit as well as for the modules. Furthermore, all functions can be furnished from a distance per web browser.

Technical data	
Input	
Input frequency range	47...878 MHz
Input frequency steps	0.001 MHz
Input level range	35...90 dBµV
Channel bandwidth	6/7/8 MHz
COFDM-Spectrum DVB-T	2 k/8 k/16 k/32 k FFT
COFDM modulation type	QPSK, 16QAM, 64QAM,128QAM, 256QAM
COFDM Guard Intervall	1/4, 1/8, 1/16, 1/32, 1/128, 19/128, 19/256
FEC	LDPC/BCH-Code 1/2, 2/3, 3/4, 5/6, 3/5
Output	
Output frequency range	45...862 MHz
Output frequency steps	250 kHz
Frequency stability	±30 kHz
Output channel bandwidth (coupelt)	7/8MHz
Output level	90...105 dBµV (1 dB-steps)
Amplitude response (O-E)	±1,5 dB
Spurious suppression	>55 dB
TV standards	B/G, D/K, I, L, M, N
Video Standard	PAL, SECAM, NTSC
Video formats	4:3/16:9/4:3 Zoom
Video decoder	MPEG 2 MP@ML, MPEG 4 H.264
audio decoding	MPEG 2 (L1/L2)
Connectors	
F-socket	2 pcs.
Common Interface for Descrambling	1 pcs.
General data	
Power consumption	10 W
LNB supply voltage	12 V
LNB electrical power supply	0.83 A
Dimensions (width x height x depth)	mm
Operating temperature range	-20...+55 °C

characteristics

- Reception of a DVB-T/ T2 / C-signal and modulation in an analogue TV-channel
- MPEG 2 and MPEG 4 compatible
- 1x CI slot for central decryption
- NICAM Encoder
- Input frequency range 110–878 MHz
- Output frequency range 45...862 MHz
- Vestigial sideband modulator

Digital modules

OH 79 2D

DVB-T / T2 / C analogue channel processing headends with CI (MPEG-4 and Dolby)

Powerful technology, compact dimensions, modular and flexibly expandable; the WISI COMPACT HEADEND System OH combines all the advantages of an innovative and affordable headend. WISI Compact Headend OH is easy to configure. With up to 14 module slots it offers channel processing for 14 analogue or 28 digital channels in a 3 HU 19" rack chassis. WISI Compact Headend OH operates on a high efficiency power supply, with low consumption modules in order to make a minimum ecological impact and a low operational cost. The USB connection and the RJ45 interface can be used to execute software updates for the basic unit as well as for the modules. Furthermore, all functions can be furnished from a distance per web browser.

Technical data	
Input	
Input frequency range	47...878 MHz
Input frequency steps	1 kHz
Input level range	35...90 dBµV
Channel bandwidth	6/7/8 MHz
COFDM-Spectrum DVB-T	2 k/8 k/16 k/32 k FFT
COFDM modulation type	QPSK, 16QAM, 64QAM,128QAM, 256QAM
COFDM Guard Intervall	1/4, 1/8, 1/16, 1/32, 1/128, 19/128, 19/256
FEC	LDPC/BCH-Code 1/2, 2/3, 3/4, 5/6, 3/5
Output	
Output frequency range	45...862 MHz
Output frequency steps	250 kHz
Frequency stability	±30 kHz
Output channel bandwidth (coupelt)	7/8MHz
Output level	90...105 dBµV (1 dB-steps)
Amplitude response (O-E)	±1,5 dB
Spurious suppression	>55 dB
TV standards	B/G, D/K, I, L, M, N
Video Standard	PAL, SECAM, NTSC
Video formats	4:3/16:9/4:3 Zoom
Video decoder	MPEG 2 MP@ML, MPEG 4 H.264
audio decoding	MPEG 2 (L1/L2), Dolby (AC3, EAC3)
Connectors	
F-socket	2 pcs.
Common Interface for Descrambling	1 pcs.
General data	
Power consumption	10 W
LNB supply voltage	12 V
LNB electrical power supply	0.83 A

Technical data	
Dimensions (width x height x depth)	mm
Operating temperature range	-20...+55 °C

characteristics
- Reception of a DVB-T/ T2 / C-signal and modulation in an analogue TV-channel
- MPEG 2 and MPEG 4 compatible
- Dolby digital decoding
- 1x CI slot for central decryption
- NICAM Encoder
- Input frequency range 110–878 MHz
- Output frequency range 45...862 MHz
- Vestigial sideband modulator

Digital modules

OH 84

Reception of 4 DVB-S/S2 signals and transmodulation into 4 DVB-C channels

Powerful technology, compact dimensions, modular and flexibly expandable; the WISI COMPACT HEADEND System OH combines all the advantages of an innovative and affordable headend. WISI Compact Headend OH is easy to configure. With up to 14 module slots it offers channel processing for 14 analogue or 28 digital channels in a 3 HU 19" rack chassis. WISI Compact Headend OH operates on a high efficiency power supply, with low consumption modules in order to make a minimum ecological impact and a low operational cost. The USB connection and the RJ45 interface can be used to execute software updates for the basic unit as well as for the modules. Furthermore, all functions can be furnished from a distance per web browser.

