ALC100
DVB Audio
Level Control

ITNM Systems

ALC100

• Clears loudness differences amongst DVB-signals efficiently •
• Processing directly in the MPEG-domain •
• No decoding and encoding required •
• No loss of audio quality •
• Automatic gain control •
• SNMP • ASI and GbE •

ITNM Systems ALC100
DVB Audio Level Control

Operational excellence of digital television

Digital television distribution systems make use of signals coming from program suppliers all over the world. A network operator combines these signals to one complete and varied bouquet. For user-friendliness it is important that the properties of the channels - like sound, picture, programme information, teletext and subtitling – differ as little as possible. In practice, these properties appear to be quite different that degrades the quality of service. With maximum customer satisfaction, ITNM Systems develops applications that help to minimise the differences in a way the services can be used with the best possible performance after all.

ALC100 DVB Audio Level Control

ITNM Systems has developed a system that offers a solution for the consumer's annoying and terrifying high loudness differences among the channels broadcasted by digital television. Cable operators don't have any means - in contrast to analogue distribution – to do something about this. The reason why is explained by the fact that most of the digital signals are passed on in a packed form, by which the properties of the content remain unchanged. The equipment used for this method – the DVB remultiplexer – does not offer any option to change the audio level.

The alternative

The alternative is decoding and re-encoding of all channels but for so many television and radio services this would imply a very high investment and moreover, signal quality would degrade. So, direct distribution seems to be the most logical thing to do, but comes with a significant drawback. Because programme distributors all over the world are using very different methods, the consumer is burdened with very high differences in loudness switching from one channel to another in case direct digital distribution is used.

