TANGRAM

SOLVING YOUR PUZZLE

WISI







High Density Video Platform

FOR CABLE TV, IPTV AND OTT SOLUTIONS

TANGRAM

The High Performance Headend for Gateway and Edge Applications

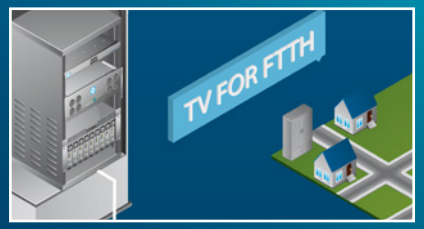


Solutions with TANGRAM



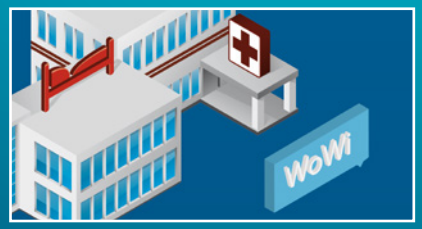
CHANNEL PROCESSING

Headends for residential, regional and national networks.



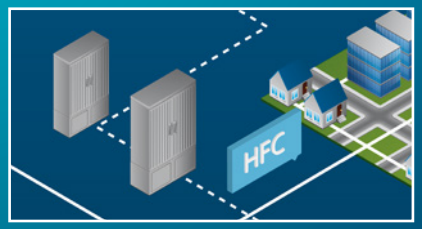
RF OVERLAY

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

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:

- DVB-IP Gateway for DVB-C/S/S2/T/T2 and ISDB-T Reception
- Descrambling and Scrambling
- Remultiplexing and PSI/SI Processing
- Digital and analogue Edge Modulation
- QAM, PAL, NTSC, SECAM, FM, COFDM and ISDB-T
- T2-MI de-encapsulation and PLP management

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.