Technical data	
Input	
Input frequency range	950...2150 MHz
Input frequency steps	1 MHz
Return loss IN	>8 dB
Isolation internal multiswitch	>30 dB
Input level range	47...90 dBµV
AFC	±10 MHz
Modulation	QPSK (EN300421), QPSK 8PSK (EN302307)16APSK, 32APSK
Symbol rate	QPSK: 1...53 MS/s; 8PSK: 1...45 MS/s; 16APSK: 1...35 MS/s; 32APSK: 1...28 MS/s
Spectral inversion	normal or inverted
FEC outer DVB-S	RS 204-16
FEC inner DVB-S	1/2, 2/3, 3/5, 5/6, 7/8
FEC outer DVB-S2	BCH
FEC inner DVB-S2	(1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 (QPSK) /5, 2/3, 3/4, 5/6, 8/9, 9/10 (8PSK))
Output	
Output frequency range	45...862 MHz
Output frequency steps	250 kHz
Frequency stability	±30 kHz
Output channel bandwidth (coupelt)	4 x 8 MHz
Output level	88...103 dBµV
Amplitude response (O-E)	1 dB
Modulation type	32-, 64-, 128-, 256-QAM
Symbol rate	4,48...7,20 MS/s
Spurious suppression	>50 dB (at QAM 256)
SNR	≥45 dB
MER	≥40 dB
Bit stuffing	Yes
SI-Table handling	Yes
PID filtering	Yes
NIT generation	Yes

Technical data	
Connectors	
F-socket	5 pcs.
General data	
Power consumption	<10 W
LNB supply voltage	14...18 V (22 kHz), DiSEqC 1.0
LNB electrical power supply	0.5 A
Dimensions (width x height x depth)	29,5 x 105 x 253 mm
Operating temperature range	-20...+55 °C

Short description

- Reception of 4 DVB-S/S2 signals and transmodulation into 4 DVB-C channels
- Input frequency range 950...2150 MHz
- Output frequency range 47...862 MHz
- Integrated distribution matrix
- DiSEqC 1.0
- PID filtering
- NIT and LCN generation
- MPEG2 and MPEG4 compatible

Digital modules

OH 85 H

Twin DVB-S/S2 – QAM transmodulator with CI

Powerful technology, compact dimensions, modular and flexibly expandable; the WISI COMPACT HEADEND System OH combines all the advantages of an innovative and affordable headend. WISI Compact Headend OH is easy to configure. With up to 14 module slots it offers channel processing for 14 analogue or 28 digital channels in a 3 HU 19" rack chassis. WISI Compact Headend OH operates on a high efficiency power supply, with low consumption modules in order to make a minimum ecological impact and a low operational cost. The USB connection and the RJ45 interface can be used to execute software updates for the basic unit as well as for the modules. Furthermore, all functions can be furnished from a distance per web browser.

Technical data	
Input	
Input frequency range	950...2150 MHz
Input frequency steps	1 MHz
Input level range	47...70 dBµV
AFC	±10 MHz
Modulation	QPSK, 8PSK
Symbol rate	QPSK: 1...53 MS/s; 8PSK: 1...45 MS/s; 16APSK: 1...35 MS/s; 32APSK: 1...28 MS/s
Spectral inversion	normal or inverted
FEC outer DVB-S	RS 204, 188, 16
FEC inner DVB-S	Conv. 1/2, 2/3, 3/4, 5/6, 7/8
FEC outer DVB-S2	BCH
FEC inner DVB-S2	LDPC 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
Output	
Output frequency range	45...862 MHz
Output frequency steps	500 kHz
Frequency stability	±30 kHz
Output channel bandwidth (coupelt)	2 x 8 MHz
Output level	85...103 dBµV
Amplitude response (O-E)	1 dB
Modulation type	16-, 32-, 64-, 128-, 256- QAM
Symbol rate	3.45...6.9 MS/s
Spurious suppression	>50 dB
SNR	≥45 dB
MER	≥40 dB
Bit stuffing	Yes
PCR correction	Yes
PID filtering	Yes
LCN	Yes
NIT generation	Yes
Connectors	
F-socket	3 pcs.

