BLANKOM®

Professional Headend Solutions

Operating instructions

TWIN QAM MODULATOR

ASI QAM/RF

Contents

» **AMC 406**
Art.Nr.: 9618.08

...Setting Signals

1. Safety and operating instructions

When assembling, starting-up and adjusting the modules, it is necessary to consider the system specific references in the manual instruction!

⚠ The modules may only be installed and started up by authorized technical personnel!

⚠ When assembling the modules into the receiving points, the adherence of the EMC regulations is to be secured!

⚠ The assembly and wiring have to be done without voltage!

⚠ All active modules may only be operated with the Headend Controller HCB 100 or Bus Extender BEB 100!

⚠ The main voltage and the operating voltage of the modules working by DC have to be in complience to the operating parameters described in the technical data.

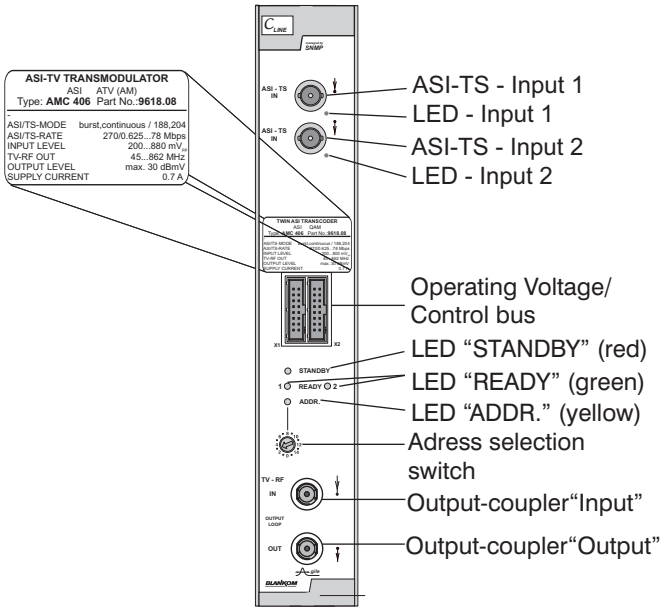
⚠ With all work the defaults of the DIN EN 50083 have to be considered! Especially the safety relevant execution of the DIN EN 50083/1 [2] is necessary!

AMC 406
Part N°: 9618.08

TWIN QAM MODULATOR
ASI QAM/RF

C LINE

2. Front View



managed by **SNMP**

3. Device variants

AMC 406 9618.08 ASI-TS → QAM/HF [45…862 MHz]

Mininum software requirements for HCB 100:
9650.03: Version 2.34*
9650.04/05: Version 3.18*

*) Updates: www.blankom.de

4. General

The Twin ASI-TV-Transcoder AMC 406 is a module of the C-LINE headend system.
The module converts two digital transponders into the digital cable standard DVB-C/J.83 B (QAM).
The signals will be transcoded from the ASI transportstream into cable-TV-channels.
The management of the modules will be done via the central control unit (Headend Controller / HCB 100) manually or remotly.

5. Function Description

The ASI input module is configurated as twin input automatically. The data stream is passed to a FIFO and the resulting transport stream is adjusted to input data rate accordingly. A warning is generated if user bit rate exceeds 78 Mbit/s. The conversion into the IF-range is done within the following modulator (QAM). The subsequent conversion into an adjacent channel pair within the cable-TV-range is done for both channels together. The symbol rate of the QAM - Modulator is adjustable.The programming of the output channels is done via transmodulator 2. Transmodulator 1 is normally one channel lower (with spare space two channels lower) The channel spacing within the TV - ranges will be considered automatically. Offset - frequencies can be programmed, too. In- and outputs are performed in loopthrough technique.