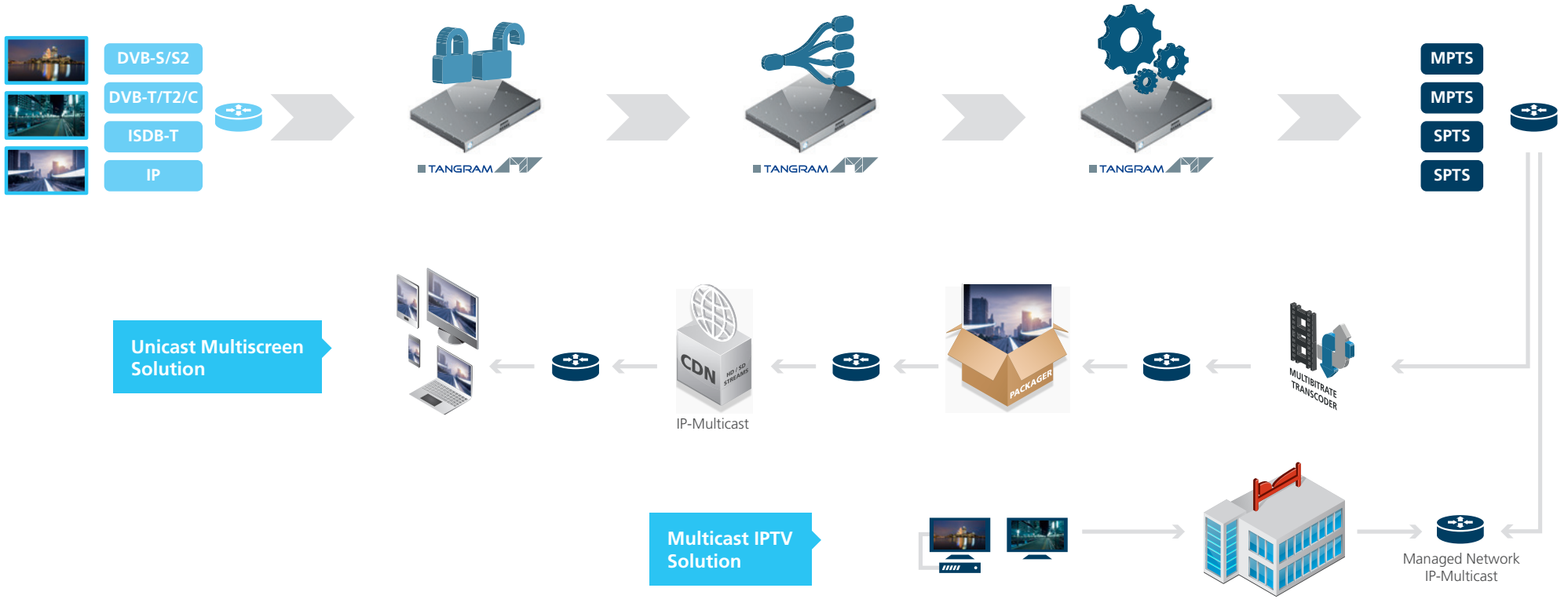
Advantages at a glance

- 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

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, DVB-T/T2, DVB-C, DVB-ASI, ISDB-T and T2-MI de-encapsulation. The gateway solution is the basis for providing the digital TV content for IP distribution and for all kind of different applications, like multiscreen transcoding or edge modulation.