Technical data	
Common Interface for Descrambling	2 pcs.
General data	
Power consumption	<10 W
LNB supply voltage	14/18 V (22 kHz), DiSEqC 1.0
LNB electrical power supply	0.5 A (without CAM)
Dimensions (width x height x depth)	29,5 x 105 x 253 mm
Operating temperature range	-20...+55 °C

characteristics

- Reception of two DVB-S/S2-signals and transmodulation into two DVB-C channels
- 2x CI slots for central decryption
- Input frequency range 950...2150 MHz
- Output frequency range 47...862 MHz
- MPEG 2 and MPEG 4 compatible
- PID filtering
- NIT and LCN generation

Digital modules

OH 86 2

Twin DVB-C/-T/-T2 - QAM transmodulator with CI

Powerful technology, compact dimensions, modular and flexibly expandable; the WISI COMPACT HEADEND System OH combines all the advantages of an innovative and affordable headend. WISI Compact Headend OH is easy to configure. With up to 14 module slots it offers channel processing for 14 analogue or 28 digital channels in a 3 HU 19" rack chassis. WISI Compact Headend OH operates on a high efficiency power supply, with low consumption modules in order to make a minimum ecological impact and a low operational cost. The USB connection and the RJ45 interface can be used to execute software updates for the basic unit as well as for the modules. Furthermore, all functions can be furnished from a distance per web browser.

Technical data	
Input	
Input frequency range	45...878 MHz
Input frequency steps	1 kHz
Channel bandwidth	6/7/8 MHz
channel bandwidth DVB-T2	1,7 / 5 / 6 / 7 / 8 MHz
Input level range	47...90 dBµV
FEC DVB-C	Conv., RS 188, 204
QAM-Modulationsart	QPSK, 16QAM, 64QAM,128QAM, 256QAM
QAM Symbolrate	1...7,2 Mbaud
FEC DVB-T	Conv., K=7, G=1/2, 2/3, 3/4, 4/5, 5/6, 7/8
Modulation schema DVB-T	QPSK, 16-, 64-QAM
Guard Intervall DVB-T	1/4, 1/8, 1/16, 1/32
FFT DVB-T	2k, 8k switchable
FEC DVB-T2	LDPC/BCH-Code 1/2, 2/3, 3/4, 4/5, 5/6, 3/5
Modulation scheme DVB-T2	QPSK, 16QAM, 64QAM, 256QAM
Guard Intervall DVB-T2	1/4, 1/8, 1/16, 1/32, 1/128, 19/128, 19/256
FFT DVB-T2	1k, 2k, 4k, 8k, 16k, 32k
Output	
Output frequency range	45...870 MHz (channel A)
Output frequency steps	1000 kHz
Frequency stability	±30 kHz
Output channel bandwidth (coupelt)	2 x 8 MHz
Output level	85...103 dBµV (Depending on QAM-symbol rate)
Amplitude response (O-E)	±1 dB
Spurious suppression	≥50 dB
S/N	≥45 dB
MER	≥40 dB
Modulation	16-, 32-, 64-, 128-, 256-QAM
Symbol rate	3,45...6,9 MS/s

Technical data	
Spectral inversion	
FEC outer DVB-S	RS-204,188,16
Bit stuffing	Yes
PCR correction	Yes
PID filtering and remapping	Yes
Connectors	
F-socket	3 pcs.
Common Interface for Descrambling	2 pcs.
General data	
Power consumption	<10 W
Supply voltage DVB-T antenna	12 V DC (830 mA)
Dimensions (width x height x depth)	29,5 x 105 x 253 mm
Operating temperature range	-20...+55 °C

characteristics

■ Reception of two DVB-T / T2 / C signals and transmodulation into two QAM-TV channels (coupled)

■ 2x CI slots for central decryption

■ MPEG 2 and MPEG 4 compatible

■ PID filtering

■ NIT and LCN generation

Digital modules

OH 88 H

Twin DVB-S/S2 – COFDM transmodulator with CI

Powerful technology, compact dimensions, modular and flexibly expandable; the WISI COMPACT HEADEND System OH combines all the advantages of an innovative and affordable headend. WISI Compact Headend OH is easy to configure. With up to 14 module slots it offers channel processing for 14 analogue or 28 digital channels in a 3 HU 19" rack chassis. WISI Compact Headend OH operates on a high efficiency power supply, with low consumption modules in order to make a minimum ecological impact and a low operational cost. The USB connection and the RJ45 interface can be used to execute software updates for the basic unit as well as for the modules. Furthermore, all functions can be furnished from a distance per web browser.

Technical data	
Input	
Input frequency range	950...2150 MHz
Input frequency steps	1 MHz
Input level range	47...70 dBµV
AFC	±10 MHz
Modulation type	QPSK, 8PSK
Symbol rate	QPSK: 1...53 MS/s; 8PSK: 1...45 MS/s; 16APSK: 1...35 MS/s; 32APSK: 1...28 MS/s
FEC outer DVB-S	BCH
FEC inner DVB-S	Conv. 1/2, 2/3, 3/4, 5/6, 7/8
FEC outer DVB-S2	BCH
FEC inner DVB-S2	LDPC 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
Output	
Output frequency range	47...862 MHz
Output frequency steps	500 kHz
Frequency stability	±30 kHz
Output channel bandwidth (coupelt)	2 x 7/8 MHz
Output level	95...105 dBµV
Amplitude response (O-E)	±1 dB
Spurious suppression	>50 dB
S/N	>41 dB
MER	>37 dB
Modulation	QPSK, 16-, 64-QAM
FEC	1/2, 2/3, 3/4, 5/6, 7/8
Guard Interval	1/4, 1/8, 1/16, 1/32
FFT modus	2 k/8 k
Bit stuffing	Yes
PCR correction	Yes
PID filtering and remapping	Yes
Connectors	
F-socket	pcs.
Common Interface for Descrambling	2 pcs.

