

Fully scalable Headend platform for Cable TV and IPTV networks

Luminato is a high density modular platform for
IPTV and cable TV headends with advanced
real time stream processing



The Teleste Luminato platform

Luminato business benefits:

- Fully modular platform that grows with your business, from a compact 1 RU "headend in a box" to a multi-site, distributed headend solution



- Platform's small footprint enables efficient space usage
- Low power consumption enables longer module lifetime and lower energy costs. Energy efficiency also reduces site cooling requirements
- Internal switch for cable free interconnections and simplified maintenance
- Advanced DVB stream processing offers flexibility for channel creation and simplicity in multi-vendor environments
- The ability to customise content delivery to targeted subscriber groups



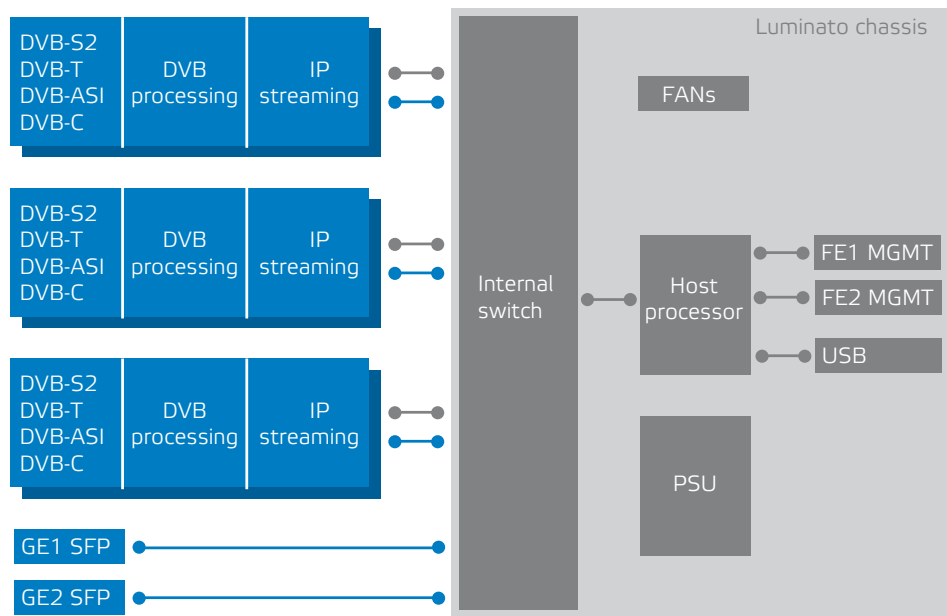
The Luminato platform is the most compact form factor in the industry with minimal power consumption.

The chassis have been divided into six processing modules. All modules can be hot swapped and auto configured, minimising service outage. The module slots can be equipped with ASI to IP, DVB receivers and QAM output depending on the application requirements.

The two Gigabit Ethernet interfaces with electrical or optical SFP modules are provided for IP payload traffic. MPEG-2 and MPEG-4 with SD and HD are supported, suitable for IP centric Cable TV and IPTV networks.

Management of the platform is via a web user interface, providing local or remote access. The advanced DVB stream processing, UDP/IP and RTP/IP streaming and MPTS pass through offers a very flexible environment for service management.

24/7 support is available for Luminato and pre-configured platforms can be provided.