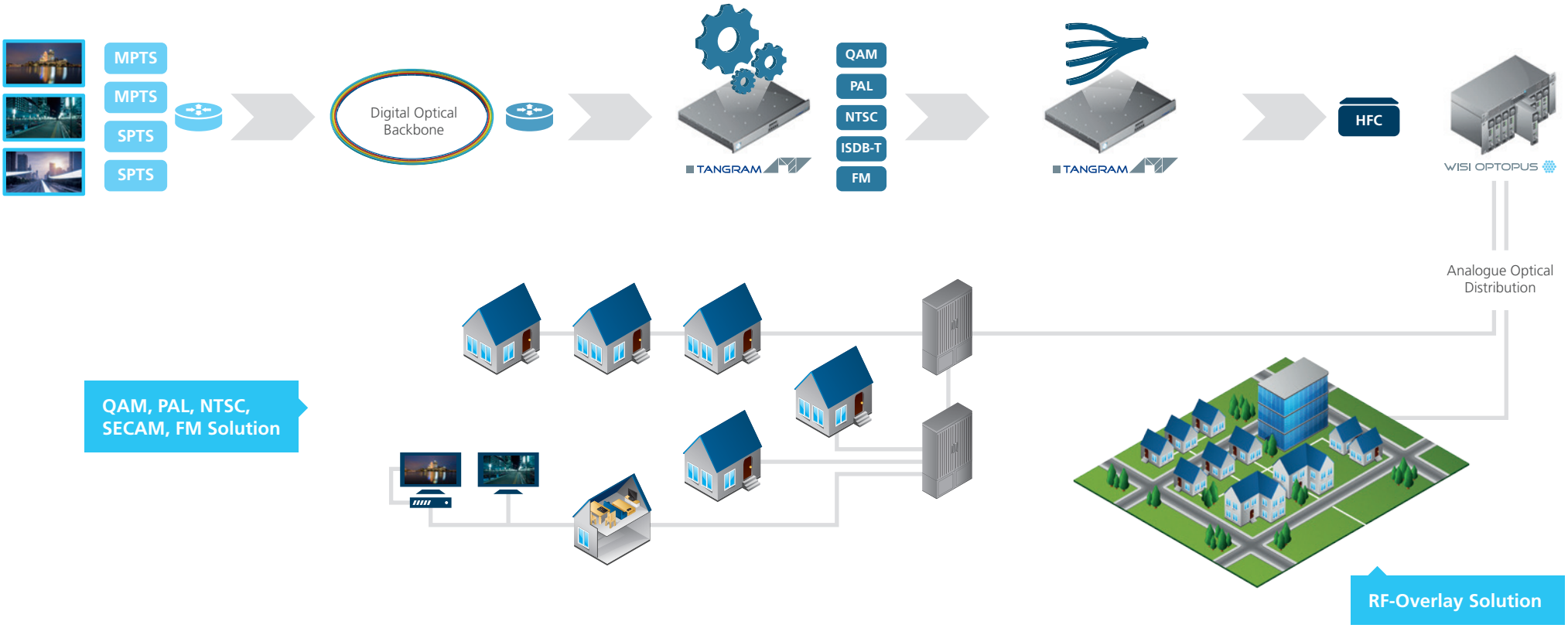




TANGRAM Applications

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

The TANGRAM edge solutions open the doors to establish and operate analogue and digital cable TV services. It supports a full range of different analogue 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 as needed.





TANGRAM Product Benefits

HIGH RELIABILITY

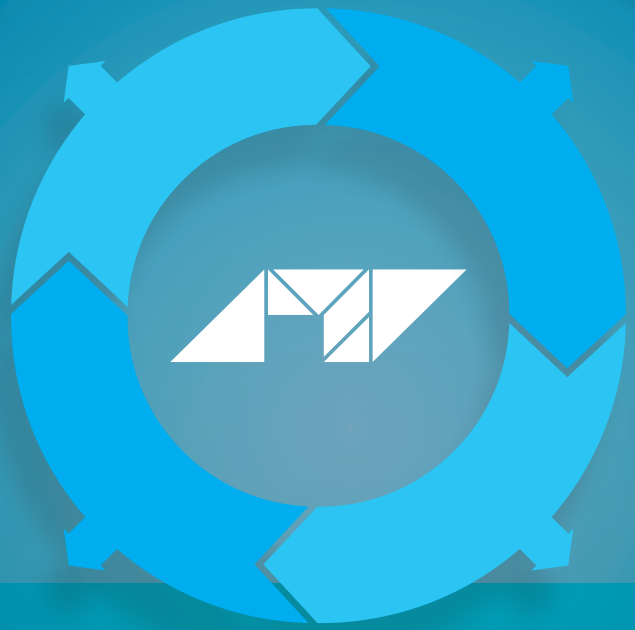
The base unit provides a carrier grade chassis and supports a fully redundant concept (1+1, n+1). The intelligent redundant concept guarantees a high system availability and reduces maintenance outages.

CHASSIS

- Redundant power supply
- Hot pluggable fan bay
- Gigabit Ethernet port redundancy

MODULE

- N+1, 1+1 redundancy
- Input transport stream redundancy



MAXIMUM FLEXIBILITY

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

INPUTS

- IP
- ASI
- DVB-S/-S2
- DVB-T/-T2
- DVB-C
- ISDB-T

OUTPUTS

- QAM
- COFDM
- FM
- ISDB-T
- PAL
- NTSC
- SECAM
- ASI
- IP

PROCESSING

- Multiplexing
- Demultiplexing
- Descrambling
- Scrambling
- T2-MI de-encapsulation
- EPG regeneration
- PSI/SI regeneration

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.

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 transponder

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

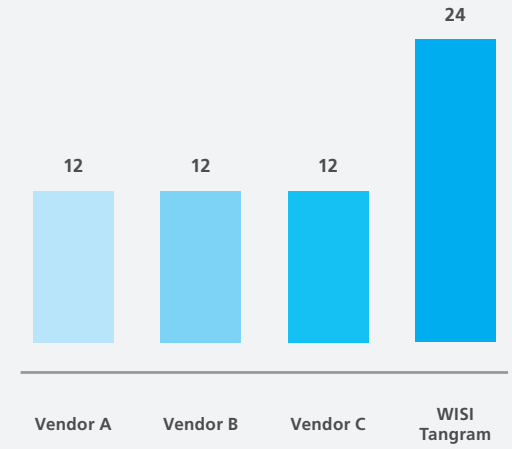
Tripling the number of generated PAL/NTSC/SECAM channels