Technical data	
General data	
Power consumption	<10 W
LNB supply voltage	14/18 V (22 kHz), DiSEqC 1.0
LNB electrical power supply	0.5 A (without CAM)
Dimensions (width x height x depth)	29,5 x 105 x 253 mm
Operating temperature range	-20...+55 °C

characteristics

- Reception of two DVB-S/S2 signals and transmodulation into two COFDM-TV channels
- 2x CI slots for central decryption
- MPEG 2 and MPEG 4 compatible
- PID filtering
- NIT and LCN generation

Digital modules

OH 89 2

Twin DVB-C/-T/-T2 - COFDM transmodulation with CI

Powerful technology, compact dimensions, modular and flexibly expandable; the WISI COMPACT HEADEND System OH combines all the advantages of an innovative and affordable headend. WISI Compact Headend OH is easy to configure. With up to 14 module slots it offers channel processing for 14 analogue or 28 digital channels in a 3 HU 19" rack chassis. WISI Compact Headend OH operates on a high efficiency power supply, with low consumption modules in order to make a minimum ecological impact and a low operational cost. The USB connection and the RJ45 interface can be used to execute software updates for the basic unit as well as for the modules. Furthermore, all functions can be furnished from a distance per web browser.

Technical data	
Input	
Input frequency range	45...862 MHz
Input frequency steps	1 kHz
Channel bandwidth	6/7/8 MHz
channel bandwidth DVB-T2	1,7 / 5 / 6 / 7 / 8 MHz
Input level range	47...90 dBµV
FEC DVB-C	Conv., RS 188, 204
QAM-Modulationsart	QPSK, 16QAM, 64QAM,128QAM, 256QAM
QAM Symbolrate	1...7,2 Mbaud
FEC DVB-T	Conv., K=7, G=1/2, 2/3, 3/4, 4/5, 5/6, 7/8
Modulation schema DVB-T	QPSK, 16-, 64-QAM
Guard Intervall DVB-T	1/4, 1/8, 1/16, 1/32
FFT DVB-T	2k, 8k switchable
FEC DVB-T2	LDPC/BCH-Code 1/2, 2/3, 3/4, 4/5, 5/6, 3/5
Modulation scheme DVB-T2	QPSK, 16QAM, 64QAM, 256QAM
Guard Intervall DVB-T2	1/4, 1/8, 1/16, 1/32, 1/128, 19/128, 19/256
FFT DVB-T2	1k, 2k, 4k, 8k, 16k, 32k
Output	
Output frequency range	45...862 MHz (channel A)
Output frequency steps	250 kHz
Frequency stability	±30 kHz
Output channel bandwidth (coupelt)	2 x 7/8 MHz
Output level	82...97 dBµV (Depending on QAM-symbol rate)
Amplitude response (O-E)	±1 dB
Spurious suppression	≥50 dB
S/N	≥41 dB
MER	≥37 dB
Modulation	QPSK, 16-, 64-QAM
FEC	1/2, 2/3, 3/4, 5/6, 7/8

Technical data	
Guard Interval	
FFT Mode	2k, 8k switchable
Bit stuffing	Yes
PCR correction	Yes
PID filtering	Yes
Connectors	
F-socket	3 pcs.
Common Interface for Descrambling	2 pcs.
General data	
Power consumption	<10 W
Supply voltage DVB-T antenna	12 V DC (830 mA)
Dimensions (width x height x depth)	29,5 x 105 x 253 mm
Operating temperature range	-20...+55 °C

characteristics

- Reception of two DVB-T / T2 / C signals and transmodulation into two COFDM-TV channels (coupled)
- 2x CI slots for central decryption
- MPEG 2 and MPEG 4 compatible
- PID filtering
- NIT and LCN generation

Encoder

OH 66

Twin A/V encoder

Powerful technology, compact dimensions, modular and flexibly expandable; the WISI COMPACT HEADEND System OH combines all the advantages of an innovative and affordable headend. WISI Compact Headend OH is easy to configure. With up to 14 module slots it offers channel processing for 14 analogue or 28 digital channels in a 3 HU 19" rack chassis. WISI Compact Headend OH operates on a high efficiency power supply, with low consumption modules in order to make a minimum ecological impact and a low operational cost. The USB connection and the RJ45 interface can be used to execute software updates for the basic unit as well as for the modules. Furthermore, all functions can be furnished from a distance per web browser.