Technical specifications

Chassis		Stream interfaces	
Mounting	19" rack mountable, 1RU Installation rails for easy installation	Two gigabit Ethernet ports	Supports electrical and optical SFP modules
Dimension (H x W x D)	1U x 19" x 407 mm	Management and monitoring	
Operating voltage	100-240 VAC 50/60 Hz	Web user interface	
Power consumption	max. 100 W / fully occupied chassis	Telnet	
Operating Temperature	0... 50 °C ambient	CLI	
Relative Humidity	up to 90% (non-condensing)	SSH	
Cooling	replaceable fans	SNMP	
Management interfaces		Interface Modules	
Two 10/100 BaseTX	for CAS and NMS	6 slots for hot swappable processing modules	
USB	for initial setup		

High density Luminato receivers for Cable TV and IPTV networks

Luminato enable flexible selection of free-to-air and scrambled service from DVB-S, DVB-S2, DVB-T and DVB-ASI sources, which can be adjusted to the operator's service line-up with the built-in advanced transport streamprocessing capabilities. The Luminato receivers support Standard Definition and HighDefinition video in MPEG-2 and MPEG-4 AVC video formats and numerous audio formats.



Headend platform with flexible modularity

- Multiple services per receiver – high efficiency, lower investments
- Embedded security – services can't be accessed in unprotected format
- Hot swap as standard – swap the module and remain the configurations

The Teleste Luminato receivers provide best of breed receiving platform for Cable TV and IPTV operators. The receivers enable flexible selection of free-to-air and scrambled services from DVB-S, DVB-S2, DVB-T or DVB-ASI sources, which can be adjusted to the operator's service line-up with the built-in advanced transport stream processing capabilities.

High density

High-performance Luminato chassis has six module slots to be freely furnished with any combination of the receiver modules which enables low-cost applications even with partially equipped chassis. Similarly, Luminato support perfectly pay-as-you-grow model in order to allow optimal timing for investments and system expansion.

- LNB power feed, adjustable Voltage and 22 kHz tone
- DVB-S/S2 IF, DVB-ASI or DVB-T reception
- Advanced transport stream processing
- Demultiplexing from MPTS to SPTS
- PID remapping and filtering
- PSI/SI pass-through or regeneration
- Service follow up, service ID remapping, stream type filtering, SID follow up and service information
- Automatic/manual PSI-SI table generation
- 2 Standard CA-module slots
- MPEG transport stream over UDP/IP streaming
- MPTS passthrough

Luminato receiver modules can receive content from satellite utilizing DVB-S, DVB-S2 and DVB-ASI networks or terrestrial DVB-T networks. All receiver types enable reliable and high performance operation for receiving up to four digital television Multi-Program Transport Streams per module.

Satellite and terrestrial receivers are available as quad-receiver model or dual-receiver model with DVB descrambling. All Luminato module slots furnished with quad-receivers enable having up to 24 receivers in one RU chassis. As one receiver can process multiple services per receiver, the amount of received services can be vast. This increases efficiency and lowers headend investments dramatically. The optional descrambling uses DVB Common Interface modules flexibly supporting large variety of Conditional Access Systems.

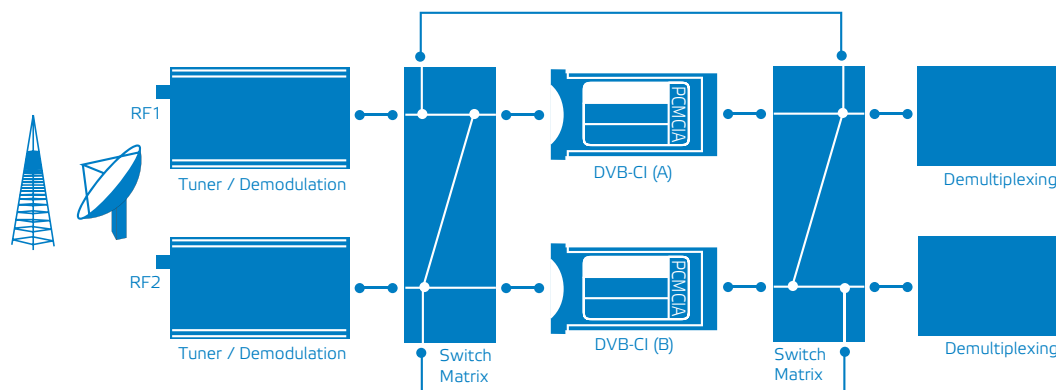
Efficiency and reliability

With advanced transport stream processing, operator can select the services and components which are relevant to his network - either to save bandwidth or otherwise simplify the outgoing stream content. The Luminato receiver follow-up any changes on the received stream to automatically readjust the processing to provide uninterrupted service. This will allow the operator to efficiently manage network capacity usage.