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

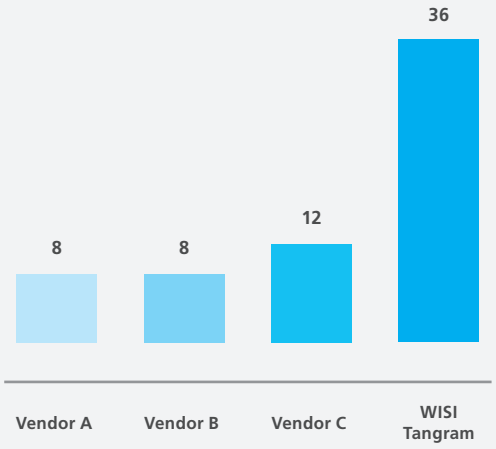
Less space necessary for the multi standard reception

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.

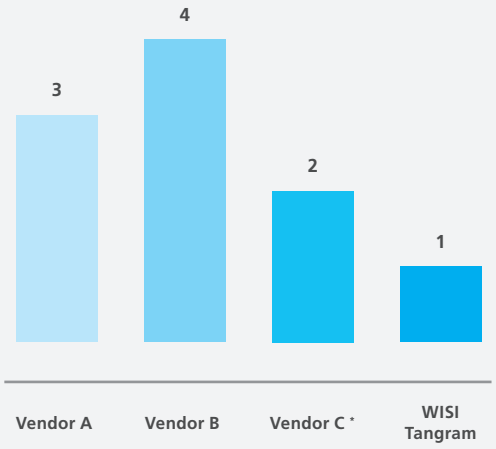
DVB-S/S2 Transponder per 1 RU chassis



Edge PAL/NTSC/SECAM per 1 RU chassis



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



* No ISDB-T Support

TANGRAM Chassis Overview

The TANGRAM chassis 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).

Minimized effort for cabling and management configuration by internal switch

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

Easy configuration of the complete platform via 1 management port

4x GigE interface individually configurable for streaming bandwidth distribution





Connect your engineer
Additional management port for local connection

Flexible Installation
Any module in any slot

High reliability by redundant AC and DC power supply

More technical info can be found at katalog.wisi.de

TANGRAM Technical Specifications

DVB-T / T2 Receivers (GT31W)	
Impedance	75 Ω
Input frequency range	43-1002 MHz
Input level range	39 to 79 dBµV
DVB compliance	DVB-T (EN300744) DVB-T2 (EN302755)
Return loss	>18 dB @ 47 MHz >12 dB @ 862 MHz
Bandwidth (DVB-T) (DVB-T2)	6/7/8 MHz 1.7/5/6/7/8 MHz and ext. bandwidth
FEC inner code	Conv., K=7, G= 1/2, 2/3, 3/4, 4/5, 5/6, 7/8
COFDM spectral	2k and 8k FFT
Guard interval	1/32, 1/16, 1/8, 1/4

DVB-S / S2 Receivers (GT31W)	
Impedance	75 Ω
Input frequency range	925-2150 MHz
Input level range	45 to 90 dBµV
DVB compliance	DVB-S (EN300421) DVB-S2 (EN302307)
Return loss	>12 dB
DiSEqC	DiSEqC 1.0. Supporting control of up to 4 satellite sources
FEC inner code	LDCP (1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10)
LNB voltage / power	13/18 V, 0,4A max.

DVB-C Receivers (GT31W)	
Impedance	75 Ω
Input frequency range	43-1002 MHz
Input level range	49 to 90 dBµV (QAM256)
Compliance	DVB-C EN300429, ITU J.38 Annex A,B,C
Return loss	>18 dB @ 47 MHz >12 dB @ 862 MHz
QAM modulation scheme	16-, 32-, 64-, 128-, 256-QAM
DVB-C symbol rate	1 to 7.2 MBaud

