

Tangram High Density Video Platform

For Cable TV, IPTV and OTT solutions



Connecting past, present and future.

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Tangram Maximum Performance, Minimum Footprint

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. The TANGRAM platform can be used in a central or distributed headend architecture and provides the following processing functions in a central location:

In decentralized architecture with regional hubs, the modulation is done at the hub sites. The aggregated digital TV streams are transported via an IP network (Backbone) to the hub site and are terminated on the Edge equipment (Edge QAM, Edge PAL, Edge FM, Edge COFDM or Edge ISDB-T) for modulation and transmission in the HFC networks.

The TANGRAM chassis can optionally be equipped with two load sharing redundant power supplies (DC or AC) and contains high performance monitored fans for cooling. All modules, fans and power supplies are hot swappable.

- DVB-IP Gateway for DVB-C/S/S2/S2X/T/T2, ATSC and ISDB-T Reception
- · Descrambling and Scrambling
- Remultiplexing and PSI / SI Processing
- · Digital and analog Edge Modulation
- HDMI and HD/SDI Encoder
- · T2-MI de-encapsulation and PLP management
- Supports MPEG-2, MPEG-4 and HEVC

Tangram Features

- 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 UI
- Great variety for building your future-proof TV network. IP, QAM, ASI, DVB-T/T2/S/S2/S2X, DVB-T2-MI, PAL, NTSC, SECAM, FM, ISDB-T, ATSC



Solutions with tangram



Channel Processing Headends for residential, regional and national networks.



RF Overlay Solutions for video services in GPON and active Ethernet networks.



Housing Industry Headends for housing complexes, hotels and hospitals.



HFC

From the Headend to the wall-outlet: Everything for the cable network.

Tangram Applications

DVB - IP Gateway

The TANGRAM receivers provide a best-of-class gateway platform for Cable and IPTV operators. The receivers enable flexible receiving of streams and IP encapsulation for different formats of DVB-S/S2/S2X, DVB-T/T2, DVB-C, DVB-ASI, ISDB-T, ATSC, and T2-MI de-encapsulation. The gateway solution is the basis for providing the digital TV content for IP distribution and for all kinds of different applications, like multiscreen transcoding or edge modulation.



Tangram Applications

IP to Edge QAM/COFDM/ISDB-T/ PAL/NTSC/SECAM/FM

The TANGRAM edge solutions open the doors to establishing and operating analog and digital cable TV services. It supports a full range of different analog and digital standards like PAL, NTSC, SECAM, QAM, COFDM and ISDB-T. The solution with TANGRAM and OPTOPUS offers high flexibility for building a cable and optical headend, as all functions are performed by individual units that can be added to the system when needed.



Tangram Product Benefits



High Reliability

The base unit provides a carrier grade chassis and supports a fully redundant concept (1+1, n+1). The intelligent redundant concept guarantees a high system availability and reduces maintenance outages.

Chassis	 Redundant power supply
	 Hot pluggable fan bay
	Gigabit Ethernet port redundancy
Module	• N+1, 1+1 redundancy
	Input transport stream redundancy



Excellent Cost Performance

The high density Edge modules, the DVB-Gateway with multi tuner support and low power consumption reduces the costs per channel or transponder reception.

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Maximum Flexibility

The modular concept of the TANGRAM platform allows combining the GT modules for your application. You can mix different applications in a single system.

Inputs	· IP	· DVB-T/T2	· ISDB-T
	· ASI	· DVB-C	· ATSC
	· DVB-S/S2/S2X	· HDMI	· HD/SDI
Outputs	· QAM	· ISDB-T	· SECAM
	· COFDM	· PAL	· ASI
	· FM	· NTSC	· IP
Processing	 Multiplexing Demultiplexing 	 Scrambling T2-MI de-encap- 	• EPG regeneration
	Descrambling	sulation	 PSI/SI regeneration



Simplicity

TANGRAM is optimized for easy mounting and initial operation. The web UI of TANGRAM is structured to simplify configuration and management, and supports you step by step in getting a running system.

Tangram Facts & Figures

High Density System

Receiving up to 100% more DVB-S/S2/S2X transponder

The DVB - Gateway needs less space for deployments compared to other products. This reduces the cost of deployment, sparing and rack space lease.

Tripling the number of generated PAL/NTSC/SECAM channels

The high density edge module allows you to generate up to 36 analog TV channels with different standards. This reduces the costs per channel, saving the cost of energy and air conditioning.