The available tools provide high degree of automated features to minimise the cost of system set-up and operation, and avoiding downtime due to changes in the received services.



Intuitive and user friendly graphical web user interface for management providing local and remote access.



Block Diagram, Dual Receivers



Luminato platform fully furnished with ASI modules and Dual S2 receiver module with CI.

Interoperability as standard

Luminato receivers support Standard Definition and High Definition video in MPEG-2 and MPEG-4 AVC video formats and numerous audio formats.

The output of the receiver is always fully DVB compatible IP streams – complete with automatically generated PSI/SI streams. The output can be either carried as Multi Program Transport Stream or de-multiplexed to Single Program Transport Streams, which are directly suitable for IPTV networks and allow highly flexible stream routing and re-multiplexing on Cable TV networks. The IP output streams from the device can be transmitted either directly to another module on the chassis for further processing, to IP connected head-end equipment on the local or remote head-end, or directly to IPTV network. Further, each module can create up to 120 output IP streams.

Multiservice descrambling

Luminato receivers use DVB Common Interface modules to descramble incoming services with DVB scrambling.

Receiver models with descrambling capability are equipped with two Common Interface modules slots and two satellite or terrestrial inputs. The Common Interface modules can be flexibly connected to either of the inputs. For example, each of the inputs can allocate own Common Interface module, or one input can use both modules for descrambling higher number of services or two different CAS system descrambling. When both descrambling slots are assigned to one input, then the other input can still be used for Free to Air services.

Embedded content protection

All receiver modules have the optional capability to do DVB Common Scrambling Algorithm content protection. The embedded scrambling doesn't require any additional hardware and the user can freely select which services will be scrambled. The content is never accessible in unprotected format which is highly appreciated by content providers. The component level scrambling is also supported to allow only video and audio scrambling and leave other streams untouched to avoid descrambling challenges for bursty data in set-top box.



Dual DVB-S2 (S) Module with Dual Common Interface Module (optional) Installed.



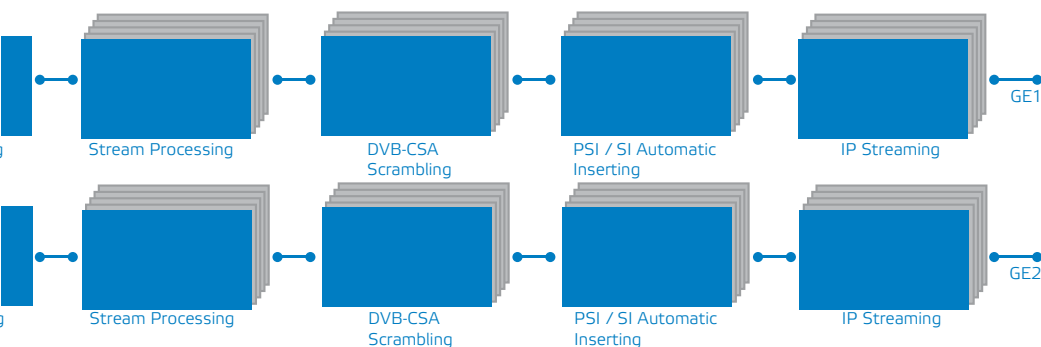
Quad DVB-S2 (S) Module.