VSB –AM PAL/SECAM/NTSC Modulation (GT21W)	
Standards	PAL B/G, D/K, L,M, N SECAM D/K, B/G, L NTSC
Sound	Mono, Stereo, Dual NICAM, A2
Modulation video	VSB AM, neg. or pos.
Modulation audio	Audio FM or AM
Output frequency	45-862 MHz
Output level	117 dBµV (1 ch) 113 dBµV (2 ch) 111 dBµV (3 ch)
Video S/N (weighted)	1 channel typ. 64 dB

DVB-C QAM Modulation (GT23W)	
QAM mode	16, 32, 64, 128 and 256 QAM
Symbol rate	4.45 - 7.0 MBauds/s
MER (at RF out)	> 45 dB, typ. 46 dB
QAM output frequency	43-1002 MHz
Output level	119 dBµV (1 ch) 115 dBµV (2 ch) 113 dBµV (3 ch) 111 dBµV (4 ch)
Compliance	DVB-C EN300429, ITU J.38 Annex A,B,C

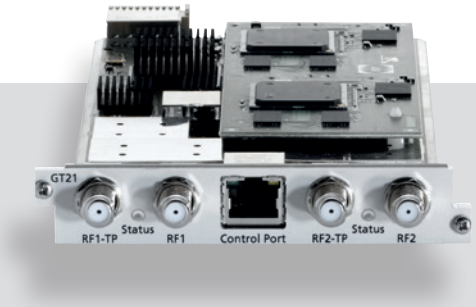
CI Multidecryption (GT42W)	
Number of CI slots	4 CI slots
Supported bit rates	55/66/72 Mbit/s
DVB Compliance	EN 50221

ASI input/output (GT32W)	
Impedance	75 Ω
Frequency range	< 270 MHz
Return loss	> 17 dB (27-270 MHz)
Compliance	EN 50083-9:2002
Packet size Input | Output	188 byte and 204 byte | 188 byte
PCR restamping	Yes
Input/Output max. payload bit rate	Typical 200 Mbit/s

TANGRAM Edge Modules

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

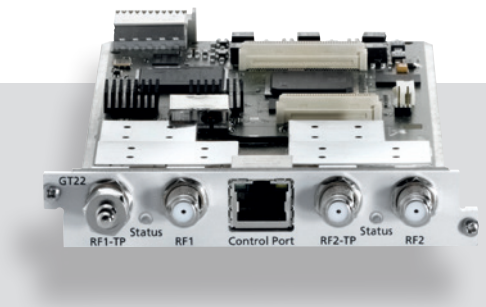
GT21W
Edge PAL / NTSC / SECAM



Features
High quality IP to analogue PAL/SECAM/NTSC modulation
Up to 8 DVB-C, Annex A, C and up to 4 Annex B*
Outstanding signal parameters by direct digital modulation
HD to SD downscaling functionality
MPEG-2 H.262 and MPEG-4 H.264 decoding (SD & HD)
For measurement/monitoring test ports of the output signal
Temperature and output level monitoring
RTP/IP input streaming with FEC error correction

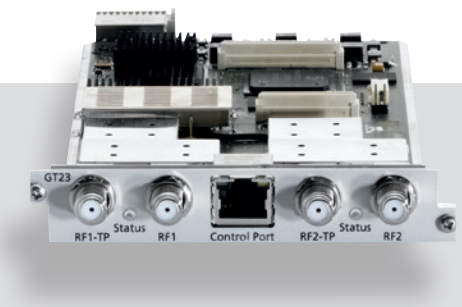
*Up to 6 for SD and up to 3 HD to SD

GT22C
Edge FM



Features
High quality IP to analogue FM modulation
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
RDS extraction and insertion
For measurement/monitoring test ports of the output signal

GT23W
Edge QAM



Features
High quality IP to QAM modulation
Up to 8 QAM channels on 2 RF outputs*
High density 48 QAM channels in 1 RU
For measurement/monitoring test ports of the output signal
DVB CSA Simulcrypt scrambling
RTP/IP input streaming with FEC error correction
Advanced DVB transport stream processing
QAM channels individually switch on/off