DVB-S/S2/S2X Transponder per 1 RU chassis



Edge PAL/NTSC/SECAM per 1 RU chassis

Less space necessary for the multi-standard reception

Vendor A

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The DVB – Gateway supports the most popular standards for satellite and terrestrial reception in one module. This provides a future-proof and flexible gateway solution.

24 channels for encoding in 1 RU

The encoding of external video sources is an important headend functionality, which Tangram fulfils with 4x HDMI or 4xHD/SDI inputs per module.



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Necessary number of modules for DVB-S/S2/S2X/C/T/T2 or ISDB-T reception

Encoder inputs per 1 RU chassis



Tangram Chassis Overview

The TANGRAM base unit is a 1 RU chassis which can fit up to 6 modules on the backside and 1 module on the front panel. It comes 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).



(3)

(4)

- 1 Easy configuration of the complete platform via 1 management port
- Minimized effort for cabling and management configuration by internal switch

- Expandability for increasing bandwidth and port redundancy by GigE SFP GT12 extension (+4 GigE)
- 4x GigE interface individually configurable for streaming bandwidth distribution



Connect your engineer Additional management port for local connection	3	High reliability by redundant AC and DC power supply
Flexible Installation Any module in any slot	4	Hot swappable fan tray

Tangram Chassis



GT01W0230	GT01W0110	GT01W0048
19″ 1 RU chassis with backplane, 1 power supply (230 VAC), fan tray and integrated GigE switch (GT11)	19″ 1 RU chassis with backplane, 1 power supply (110 VAC), fan tray and integrated GigE switch (GT11)	19″ 1 RU chassis with backplane, 1 power supply (48 VDC), fan tray and integrated GigE switch (GT11)

Tangram Power Supplies





Tangram Universal Software Based Module

Enable new business with the new, innovative GT2000 module, and deploy the ulitmate solution for high-density video processing. The GT2000 hardware module features analogue output signals by using the GT2100 Software Option. An upgrade to full digital QAM output channels will be done with the Software Option GT2300.



GT2000

Tangram Universal Module IP to Edge

- HEVC/H.265, MPEG-4/H.264 and MPEG-2/ H.262 Decoding (SD,HD & UHD/4k)
- ✓ High-density und high-quality IP in analog Modulation
- \checkmark Outstanding signal parameters by direct digital modulation
- Improved cost-per-service. Up to 10 analogue channels on 1 RF output

- ✓ Fully compatible with current Tangram chassis
- \checkmark HD to SD downscaling functionality for up to 10 service
- ✓ Enable HEVC content for analogue TV distribution
- ✓ Up to 48 QAM channels per module

Software Packages for the enhanced module platform GT2000



Tangram Input & Encoder Modules

The TANGRAM modules are the pieces of the puzzle that you combine to create your professional video headend solution.



GT31W

DVB-Gateway

- Multi transport stream reception for DVB signals
- ✓ Up to 4 DVB-S/S2/S2X/C/T/T2/ ISDB-T RF inputs
- V DVB/ARIB transport stream processing
- ✓ RTP/ IP FEC output stream protection
- Demultiplex MPEG-2/MPEG-4 signals for SPTS transmission
- ✓ SPTS and MPTS streaming (CBR or VBR)
- UDP and RTP MPEG transport stream over IP protocol
- ✓ Transmission of up to 4 SRT streams *(GTSRT)



GT32W

ASI-IP in/out

- 4x ASI input or output, each BNC port configurable as input or output
- $\checkmark\,$ PID remapping and filtering
- RTP/ IP input streaming with FEC error correction
- $\checkmark\,$ DVB/ARIB transport stream processing
- Demultiplexing from MPTS to SPTS
- ✓ High density 24 ASI in or out in 1 RU
- Supports IP input and output streaming (CBR or VBR)
- ✓ Supports 188 byte and 204 byte packet size
- ✓ Transmission of up to 4 SRT streams *(GTSRT)



GT33

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

- Multi transport stream reception for ATSC and QAM signals
- 8x 8VSB-ATSC/QAM J.83 B tuners with 4 RF inputs
- $\checkmark\,$ RTP/ IP FEC output stream protection
- High density reception 48 transponder in 1 RU
- Demultiplex MPEG-2/MPEG-4 signals for SPTS transmission
- ✓ SPTS and MPTS streaming (CBR or VBR)
- UDP and RTP MPEG transport stream over IP protocol