Special funtions:	Testsignal	(according adjustment symbol rate and QAM constellation)
	Carrier signal - generator	(Signal level -measurement)

6. Adjustments

6.1 Adjustment with the Headend Controller

- Adjustment of the addresses at the Bus Extender BEB 100 and at the modules
- Activation of the programming mode of each module by selecting the line (BEB 100) and the module position (01 - 15) at the Headend Controller (HCB 100) yellow LED is lit up til the beginning of the parameter adjustment
- Adjustment of the AMC 406 parameter (see chapter 9) green LED is lit up
- After the programming the AMC 406 will be automatically switched into the operating status yellow LED light up briefly / green LED is lit up

6.2 Adjustment with PC / Laptop

- Condition for the remote programming is an “online - connection” after IP - standard and an ethernet connection at the PC / Laptop
- Adjustment of the line / position addresses at the Bus Extender BEB 100 as well as at the modules
- At the Headend Controller HCB 100 IP - address input (e.g. 192.168.001.001)
- For “direct connection” between a PC and HCB 100 use a crossed patch cable (RJ 45)
- For connection over a deviation use an uncrossed patch cable
- HTML - browser start-up and put in IP - address as target address
- If connected correctly the HTML - control surface at the PC will open up and a blue LED (LINK) at the HCB 100 will be lit up
- All adjustment of the modules are specified at the control surface

The manual instructions of the Headend Controller HCB 100 and the Bus Extender BEB 100 have to be considered!

7. Meaning of LED signals

7.1 LED`s for the ASI ports

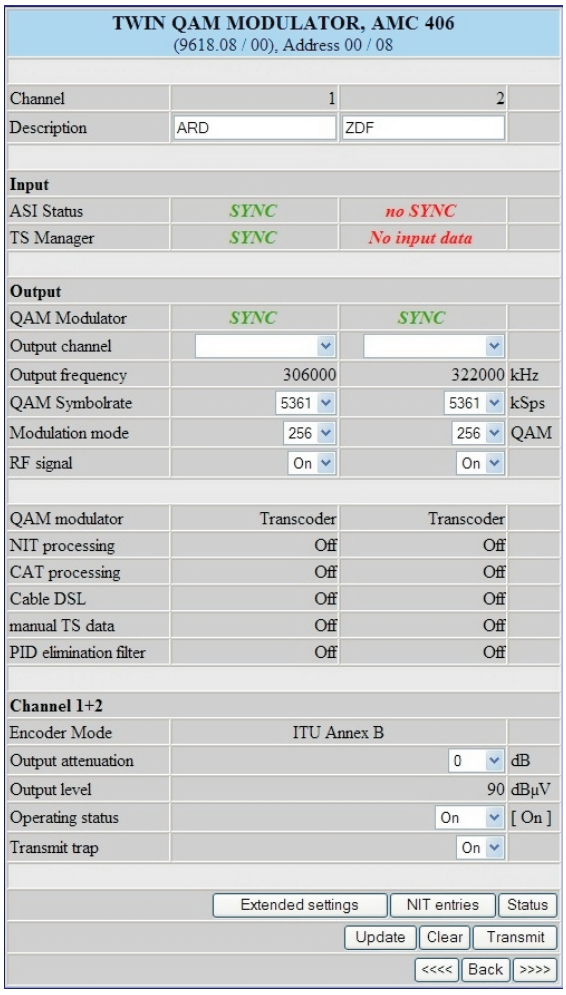
Colour	Status	Meaning of display
Green	Permanently illuminated	ASI channel has been configured as input
	Flashing	No ASI signal
Yellow	Permanently illuminated	ASI channel has been configured as output
	Flashing	No ASI signal

7.2 LED`s on front panel

Colour	Status	Meaning of display
Red	Permanently illuminated	Module is on standby
	Flashing	Module faulty (hardware)
Green	Permanently illuminated	Module working, everything ok
	Flashing	Dysfunction depending in signal: ASI not sync (e.g. in case of missing input signal) no input on the QAM modulator buffer overflow in the QAM modulator QAM overflow (input data rate on the QAM modulator too large)
Yellow	illuminated or flashing	Remote control making contact / data transmission