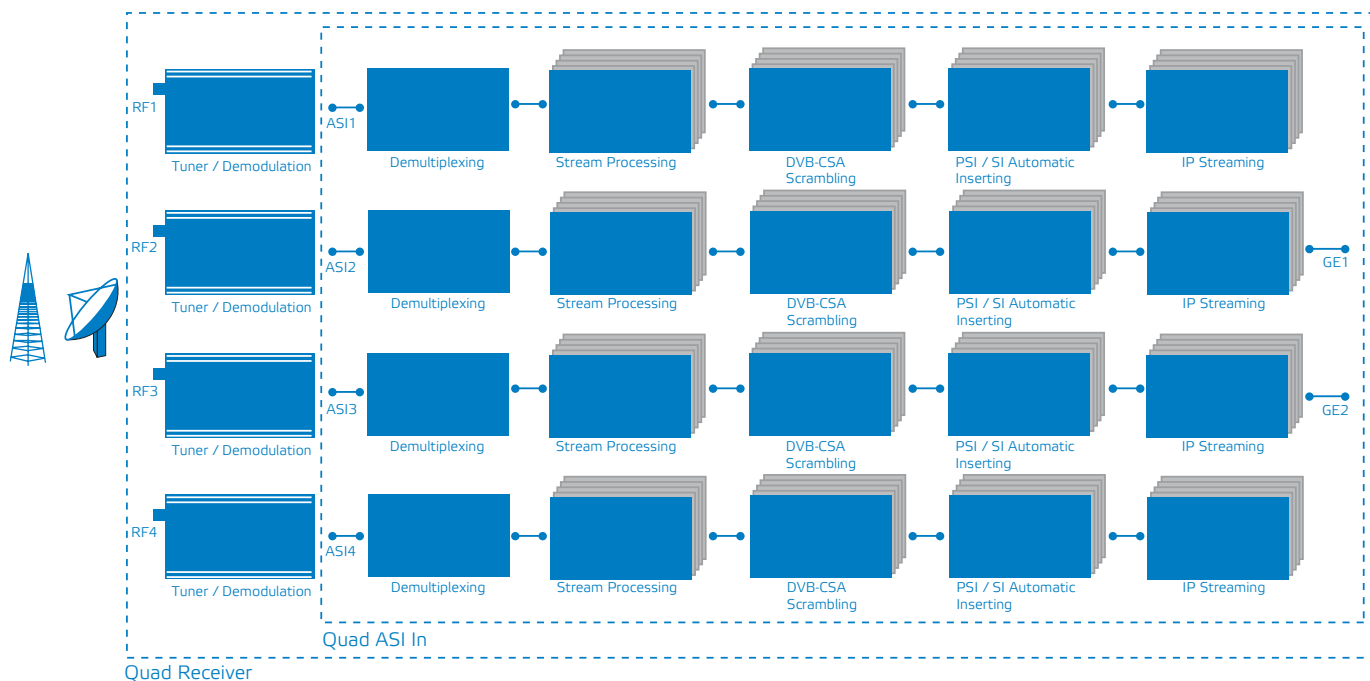


Dual DVB-T Module with Dual Common Interface Module (optional) Installed.



Quad DVB-ASI Module.