Technical data	
Video input	
Input signal	Composite CVBS-signal und SDI
Impedance	75 Ω
RF input level	1 dBm
Frequency range	0,000020...5 MHz
Encoding-Standard	MPEG 2 ISO/IEC 13818-2, MP@ML (4:2:2)
Bit rate	1...12 Mbps (0,1 Mbit-steps)
Picture size	720/576 Pixel
Teletext	Extraction from video signal
aspect ratio	4:3, 16:9 (automatic detection)
PID	automatic/manuell
PSI/SI	Autom. Generation
NIT with LCN	Optional with CS77
Audio input	
Sampling frequency	32/44, 1/48 kHz
Bit rate	192 Kbps (up to)
Audio format	Stereo, joint stereo, dual, mono
Output	
Frequency range	47...862 MHz
QAM/COFDM Modulation	Selectable
Modulation	16-, 32-, 64-, 128-, 256-QAM
Output frequency steps	250 kHz
Ouput channel bandwidth	8 MHz
Output level	88...103 dBµV
MER	≥ 40 dB
Symbol rate	2...8 MS/s
Bit stuffing	Yes
COFDM-Mode	Selectable
Modulation	QPSK, 16-, 64-QAM
FEC	
Guard Interval	1/4, 1/8, 1/16, 1/32
FFT modus	2 k/8 k
Connectors	
3,5 mm jack socket	2 pcs.

Technical data	
BNC-socket	4 pcs.
General data	
Operating temperature range	-20...+55 °C

characteristics

- Analog video input
- Digital SDI input
- QAM- or COFDM*-modulation
- PSI/SI generation
- ASI input and output

WISI BOX

OH 16 SC

Reception from 16 DVB-S/S2 signals and transmodulation in 16 DVB-C channels

The compact headend OH 16 SC is easy to install and offers a lot of interesting features.By using a multi switch with 5, 9, 13 or 17 inputs in front of the headend and the DiSEqC functionality, ensures that transponders of up to four different satellite positions can be received, transmodulated and distributed. Network integration is possible via DHCP that supports remote maintenance and programming via the web browser without any additional software. The headend set-up is user-friendly, it generates automatically an IP address for the connected PC and by entering „OH16" or the programmed IP address the operator has access to the headend. LCN, NIT generating, PID filtering and an integrated FM combiner complete the range of functions.

Technical data	
Input	
Input frequency range	950...2150 MHz
Input frequency steps	1 MHz
Return loss IN	>8 dB
Isolation internal multiswitch	>30 dB
Input level range	47...90 dBµV
AFC	±10 MHz
Modulation	QPSK (EN300421), QPSK 8PSK (EN302307)16APSK, 32APSK
Symbol rate DVB-S	1...53 Mbaud
Symbol rate DVB-S2	1...45 MSps 8PSK, 1...35 MSps 16APSK, 1...28 MSps 32APSK
Spectral inversion	Automatic
FEC outer DVB-S	RS 204-16
FEC inner DVB-S	1/2, 2/3, 3/5, 5/6, 7/8
FEC outer DVB-S2	BCH
FEC inner DVB-S2	(1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 (QPSK) /5, 2/3, 3/4, 5/6, 8/9, 9/10 (8PSK))
Output	
Output frequency range	45...862 MHz
Output frequency steps	250 kHz
Output channel bandwidth (coupelt)	4x (4 x 8 MHz)
Output level	100...115 dBµV
Amplitude response (O-E)	1 dB
Modulation type	32-, 64-, 128-, 256-QAM
Symbol rate	4,48...7,00 MS/s
Spurious suppression	>50 dB (at QAM 256)
MER	≥40 dB
Bit stuffing	Yes
SI-Table handling	Yes
PID filtering	Yes
LCN	Yes
Connectors	
F-socket	20 pcs.

Technical data	
Output test point	-20 dB
USB	1 pcs.
RJ11	1 pcs.
RJ45	1 pcs.
General data	
Power consumption	<70 W
LNB supply voltage	14...18 V DiSEqC 1.0 / 22KHz
LNB electrical power supply	0.5 A each slot / max. 1A
Dimensions (width x height x depth)	483 x 44 x 259 mm
Operating temperature range	-20...+45 °C
Operating voltage	180...265 V AC (47...63 Hz)

characteristics

- Reception of 16 DVB-S/S2 signals and transmodulation into 16 DVB-C channels
- DiSEqC 1.0
- Input frequency range 950...2150 MHz
- Output frequency range 47...862 MHz
- Integrated distribution matrix
- Programming and remote access via web browser
- PID filtering
- NIT and LCN generation
- Integrated FM amplifier
- 19" rack - or wall installation

WISI Micro Headend:

Innovative compact headend

Micro Headend

Transmodulator for DVB-C and DVB-T (with 4x CI slots)

The OM micro headend meets the high standards of signal processing especially for hospitals, hotels, hostels and retirement homes. With 4 CI-Slots, the multiplex function and static assignment of output-Pids it is perfectly made for the central decryption of pay-tv services and multiplexing of programs from several DVB-S/S2 transponders. The headend is managed through an Ethernet-connection which is simplified by the integrated DHCP-Server. Configurations can be transmitted to the headend via Bluetooth.