ALC100

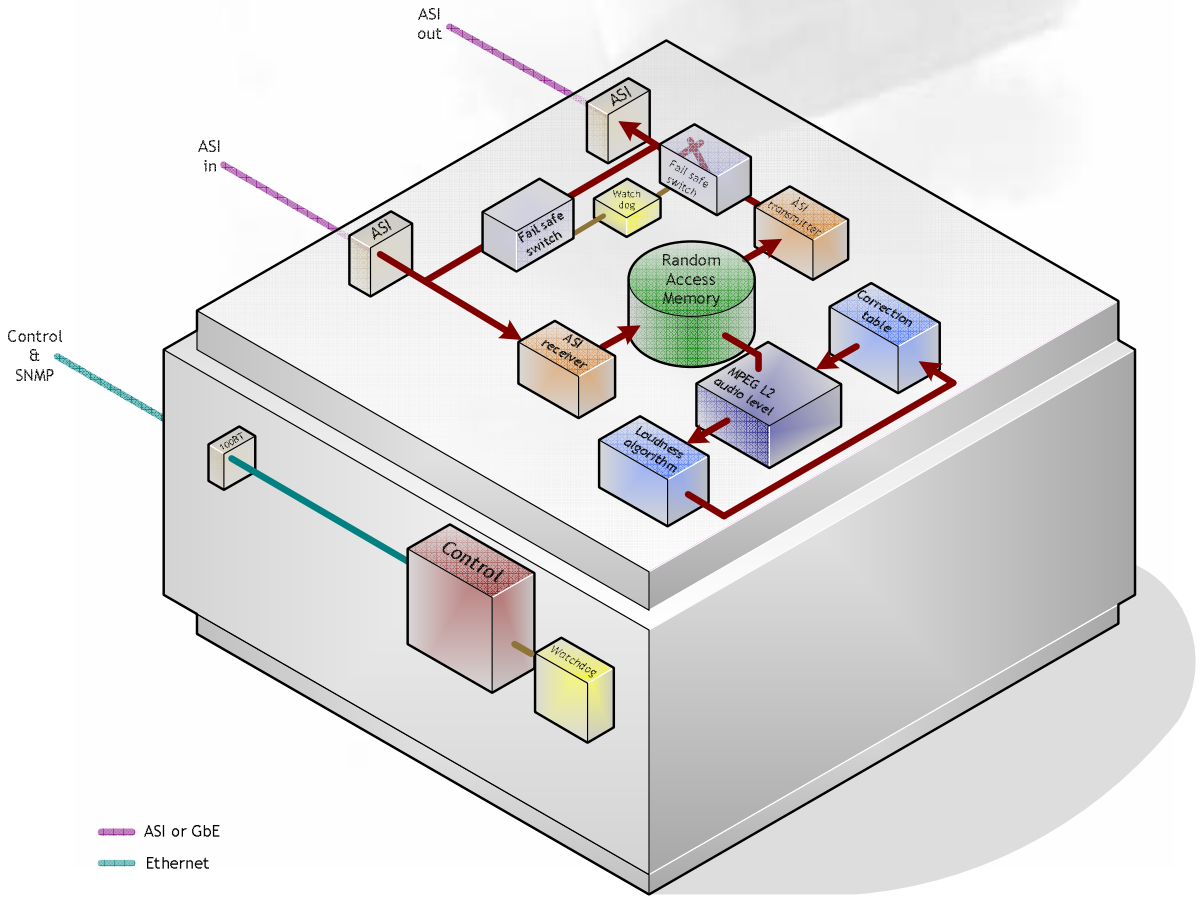
ALC100
Product description

The solution

With the introduction of the ALC100, ITNM Systems offers a unique solution without re-encoding disadvantages. The audio level is compensated directly in the data stream, what means without the need to decode and re-encode the signal. By means of efficient software programming, one system is capable of processing dozens of television and radio channels simultaneously. All this makes the ALC100 a very approachable and scalable solution – with a remarkable ratio between costs and benefits – that can be applied in DVB head-ends of both small and big sized operators.

Integration

Input for the system is the multiplexed transport stream – stripped of any scrambling – coming from the DVB multiplexer or the output signal of one or more DVB decoders. For maximum flexibility, two options are available to process this signal; by Asynchronous Serial Interfaces (ASI) or by Gigabit Ethernet. The ASI model comes standard with an automatic built-in switch, that will connect the input with the output in case of a failure or switch-off. In case of Gigabit Ethernet, the system can be optionally equipped with an optical switch, enabling it to have the same redundancy properties as the ASI type. This will make integration an easier job in existing systems.



Schematic overview ALC100

ALC100

ALC100
Product description

Transparent data transport

For maximum stability, nothing is changed to the original data structure and by doing that the systems acts as most transparent as possible. Other components than audio will remain completely untouched.

Functionality

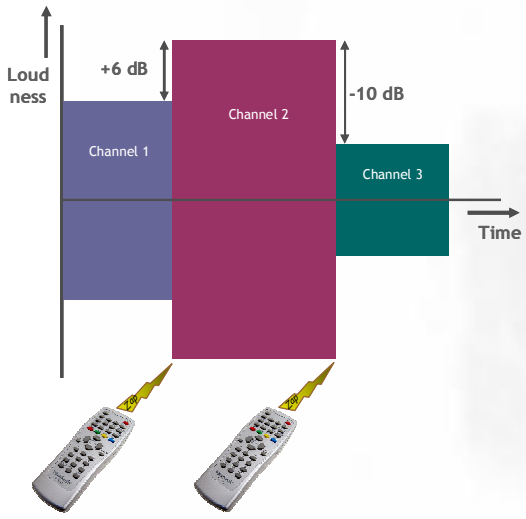
Starting point in the design of the ALC100 is the proposition that rebroadcast operators - irrespective of the kind of infrastructure – must not have the intention to change the creative properties of programme material. The basic functionality supports the view that loudness differences among several programmes, commercials and announcements in the first place is a responsibility of the programme supplier and not one of the rebroadcast operator. That's why the ALC100 adapts itself emphatically on mutual loudness differences among channels and not within a channel specifically.

Automatic gain control

The ALC100 standard version comes with manually controlled correction factors per channel. However, automatic control can be delivered as well. This option can also be installed in a later stage. Automatic control means that every channel is analysed by a loudness algorithm over a relative long period of time in order to settle loudness of all channels as close as possible to the human perception. Normally a correction is applied only once a day. Channels with instable loudness can be corrected more often. Out of balance between left and right audio channel is compensated as well in case an unusual high deviation is observed. An SNMP-generator - suitable to display the status of the system - is standard.

No loss of audio quality

The ALC100 performs all changes directly and without any loss of audio quality. All other data will remain unchanged in order to pursue maximum stability and to maintain integrity of the composition of the signal stream.



Annoying loudness jumps without application ALC100

ALC100

ALC100
Networks

Integration in networks

The ALC100 is applicable in several kinds of network architecture.