Block Diagram, Quad Receiver & Quad ASI In

Technical specifications

Parameter	Specification	Note	Parameter	Specification	Note
Satellite Receiver RF input			DVB Common Scrambling Algorithm Content Protection		
Impedance	75 ohm		Max service to be scrambled per module	32	dual inputs module
Frequency Range	950 ... 2150 MHz			64	quad inputs module
AFC Range	8 MHz		IP Streaming		
Constellation	QPSK, 8PSK, 16PSK 3)		Packet format	1 ... 7	DVB transport packets over UDP/IP
FEC modes (autodetected)	All ratios compliant with ETS302307		Traffic type	unicast or multicast	
Signal levels	-70 ... -25 dBm		Max. IP streamer per module	120	
Symbol rate	1,5 ... 47 MS/s	QPSK	Max. streaming capacity per module	300 Mb/s	
	1,5 ... 31,5 MS/s	8PSK	Traffic shaping	max peak traffic limiter	
	1,5 ... 47 MS/s	16APSK, 3)	LNB Power		
Transport Stream Bitrates per RF input	90 Mb/s	descrambling not used	Adjustable voltage	13/18 v	
	72 Mb/s	descrambling in use	22 kHz tone	on/off	
Standard	ETS300421, ETS302307		Max output current per connector	500 mA	4)
Terrestrial Receiver RF input			General		
Impedance	75 ohm		Supply voltages	24 V	
Frequency Range	47 ... 862 MHz		Power consumption	6 W	LAS-A quad ASI inputs
Constellation	QPSK, 16QAM, 64QAM			7 W	LRS-A dual sat. receiver, 2)
FEC modes (autodetected)	All ratios compliant with standard			7 W	LRS-B quad satellite receiver
OFDM spectrum	2k and 8k			7 W	LRT-A dual DVB-T receiver
Levels	-90 ... -20 dBm		Connectors, RF	F	
Channel Bandwidth	6, 7, 8 MHz		DVB-ASI	BNC 75 ohm	
Transport Stream Bitrates per RF input	90 Mb/s	descrambling not used	Dimensions	20 x 109 x 253 mm (H x W x D), 1)	
	72 Mb/s	descrambling in use	Weight	0,3 kg	
Standard	ETS300744		Enclosure classification	IP21	
DBV ASI input			Operating temperature	-10...+55 °C	
Impedance	75 ohm		Storage temperature	-30...+70 °C	
Maximum speed per interface	216 Mb/s	payload traffic	Specification is met	0 ... +45 °C	
Maximum speed total (4 ports)	400 Mb/s	shared with 4 inputs	Note!		
Standard	EN50083-9		1) Dimensions excluding connectors and locking screws		
DVB Common Interface Descrambling			2) Excluding CAM module and LNB powering.		
Connector	PCMCIA	dual slots	3) 16APSK only available in RF1 in dual DVB-S2 module (RF2 disabled) and RF1 and RF3 in quad DVB-S2 module (RF2 and RF4 disabled).		
Standard	DVB_CI EN50221		4) Total LNB power must be less than main PSU capacity minus installed module power consumption.		
CA module	PC-Card type II	Hot Plug			
Note: Aston and SMIT CA modules are verified to operate with Luminato					

Quad QAM module for Luminato platform

The QAM module enables flexible multiplexing of SPTS and MPTS video services and also PSI/SI table streams. High quality QAM modulation with agile up conversion provides easy adaptation to DVB-C delivery over HFC-network.



Versatile functionality

The Teleste Luminato quad QAM modules provide an advanced DVB-C platform for Cable TV operators. The QAM module enables flexible multiplexing of SPTS and MPTS video services and also PSI/SI table streams. High quality QAM modulation with agile up conversion provides easy adaptation to DVB-C delivery over HFC-network.

The Luminato quad QAM multiplexers support selection of free-to-air and scrambled services from IP stream sources, which can be adjusted to the operator's service line-up with the built-in advanced transport stream processing capabilities. The Luminato quad QAM module support Standard Definition and High Definition video in MPEG-2 and MPEG-4 AVC video formats and numerous audio formats. Optionally content protection can be done based on DVB simulcrypt standard.

Effective flexibility

Luminato quad QAM module is fully compatible with the high-performance

Luminato chassis, where it can be fitted freely to any of the six module slots. In accordance with the Luminato system architecture, the video processing is performed on the quad QAM modules, which enables low-cost applications even with partially equipped chassis, while having the performance scalability to fully equipped chassis.

Complete cable TV headend in 1 RU

As one or more Quad QAM modules can be included in 1 RU Luminato platform with Luminato DVB-S, DVB-S2, DVB-ASI and DVB-T receivers, together they can form a complete cable TV headend. Furthermore, this provides effective way for complementing service bouquet with locally received content in the edge of the network.