WISI Micro Headends at a glance:

- Transmodulator of DVB-S/S2 transponders to DVB-C or DVB-T channels
- The integrated 4 in 6 switch matrix reduces the installation effort and DiSEqC 1.0 is increasing the flexibility by controlling up to 4 satellites
- 4 CI slots for central decryption
- LCN / NIT processing
- Multiplex functionality at the input and output
- USB - interface to feed in any video content
- Programming via web interface
- Integrated DHCP server enables an automatic connection to a PC
- Smartphone and tablet access via Bluetooth

DVB-T/DVB-C Channel Processing

OM 10 0646

Transmodulator 6x DVB-S/S2 – 6x COFDM + 4 CI

The OM 10 0646 is a micro headend which can transmodulate 6 DVB-S/S2 transponders into 6 DVB-T (COFDM) packages. As it comes with 4 CI slots, it is perfectly suited for the central decryption of pay-tv services. There is also the possibility to create a multiplex before the CI slots allowing the user to combine services from different transponders but to decrypt them by only one smartcard, hereby guaranteeing the efficient usage of professional CAMs. Additionally the OM 10 supports the deletion of unwanted services from a transponder and enables the reduction of output channels by using the output multiplex functionality. As a transport stream, external video content can be fed in via USB or the LAN connection.

Technical data	
Input	
Impedance	75 Ω
Input frequency range	950...2150 MHz
Input frequency steps	1 MHz
Input level range	50...90 dBµV
Modulation DVB-S	QPSK
Symbol rate DVB-S	1...53 MSps
Modulation DVB-S2	QPSK, 8PSK (EN 302 307), 16APSK, 32 APSK
Symbol rate DVB-S2	1...53 MSps (QPSK); 1...45 MSps (8PSK); 1...35 MSps (16APSK); 1...28 MSps (32APSK)
CI Processing	
Number of PCMCIA slots	4
TS Processing	
TS stuffing	Yes
SI-Table handling	Yes
NIT handling	Yes
PID remapping	Yes
COFDM Processing	
Constellations	QPSK, 16-, 64-QAM
FEC	1/2,2/3,3/4,5/6,7/8
Guard Interval	1/8, 1/16, 1/32
FFT Mode	2k, 8k
MER	>40 dB
Output	
Impedance	75 Ω
Output frequency range	110...862 MHz
Output frequency steps	1 MHz
Output level	85...100 dBµV
Number of Channels	6 pcs.
Channel allocation	adjacent (1 x 6)
Return loss	dB
Output attenuation	0...15 dB (1 dB step)
Connectors	
F-socket	5 pcs. (4x Input, 1x Output)

Technical data	
RJ45	1 pcs.
USB	1 pcs.
General data	
Supply voltage	110...240 V (50/60 Hz)
Dimensions (width x height x depth)	272 x 196 x 75 mm
Power consumption	Typ. <40 W (Max. 50 W with 4 LNBs)
Operating temperature range	5...45 °C

characteristics

- Transmodulator of 6 DVB-S/S2 transponders to 6 DVB-T packages
- The integrated 4 in 6 switch matrix reduces the installation effort and DiSEqC 1.0 is increasing the flexibility by controlling up to 4 satellites
- 4 CI slots for central decryption
- PID remapping allows setting of static service PIDsat the output. It is no longer necessary for the TVset to make a scan if there is any transponder modification at the input
- LCN / NIT processing
- Multiplex functionality at the input and output
- USB - interface to feed in any video content
- Programming via web interface
- Integrated DHCP server enables an automatic connection to a PC
- Smartphone and tablet access via Bluetooth

DVB-T/DVB-C Channel Processing

OM 10 0648

Transmodulator 6x DVB-S/S2 - 8x QAM/COFDM + 4 CI

The OM 10 0648 is a micro headend which can transmodulate 6 DVB-S/S2 transponders into 8 DVB-C (QAM) or 8 DVB-T (COFDM) channels. As it comes with 4 CI slots, it is perfectly suited for the central decryption of pay-tv services. There is also the possibility to create a multiplex before the CI slots allowing the user to combine services from different transponders but to decrypt them by only one smartcard, hereby guaranteeing the efficient usage of professional CAMs. Additionally the OM 10 supports the deletion of unwanted services from a transponder and enables the reduction of output channels by using the output multiplex functionality. As a transport stream, external video content can be fed in via USB or the LAN connection.