Implementation

Normally the system is placed at the location where centralised processing of digital radio and television services is performed; the head-end or digital play-out centre. There are many ways to connect, depending on the construction of the existing multiplexer and receiver equipment.

Connections

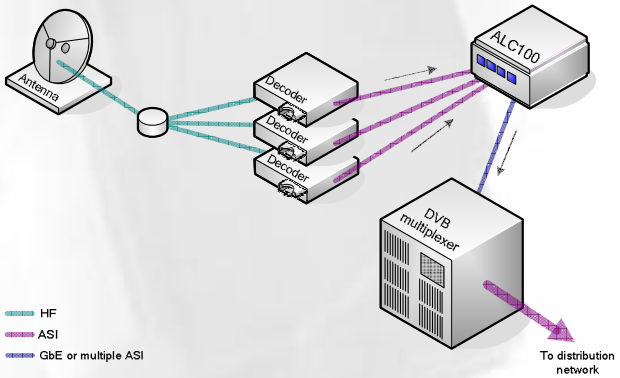
The DVB transmission is done by electrical or optical Gigabit Ethernet, or by ASI interfaces. Communications with the ALC100 for maintenance and SNMP is done by common Ethernet.

Examples

The following drawings show examples of implementation of the ALC100 in several kinds of network design. However, the possibilities are not limited to these examples.

Fed by the receivers

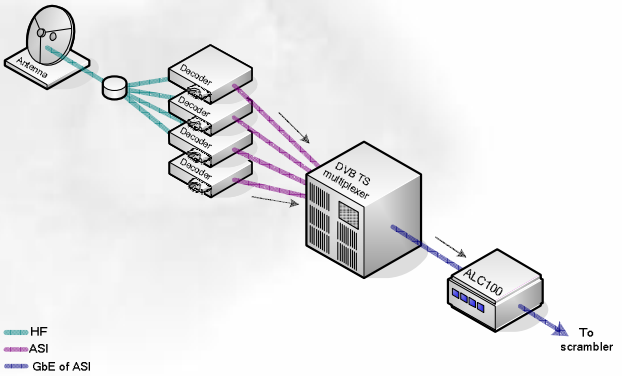
In case it is not possible or not desired to connect through the multiplexer, then the ALC100 also accepts ASI input signals directly coming from the satellite receivers. For this, one or more ASI connections can be used.



ALC100 directly fed

Fed by the multiplexer

The ALC100 can also be used behind the multiplexer for processing of the complete transport stream. The connection can be ASI or GbE.



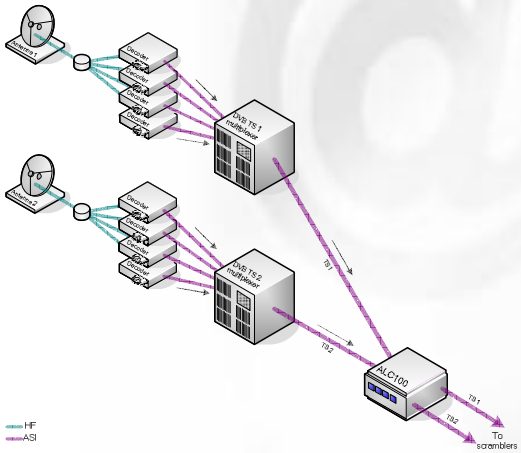
ALC100 fed by the mux

ALC100

ALC100
Networks

Fed by two multiplexers

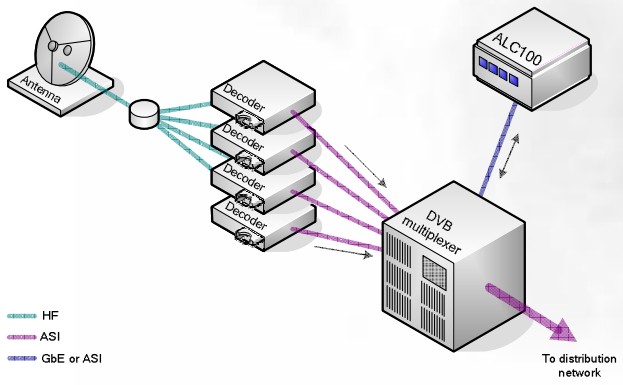
Thanks to the big processing capacity of the ALC100, even multiple transport streams can be processed simultaneously by means of up to two ASI connections.