Embedded content protection

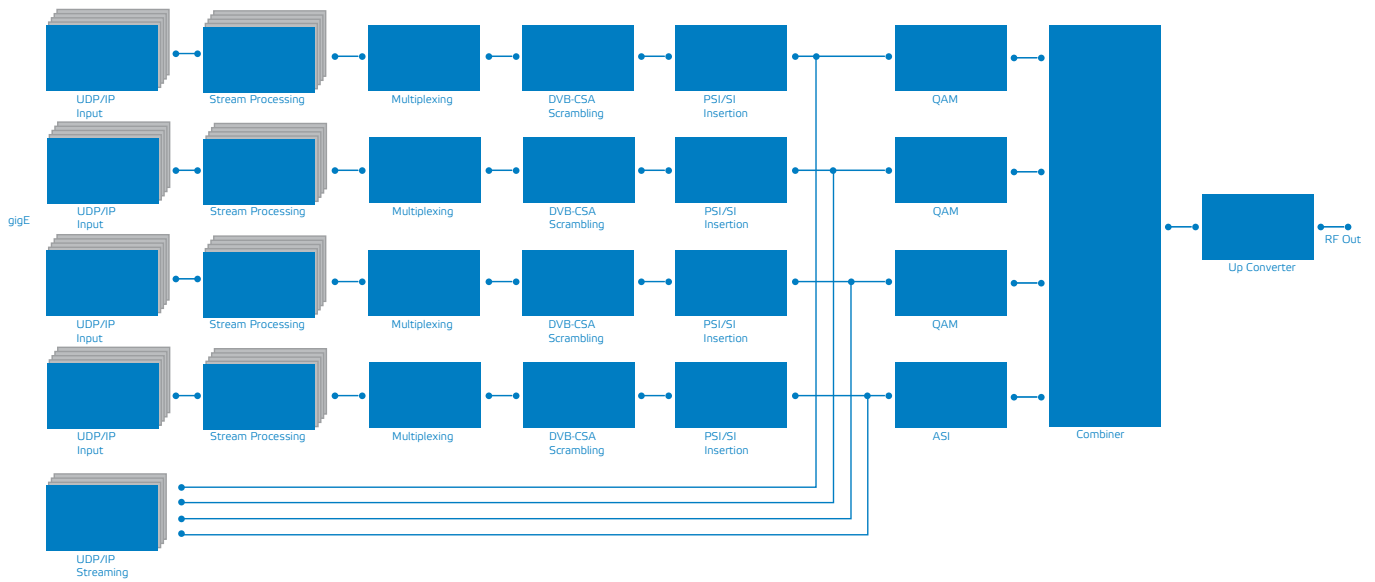
Quad QAM module has the optional capability to do DVB Common Scrambling Algorithm content protection. The embedded scrambling doesn't require any additional hardware and the user can freely select which services will be

scrambled. The content is never accessible in unprotected format which is highly appreciated by content providers. The component level scrambling is also supported to allow only video and audio scrambling and leave other streams untouched to avoid descrambling challenges for bursty data in set-top box.

Efficiency and reliability

With the advanced transport stream processing, operator can select the services and components which are relevant to his network. The Luminato will follow-up any changes on the stream to automatically readjust the processing to provide uninterrupted service. This will allow the operator to efficiently manage network capacity usage.

The available tools provide high degree of automated features to minimise the cost of system set-up and operation, and avoiding downtime due to changes in the received services.