Technical data	
Input	
Impedance	75 Ω
Input frequency range	950...2150 MHz
Input frequency steps	1 MHz
Input level range	50...90 dBµV
Modulation DVB-S	QPSK
Symbol rate DVB-S	1...53 MSps
Modulation DVB-S2	QPSK, 8PSK (EN 302 307), 16APSK, 32 APSK
Symbol rate DVB-S2	1...53 MSps (QPSK); 1...45 MSps (8PSK); 1...35 MSps (16APSK); 1...28 MSps (32APSK)
CI Processing	
Number of PCMCIA slots	4
TS Processing	
TS stuffing	Yes
SI-Table handling	Yes
NIT handling	Yes
PID remapping	Yes
QAM Processing	
Constellations	64-, 256- QAM
Symbol rate	4,45...7,20 MSymb/s
MER	>40 dB
COFDM Processing	
Constellations	QPSK, 16-, 64-QAM
FEC	1/2, 2/3, 3/4, 5/6, 7/8
Guard Interval	1/8, 1/16, 1/32
FFT Mode	2k, 8k
MER	>40 dB
Output	
Impedance	75 Ω
Output frequency range	110...862 MHz (COFDM); 50...862 MHz (QAM)
Output frequency steps	MHz
Output level	90...105 dBµV
Number of Channels	8 pcs.

Technical data	
Channel allocation	adjacent (2 blocks per 4 channels)
Return loss	≥14 dB (45 MHz), 1,5 dB/Octave but >10 dB
Output attenuation	0...15 dB (1 dB step)
Connectors	
F-socket	5 pcs. (4x Input, 1x Output)
RJ45	1 pcs.
USB	1 pcs.
General data	
Supply voltage	110...240 V (50/60 Hz)
Dimensions (width x height x depth)	272 x 196 x 75 mm
Power consumption	Typ. <40 W (Max. 50 W with 4 LNBs)
Operating temperature range	5...45 °C

characteristics

- Transmodulator of 6 DVB-S/S2 transponders to 8 DVB-C or DVB-T channels
- The integrated 4 in 6 switch matrix reduces the installation effort and DiSEqC 1.0 is increasing the flexibility by controlling up to 4 satellites
- 4 CI slots for central decryption
- PID remapping allows setting of static service PIDsat the output. It is no longer necessary for the TVset to make a scan if there is any transponder modification at the input
- LCN / NIT processing
- Multiplex functionality at the input and output
- USB - interface to feed in any video content
- Programming via web interface
- Integrated DHCP server enables an automatic connection to a PC
- Smartphone and tablet access via Bluetooth

DVB-T/DVB-C Channel Processing

OM 11 0648

Transmodulator 6x DVB-T/T2/C - 8x QAM/COFDM + 4 CI

The OM 11 0648 is a micro headend which can transmodulate 6 DVB-T/T2/C channels into 8 DVB-C (QAM) or 8 DVB-T (COFDM) channels. As it comes with 4 CI slots, it is perfectly suited for the central decryption of pay-tv services. There is also the possibility to create a multiplex before the CI slots allowing the user to combine services from different channels but to decrypt them by only one smartcard, hereby guaranteeing the efficient usage of professional CAMs. Additionally the OM 11 supports the deletion of unwanted services from a channel and enables the reduction of output channels by using the output multiplex functionality. As a transport stream, external video content can be fed in via USB or the LAN connection.

Technical data	
Input	
Impedance	75 Ω
Input frequency range	42...1002 MHz
Input frequency steps	250 kHz
Input level range	55...95 dBµV
Bandwidth	6, 7, 8 MHz
Modulation DVB-T/T2	COFDM / OFDM (EN 300 744)
Symbol rate DVB-T/T2	according modulation standard
Modulation DVB-C	16-, 64-, 256 QAM (EN 300 429)
Symbol rate DVB-C	1...7,2 Mbaud
FEC DVB-T	RS 204, 1885,8 / Convolution
FEC DVB-T2	LDPC / BCH
FEC DVB-C	RS 204-16
CI Processing	
Number of PCMCIA slots	4
TS Processing	
TS stuffing	Yes
SI-Table handling	Yes
NIT handling	Yes
PID remapping	Yes
QAM Processing	
Constellations	64-, 256- QAM
Symbol rate	4,45...7,20 MSymb/s
MER	>40 dB
COFDM Processing	
Constellations	QPSK, 16-, 64-QAM
FEC	1/2, 2/3, 3/4, 5/6, 7/8
Guard Interval	1/8, 1/16, 1/32
FFT Mode	2k, 8k
MER	dB
Output	
Impedance	75 Ω
Output frequency range	110...862 MHz (COFDM); 50...862 MHz (QAM)
Output frequency steps	1 MHz