*Up to 8 DVB-C, Annex A, C and up to 4 Annex B

TANGRAM Chassis

GT01W0230



19″ 1 RU chassis with backplane, 1 power supply (230 VAC), fan tray and integrated GigE switch (GT11)

GT01W0110



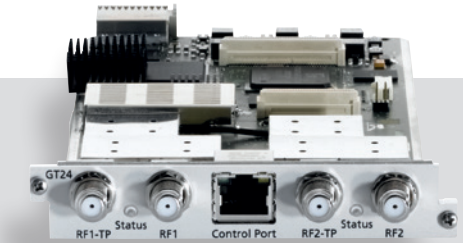
19″ 1 RU chassis with backplane, 1 power supply (110 VAC), fan tray and integrated GigE switch (GT11)

GT01W0048



19″ 1 RU chassis with backplane, 1 power supply (48 VDC), fan tray and integrated GigE switch (GT11)

GT24W
Edge COFDM



Features
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
Advanced DVB transport stream processing
For measurement/monitoring test ports of the output signal
DVB CSA Simulcrypt scrambling

*Up to 8 (2k Mode) or up to 4 (2k/8 Mode)

GT26
Edge ISDB-T



Features
High quality IP to ISDB-T modulation
Up to 2 ISDB-T channels on 2 RF outputs
ARIB/DVB transport stream processing
RTP/IP input streaming with FEC error correction
Outstanding signal parameters by direct digital modulation
Output detection for alarming and redundancy switching
For measurement/monitoring test ports of the output signal
Up to 12 ISDB-T channels in 1 RU

TANGRAM Power Supplies

GT55W0230



Redundant PSU 230V AC for GT01W

GT550110



Redundant PSU 110V AC for GT01W

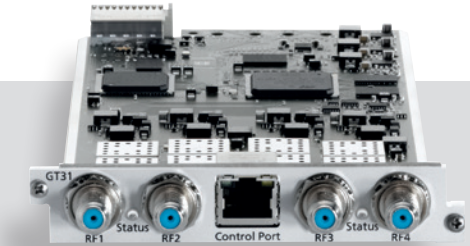
GT55W0048



Redundant PSU 48V DC for GT01W

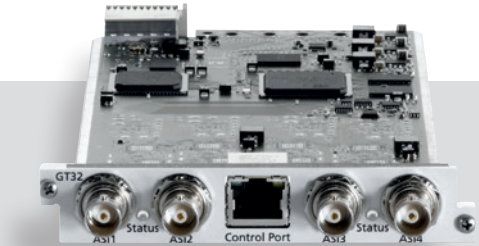
TANGRAM Input & Processing Modules

GT31W
DVB-Gateway



Features
Multi transport stream reception for DVB signals
4x DVB-S/S2/C/T/T2 and ISDB-T RF inputs
Advanced DVB transport stream processing
RTP/IP FEC output stream protection
High density reception 24 transponder in 1 RU
Demultiplexing of MPEG-2/4 signals for SPTS transmission
SPTS and MPTS streaming (CBR or VBR)
UDP and RTP MPEG transport stream over IP protocol

GT32W
ASI–IP in/out



Features
4x ASI input or output, each BNC port configurable as input or output
PID remapping and filtering
RTP/IP input streaming with FEC error correction
Advanced DVB 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

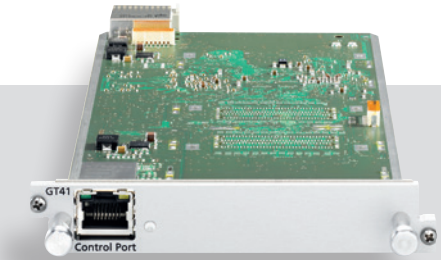
GT37
Transcoder



Features
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
Output 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