GT34

8x/16x DVB-S/S2/S2X - IP Gateway

- DVB-S/S2/S2X IP gateway for IPTV, CATV and multiscreen solutions
- Reception of up to 16x DVB-S/S2/S2X satellite transponders via 4 RF-inputs
- For saving cabling costs integrated SAT multiswitch
- ✓ Professional DVB transport stream processing
- ✓ SPTS and MPTS streaming (CBR or VBR)
- UDP and RTP MPEG transport stream over IP protocol
- High-density reception of 96 transponders in 1 RU

GT35

HD/SD Encoder with 4x HDMI

- HD/SD MPEG-4 (AVC, H.264) and HD/SD MPEG-2 video encoding
- ✓ Up to 4 HDMI inputs per module
- Professional multiplexer integrated
- ✓ SPTS and MPTS streaming (CBR or VBR)
- ✓ Supports PSI/SI processing
- Integrated into the TANGRAM System-Management
- Control and managment via web-UI
- \checkmark Transmission of up to 4 SRT streams *(GTSRT)

GT36

HD/SD Encoder with 4x SDI or A/V inputs

- HD/SD MPEG-4 (AVC, H.264) and HD/SD MPEG-2 video encoding
- ✓ Up to 4 HDMI inputs per module
- Professional multiplexer integrated
- ✓ SPTS and MPTS streaming (CBR or VBR)
- ✓ Supports PSI/SI processing
- Integrated into the TANGRAM System-Management
- Control and managment via web-UI
- ✓ Transmission of up to 4 SRT streams *(GTSRT)

Tangram Edge Modules

The TANGRAM modules are the pieces of the puzzle that you combine to create your professional video headend solution.







GT21W

Edge PAL/NTSC/SECAM

- High quality IP to analog
 PAL/SECAM/NTSC modulation
- ✓ Up to 6 analog channels on 2 RF outputs*
- Outstanding signal parameters by direct digital modulation
- MPEG-2 H.262 and MPEG-4 H.264 decoding (SD & HD)
- ✓ RTP/IP input streaming with FEC error correction
- ✓ Supports the reception of SRT (*GTSRT)

GT22C

Edge FM

- ✓ High quality IP to analogue FM modulation
- \checkmark Up to 8 FM channels on 1 RF output
- ✓ Advanced MPEG decoding
- Outstanding signal parameters by direct digital modulation
- ✓ High density 48 FM channels in 1 RU
- RTP/ IP input streaming with FEC error correction
- \checkmark RDS extraction and insertion
- Decoding of HE-AAC or HE-AACv2 audio *(GTFMADV)
- ✓ Supports the reception of SRT (*GTSRT)

GT23W

Edge QAM

- High quality IP to QAM modulation
- ✓ Up to 12 QAM channels on 2 RF outputs
- ✓ High density 72 QAM channels in 1 RU
- For measurement / monitoring test ports of the output signal
- $\checkmark\,$ DVB CSA Simulcrypt scrambling
- RTP/ IP input streaming with FEC error correction
- ✓ DVB/ARIB transport stream processing
- ✓ QAM channels individually switchable on/off
- ✓ Supports the reception of SRT (*GTSRT)





GT24W

Edge COFDM

- ✓ High quality IP to COFDM modulation
- ✓ Up to 8 COFDM channels on 2 RF outputs
- Outstanding signal parameters by direct digital modulation
- RTP/ IP input streaming with FEC error correction
- ✓ High density 48 COFDM channels in 1 RU
- ✓ DVB/ARIB transport stream processing
- V DVB CSA Simulcrypt scrambling
- ✓ Supports the reception of SRT (*GTSRT)

GT26

Edge ISDB-T

- ✓ High quality IP to ISDB-T modulation
- ✓ Up to 4 ISDB-T channels on 2 RF outputs
- Outstanding signal parameters by direct digital modulation
- RTP/ IP input streaming with FEC error correction
- ✓ DVB/ARIB transport stream processing
- Output detection for alarming and redundancy switching
- ✓ Up to 24 ISDB-T channels in 1 RU
- ✓ Supports the reception of SRT (*GTSRT)

Tangram Switch Extension & Processing Modules

The TANGRAM modules are the pieces of the puzzle that you combine to create your professional video headend solution.