Technical data	
Output level	90...105 dBµV
Number of Channels	8 pcs.
Channel allocation	adjacent (2 blocks per 4 channels)
Return loss	≥14 dB (45 MHz), 1,5 dB/Octave but >10 dB
Output attenuation	0...15 dB (1 dB step)
Connectors	
F-socket	5 pcs. (4x Input, 1x Output)
RJ45	1 pcs.
USB	1 pcs.
General data	
Supply voltage	110...240 V (50/60 Hz)
Dimensions (width x height x depth)	272 x 196 x 75 mm
Power consumption	Typ. <40 W (Max. 50 W with 4 LNBs)
Operating temperature range	5...45 °C

characteristics

- Transmodulator of 6 DVB-T/T2/C channels to 8 DVB-C or DVB-T channels
- Integrated switch matrix reduces installation effort. Parallel insertion of DVB-T/T2 and DVB-C possible (Input 1 -> Tuner 1...2 / Input 2 -> Tuner 1...6 / Input 3 -> Tuner 3....6)
- 4 CI slots for central decryption
- PID remapping allows setting of static service PIDs at the output. It is no longer necessary for the TV set to make a scan if there is any transponder modification at the input
- LCN / NIT processing
- Multiplex functionality at the input and output
- USB-interface to feed in any video content
- Programming via web interface
- Integrated DHCP server enables an automatic connection to a PC
- Smartphone and tablet access via Bluetooth

WISI Accessories channel processing:

The perfect match to our channel processing units

Labeled terminals

High quality sockets

only 1 rack unit

Cable management also at the front

DC 28
WISI
4S0T

SAT 1 IN 1DC 2 3 4 5 6 7
950-2150 MHz 11-14 dB

SAT 3 IN 1DC 2 3 4 5 6 7
950-2150 MHz

SAT 2 IN 1DC 2 3 4
950-2150 MHz 11-14 dB

SAT 4 IN 1DC 2 3 4
950-2150 MHz

Accessories
channel processing

With the accessories for channel processing systems WISI offers the perfect complement to organize cabling in 19" cabinets and the comfortable configuring of the systems via a hand-held unit.

WISI Accessories channel processing at a glance:

- Compact design
- versatile applicable
- Simple clear installation
- High quality connections

Input splitter

DC 28 0S4T
Input splitter

DC 28 3S1T
Input splitter

DC 28 4S0T
Input splitter

Technical data			
Input			
Numer SAT	- pcs.	21 pcs.	28 pcs.
Number TERR	28 pcs.	7 pcs.	- pcs.
Frequency range SAT	- MHz	920...2150 MHz	920...2150 MHz
Frequency range TERR	45...862 MHz	45...862 MHz	- MHz
Output			
Output return loss	>15 dB	>12/>15 dB (SAT/TERR)	>12 dB
Through loss	<13 dB (±1 dB)	<14/<13 dB (SAT: ±2,5 dB/TERR: ±1 dB)	<14 dB (±2,5 dB)
Isolation	>25 dB	>23/>25 dB (SAT/TERR)	>23 dB
Connectors			
F-socket	32 pcs.	32 pcs.	32 pcs.
General data			
Power passing	- V DC	<21 V DC (only SAT)	<21 V DC
Power passing	- A	<1,5 A (only SAT)	<1,5 A
Dimensions (width x height x depth)	483 x 44 x 51 mm	483 x 44 x 51 mm	483 x 44 x 51 mm
Operating temperature range	-20...+55 °C	-20...+55 °C	-20...+55 °C

Output collector

DM 17 A

Passive headend combiner

Technical data	
Frequency range	5...1000 MHz
Input impedance	75 Ω
Input return loss	>18 dB typ., min. 14 dB
Number of taps	12
Output impedance	75 Ω
Output return loss	>18 dB typ., min 13 dB
Tap loss IN-Out	1...12 < 18 dB (±1,5 dB)
Amplitude response (O-E)	<1,5 dB
Isolation Out-Out	>40 dB typ., min. 36 dB
Test Port	-20 dB
RF-screening	>110 dB
Power passing	V DC none
General data	
Dimensions (width x height x depth)	483 x 44 x 124 mm
Temperature range	-20...+55 °C
Connectors	
Output	1x F-connector
Input	12x F-connector
Test	1x F-connector

Mounting accessories

Handsets

ZG 80

Mounting set for input splitter DC 28 to basic unit OH 50

OH 41

Handset

Technical data	
General data	
Dimensions (width x height x depth)	80 x 37 x 20 mm

The ZG 80 is a mounting kit to attach the input splitter DC 28 on the basic unit OH 50.

Technical data	
Display	
Kind of display	LCD Dot Matrix
control panel	
buttons	4 pcs.
Connectors	
RJ11	1 pcs.
General data	
Power supply	5 V DC
Dimensions (width x height x depth)	130 x 76 x 23 mm
length of connection cable	1,2 m (max.)
Operating temperature range	0...+50 °C

Handset for programming of COMPACT HEADEND module with data storage

Always up to date

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WISI product brochures can be found here!

download-area.wisi.de

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