Block Diagram, Quad QAM Out

Features

- DVB TS over UDP/IP reception
- IP address / UDP port selector for input streams
- Network dejittering
- Support SPTS and MPTS multiplexing
- Advanced transport stream processing
- PCR processing
- Multiplexing
- Priority multiplexing
- DVB CSA content protection
- Automatic PSI/SI table generation
- Custom PSI/SI creation and streaming
- High quality QAM modulation

Technical specifications

Parameter	Specification	Note	Parameter	Specification	Note
IP inputs			Harmonics	<-60 dBc	
Frame formats	UDP/IP RTP/IP	1 ... 7 TS packets/frame 2)	MER	>43 dB	(LQM-A module version)
Max inputs streams/module	128		MER	>40 dB	(LQM-B module version)
Dejittering buffersize	200 ms	adj. 100...500 ms	IP streamer output of multiplexer		
Multiplexers			Framing format	raw UDP/IP	
Number of multiplexer	4		Traffic type	unicast or multicast	
Max input service/multiplexer	64		TS packets per UDP frame	1 ... 7	
Max components per service	32		Max TS packet speed/streamer	directly related QAM output speed	
Output speed	depends on QAM modulator settings		Maximum speed total	300 Mb/s	shared with 4 outputs
QAM Output			General		
Standard	ITU-T J.83 Annex A and C		Power consumption	15 W	
QAM constellations	64, 128, 256		Supply voltages	24 V	
Symbol Rate	4...7,4 MS/s		Connectors, DVB-ASI	BNC 75 ohm	
Impedance	75 ohm		Dimensions	20 x 109 x 253 mm (HxWxD), 1)	
Output return loss	>14 dB	active channel	Weight	0,4 kg	
	>12 dB	act. ch 81 ... 862 MHz	Enclosure classification	IP21	
	>10 dB	act. ch 862... 1000 MHz	Operating temperature range	-10...+55 °C	
Output Level	42 ... 52 dBmV	Quad channels	Storage temperature range	-30...+70 °C	
	46 ... 56 dBmV	Dual channels	Specification is met	0...+45 °C	
	50 ... 60 dBmV	One channel	Notes		
Output Level accuracy	+/- 2 dB		1) Dimensions excluding connectors and locking screws		
Output Power step size	0,2 dB		2) No timestamp synchronization or packet reordering is implemented.		
Output center frequency	85...999 MHz		3) Values for quad channels active. Excluding harmonics		
Output frequency accuracy	+/- 30 kHz		4) Typical value outside 100 MHz of active channel block		
Output frequency step size	50 kHz		5) Values are met in quad channel mode within output power range 42 ... 50 dBmV (LQM-B)		
Out of band noise, 3), 5)	<-58,5 dBc	1st adj. channel			
	<-62 dBc	2nd adj. channel			
	<-64 dBc	3rd adj. channel			
	<-66 dBc	other channels			
	-70 dBc	other channels, 4)			

DVB-ASI output module for Luminato platform

The DVB-ASI output module enables flexible multiplexing of SPTS and MPTS video services and also PSI/SI table streams. High quality multiplexing module is ideal for an IP centric headend to create MPTS at the main headend for sending through DVB-ASI or IP network to remote headends.



Versatile functionality

Luminato multiplexer enables flexible multiplexing of SPTS and MPTS video services and also PSI/SI table streams. The multiplexer is ideal for an IP centric headend to create MPTS at the main headend and send them through to IP network to remote headends.

The Luminato quad ASI output module support selection of free-to-air and scrambled services from IP stream sources, which can be adjusted to the operator's service line-up with the built-in advanced transport stream processing capabilities. The Luminato quad ASI output module support Standard Definition and High Definition video in MPEG-2 and MPEG-4 AVC video formats and numerous audio formats.