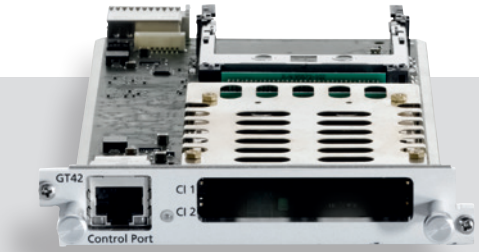
TANGRAM Input & Processing Modules

GT41W
IP Processing



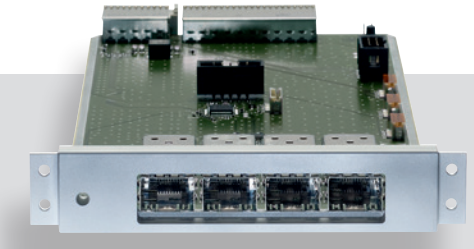
Features
High density MPTS ↔ SPTS IP Gateway
DVB Scrambling for IPTV out
DVB CSA Simulcrypt scrambling
Advanced DVB transport stream processing
Supports MPEG-2 H.262 and MPEG-4 H.264 scrambling (SD & HD)
SPTS/MPTS streaming and receptions (CBR or VBR)
High flexibility scrambling on PID Level
Dedicated Ethernet interface for CAS connection

GT42W
Descrambler



Features
4 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

GT12W
SFP Switch Extension Board



Features
4x SFP slots for optical or electrical access
High flexibility for bandwidth extension
Port and service redundancy for external connection (main/backup)
Support of standard SFPs
Bandwidth Port Monitoring

TANGRAM Software Options

Software options are license files that enables 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, come need for more functionality. More technical info can be found at katalog.wisi.de

Service License Agreement
GTM1/GTM3

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 a gapless and valid Service License Agreement. All TANGRAMs get a one year SLA from the date of registration on wisiconnect.tv.

Dolby Decoding
GTDOL

The TANGRAM Dolby decoding for analogue 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 analogue (PAL and SECAM) modulation. The GTDOL software option requires a Dolby enabled TANGRAM hardware.

IP Forward Error Correction
GTFEC

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.

Simulcrypt Scrambling
GTSCR

Scrambling in the TANGRAM is enabled by the software option GTSCR (Simulcrypt scrambling). The GTSCR 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.

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.

T2-MI De-Encapsulation
GTT2MIDE, GTDT2MIDE, GTQT2MIPL

The TANGRAM T2-MI de-encapsulation is enabled by the software options GTT2MIDE (1 de-encapsulator with up to 2 PLPs), GTDT2MIDE (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 for all sizes of cable networks.

Remultiplexing & PSI/SI
GTMUX, GTPSISI, GTSYMUX

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).

IP Input Redundancy
GTRED

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 also for cases where one source fails completely.



WISI Tools

We provide several different tools to help you make the most out of your WISI products. The tools give you easy access to support such as forums, FAQ's and help with configuring your installations. They are available without any extra fee for all TANGRAM customers.

configurator.wisi.de



WISI Configurator

Selecting & Ordering Software

The WISI Configurator is an online tool to help you select and order the optimal software options for your particular installation.

Once an order has been processed, the entitlement file containing the licences for the software options will be available for download at the WISI Connect portal.

In order to gain access to the WISI Configurator you need to register as a customer. You can do this at the WISI Configurator website.

wisiconnect.tv



WISI Connect

Registration & Information

The WISI Connect portal is a repository for information about your TANGRAMs. All your registered products will be listed, and you can add textual information such as installation site or the function for each TANGRAM. Product documentation, release notes and all released firmware versions are available for download from the portal. The FAQ and Forum gives additional help, and allows you to share questions and information with other TANGRAM users.

At the portal you can also download the entitlement file enabling your purchased software options.

Your TANGRAM IP address



WISI Control

Control & Management

The TANGRAM is configured and managed via WISI Control, the web UI. Each TANGRAM contains an embedded web server, and no proprietory control software is needed. To connect to the UI of a TANGRAM, simply start a browser on your computer and type the IP address of the TANGRAM in the address field.

The web UI of TANGRAM is structured to simplify configuration and management. To unlock your previously purchased software options, upload the entitlement file that you downloaded from the WISI Connect portal and make your desired settings.

Any video from any source to any device

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