GT12W

SFP Switch Extension Board

- ✓ 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



GT41W

IP Processing

- ✓ High density MPTS SPTS IP Gateway)
- Scrambling for IPTV out (CSA, AES,
- Philips VSecure, Pro:Idiom, Samsung LYNK)

 DVB CSA Simulcrypt and BISS scrambling
- $\checkmark\,$ Advanced DVB transport stream processing
- ✓ Supports MPEG-2/H.262, MPEG-4/H.264 and HEVC/H.265 scrambling (SD & HD)
- SPTS/MPTS streaming and receptions (CBR or VBR)
- Verimatrix bulk decryption
- ✓ Dedicated Ethernet interface for CAS connection



GT42W

Descrambler

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

For more technical informations, please visit: katalog.wisi.de

Tangram Software Options

Software options are licence files that enable the defined functionalities. The software options can be bought at the same time as the hardware, or as a separate order. You can add software options to an existing TANGRAM at any time, when you want more functionality. More technical info can be found at **katalog.wisi.de**

Software Function	Package Name	Software Function	
Software Update Agreement	GTM1/GTM3, GTESUA1/GTESUA	Dolby Decoding	

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 to your existing installations. To be allowed to upgrade to a new firmware version, you must have a gapless and valid Software Update Agreement. All TANGRAMs get a one-year SUA from the date of registration at WISI Connect.

Scram	Ы	lina
Sciam		my

GTSCR/X, GTAES/X, GTLYNK/X, GTPISCR8/16/24, GTVSEC/X

The type of content encryption in TANGRAM is enabled by the software options GTSCR (CSA Simulcrypt and BISS), GTSCRX (extension CSA Simulcrypt and BISS), GTVSEC/X (Philips VSecure), GTASE/X (AES-128), GTLYNK/X (Samsung LYNK), or GTPISCR8/16/24 (LG Pro:Idiom). The scrambling GTPISCR8/16/24 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 or adding manually a key.

The TANGRAM Dolby decoding for analog output is enabled by the software option GTDOL. The Dolby decoding allows reception of Dolby audio sound and decoding to support the different audio output formats for analog (PAL and SECAM) modulation. The GTDOL software option requires a Dolby enabled TANGRAM hardware.

Descrambling

GTBISS, GTVMX, GTVMXX

Package Name

The descrambling of BISS encrypted content, delivered by satellite or IP, will be enabled by the GTBISS software option. The GTVMX and GTVMXX (extension of the number of services) software option enables the bulk decryption of encrypted Verimatrix content.

IP Input Redundancy	GTRED GTERED
	OTRED, OTERED

IP input redundancy in the TANGRAM is enabled by the software options GTRED. The IP input redundancy handles switching between sources carrying identical information, e.g. dual sources, for securing operation even in cases where one source fails completely.

Remultiplexing & psi/si	GTMUX, GTPSISI, GTSYMUX	T2-MI Do-Enconsulation	GTT2MIDE, GTDT2MI
			GTQT2N
Remultiplexing and PSI / SI hand	ling in the TANGRAM platform and		
in a system of TANGRAMs are enal	oled by the software options GTMUX	The TANGRAM T2-MI de-encaps	sulation is enabled by the softw
(remultiplexing in a single TAN	GRAM), GTPSISI (enabling PSI/SI	options GTT2MIDE (1 de-encapsul	lator with up to 2 PLPs), GTDT2M
sharing between TANGRAMs), a	and GTSYMUX (remultiplexing in a	(2 de-encapsulator with up to 4 F	PLPs) and GTQT2MIPL (4 additic
system of TANGRAMs).		PLPs). Complying with the T2-MI E	N TS 102 773, the TANGRAM T2
		de-encapsulator gives profession	al T2-ML inputs for all sizes of ca

Extension for IP in- and outputs	GTSTRX
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With the extension GTSTRX software option the number of IP in- an outputs can be increased up to 128. GTSTRX is available for the GT3x and GT4x modules.

IP Forward Error Correctic	on
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Software Function

GTFEC, GTEFEC

Package Name

The TANGRAM GTFEC software option provides an advanced error correction and error protection for IP streams. For IP SPTS or MPTS streaming reception, FEC is 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.

Software Function	Package Name
	GTT2MIDE, GTDT2MIDE,
I 2-IVII De-Encapsulation	GTQT2MIPL

/are NDF onal P-MI encapsulator gives professional T2-MI inputs for all sizes of cable networks.

N+1 Redundancy

GTNRED

The N+1 module redundancy for GT01Wx is enabled by the software option GTNRED. The N+1 redundancy for GT01Wx provides the functionality to set up redundancy groups, and assigning TANGRAM modules as "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.

For over nine decades WISI has been among the worldwide pioneers of receiving and distributing technology. As a system provider in the product areas of CATV technology, reception and distribution technology, mobile communication and highfrequency assemblies, we have learned not only to maintain the lead in technological development but to continually implement visions into new quality products.

The converging media, new multi-media choices and broadband services demand intelligent transport routes for their distribution. This is our business. As a developer and technology supplier for the key areas of communication we are committed to innovation, now and in the future.