Effective flexibility

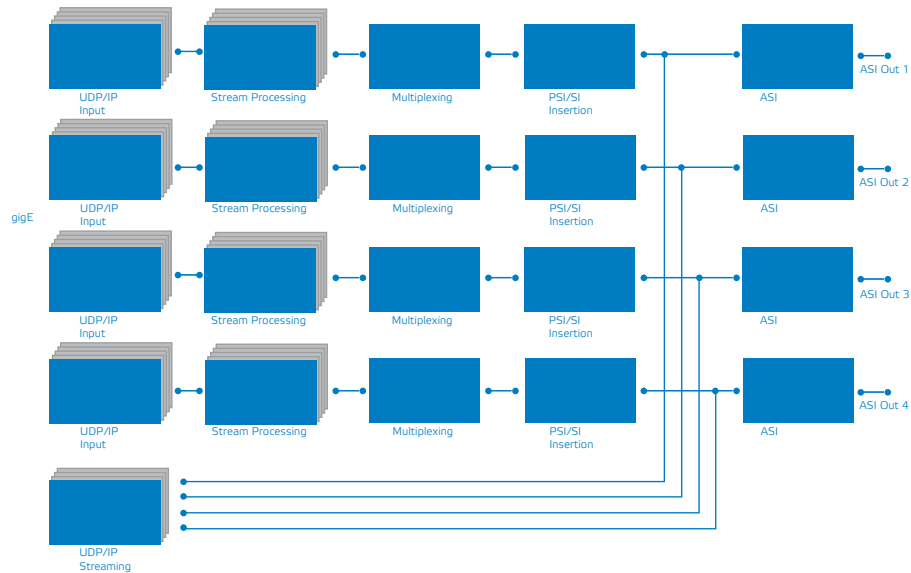
Luminato quad ASI output module is fully compatible with the high-performance Luminato chassis, where it can be fitted freely to any of the six module slots. In accordance with the Luminato system architecture, the video processing is performed on the quad ASI output modules, which enables low-cost applications even with partially equipped chassis, while having the performance scalability to fully equipped chassis.

Efficiency and reliability

With the advanced transport stream processing, operator can select the services and components which are relevant to his network. The Luminato will follow-up any changes on the stream

to automatically readjust the processing to provide uninterrupted service. This will allow the operator to efficiently manage network capacity usage.

The available tools provide high degree of automated features to minimise the cost of system set-up and operation, and avoiding downtime due to changes in the received services.



Block Diagram, Quad ASI Out

Features

- DVB TS over UDP/IP reception
- IP address / UDP port selector for input streams
- Network dejittering
- Advanced transport stream processing
- Multiplexing
- Priority multiplexing
- PCR processing
- PID remapping and filtering
- PSI/SI pass-through or automatic/manual regeneration
- Service followup, service ID remapping, stream type filtering, SID followup and service information
- MPEG transport stream over UDP/IP streaming
- MPTS passthrough
- DVB-ASI output

Technical specifications

Parameter	Specification	Note	Parameter	Specification	Note
IP inputs			IP streamer output of multiplexer		
Frame formats	raw UDP/IP RTP/IP	2)	Framing format	raw UDP/IP	
Max inputs streams per module	128		Traffic type	unicast or multicast	
Dejittering buffersize	200 ms	adj. 100... 500 ms	TS packets per UDP frame	1 ... 7	
Multiplexers			Max TS speed per streamer	100 Mb/s	
Number of multiplexer per module	4		Maximum speed total	300 Mb/s	shared with 4 outputs
Max input services per multiplexer	64		General		
Max components per service	32		Power consumption	6,5 W	ASI outputs
DBV ASI Output			Supply voltages	24 V	
Impedance	75 ohm		Connectors,	BNC 75 ohm	
Traffic mode	adjustable	variable/constant bit rate	Dimensions	20 x 109 x 253 mm (HxWxD), 1)	
Output speed for constant bitrate	adjustable	1...100 Mb/s	Weight	0,3 kg	
Maximum speed per interface	100 Mb/s	payload traffic	Enclosure classification	IP21	
Maximum speed total (4 ports)	300 Mb/s	shared with 4 outputs	Operating temperature range	-10...+55 °C	
Standard	EN 50083-9		Storage temperature range	-30...+70 °C	
			Specification is met	0 ... +45 °C	
			Note!		
			1) Dimensions excluding connectors and locking screws		
			2) No timestamp synchronization or packet reordering is implemented		