ALC100 in duo mux configuration

Small multiplexer system

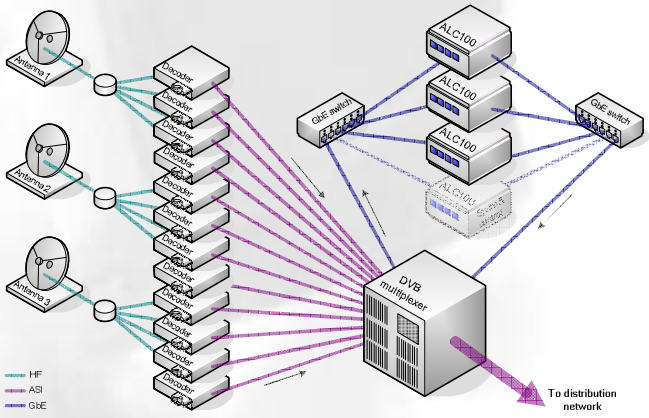
In a configuration of only one or a few transport streams, signals can be exchanged by efficient (Gigabit) Ethernet or one or more ASI connections.



ALC100 in small mux configuration

Big multiplexer configuration

Dependent on the composition of the signals and the amount of channels, one or more GbE or ASI connections from and to the multiplexer can be used. It is also possible to divide the traffic by means of a GbE switch. A spare ALC100 can optionally be applied working as a shadow and working as controller and monitor for the diversion of data.



ALC100 in big mux configuration

ALC100

ALC100
Specifications

Capacity

- 50 stereo audio signals of television or radio channels simultaneously (capable of expansion up to 100)

Functionality

- Manual adjustable correction of average loudness differences
- Creative programme properties remain untouched
- No loss of audio quality
- No additional delay between sound and image
- Integral processing time only 0.1 second
- Processing of (plural) MPTS or plural SPTS
- ASI or Gigabit Ethernet connections
- Automatic built-in loop-through switch standard on ASI-model
- SNMP

Options

- Automatic gain control of mutual average loudness
- Automatic out of balance correction
- Additional ASI connections
- Optical GbE connections
- Optical loop-through switch
- Expansion per 25 stereo audio signals
- Loudness algorithm changeable on user request
- Redundant design
- User specific demands

ITNM Systems reserves the right to change the specifications.

ALC100

ALC100
Foundation

Construction

The foundation of the ALC100 is a Supermicro industrial server controlled by Linux operation system. The power supply and hard disk can be swapped from the outside. A watchdog circuit is monitoring the availability continuously. Communications for maintenance and SNMP can be done by means of common Ethernet. The foundation can optionally be equipped with redundant power supplies and ditto hard disks. Delivery based on a HP Proliant server is also an option.

Front and rear panel of the industrial server

Standard configuration

Industrial server
Watchdog circuit
Swappable power supply and hard disk
No keyboard or mouse needed to start up
Mains 230 V 50 Hz (other available on request)
Used power 150-250 W*
Colours beige and black

Dimensions (width x depth x height):
1 RU = 438 x 681 x 43 mm

Environmental conditions:
Temperature range storage 0 – 50 °C
Temperature range operating 10 – 35 °C
Humidity 8%-90% non-condensing

Safety and EMC:
CE compliant (EN 60950/IEC 60950)

Connections:
1 x MPTS/SPTS-input/output (10/100/1000 Base-T Layer 3)
1 x Control/SNMP (10/100/1000 Base-T)

Connection options:
Up to 2 MPTS inputs (ASI)
Up to 2 MPTS outputs (ASI)
2 x MPTS/SPTS-input/output optical (1000 Base-SX GbE Layer 3 via duplex LC-connector)

* Dependent on the configuration.

ITNM Systems reserves the right to change the specifications of the configuration.

ALC100

ALC100
Management

Purpose

Besides powerful and advanced functionality and cost-effective design, durability of a part in a digital television broadcast system is of course of vital importance. A service level agreement is the appropriated means for a user defined improved or continuous availability.

Service level agreement

A service level agreement covers preventive as well as corrective maintenance of the whole system as well as possible bugs in the applications. The standard rate is 7 % of the installed base per year. The standard coverage in the Netherlands implies a maximum response time of one hour during seven days a week between 9 o'clock in the morning and 11 o'clock in the evening. The response time at the location is four hours maximum. Spare material can be included on customer's demand as part of the delivery.

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