8. Programming by web servers*

8.1 Main menu



Name of device, item number, address in headend

Desctription program name (max. 30 characters)

Input
ASI status input signal (sync/no sync)
FPGA status status, valid transport stream

Output
QAM modulator status signal at the output
Ouput channel channel selection (2…116)
Output frequency dedicated output frequency
QAM symbol rate selection: 5057, 5361 with Annex B
Modulation mode selection: 64, 256 with Annex B (Menu 1)
RF Signal selection: On/Off

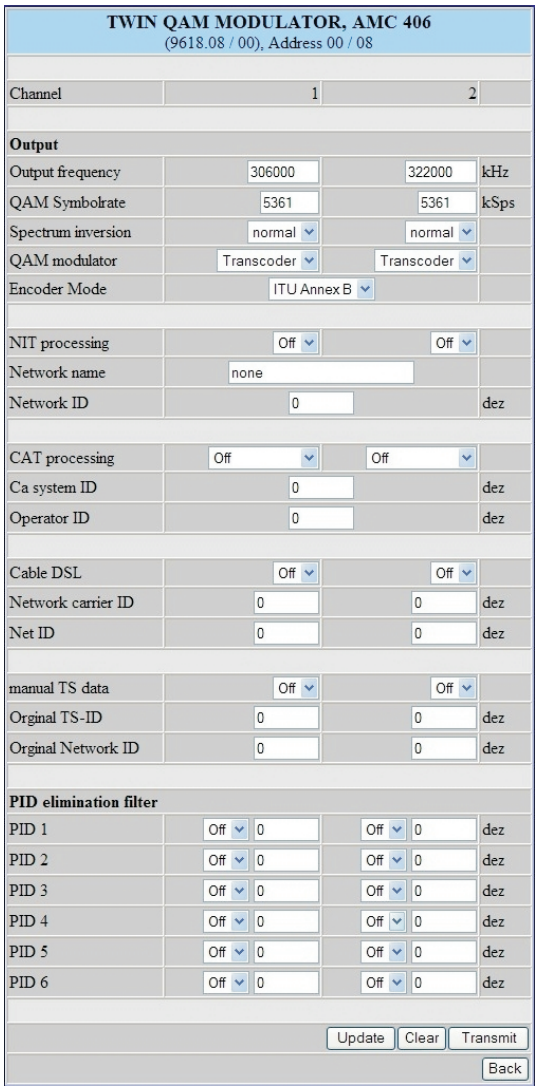
Operating mode Transcoder (according adjustment menu 1)
NIT processing On/Off according adjustment menu 1
CAT processing On/Off according adjustment menu 1
Cable DSL On/Off according adjustment menu 1
Manual TS data On/Off according adjustment menu 1
PID elimination filter On/Off according adjustment menu 1

Adjustments for both of the channels
Encoder Mode DVB-C / ITU Annex B (adjustment in menu1)
Output attenuation 0 … 20 dB in 0.5 dB steps
Output level dedicated output level
Operating status On/Off
SNMP trap message On/Off

Routing to the appropriate adjustment menu
Extended settings. see menu 1
NIT entries see menu 2
Status see menu 3
Update refresh screen
Clear discard changes
Transmit send changes

* Further details on this are to be found in the HCB manual

8.2 Extended settings (Menu 1)



TWIN QAM MODULATOR, AMC 406
(9618.08 / 00), Address 00 / 08

Channel	1	2	
Output			
Output frequency	306000	322000	kHz
QAM Symbolrate	5361	5361	kSps
Spectrum inversion	normal	normal	
QAM modulator	Transcoder	Transcoder	
Encoder Mode	ITU Annex B		
NIT processing	Off	Off	
Network name	none		
Network ID	0		dez
CAT processing	Off	Off	
Ca system ID	0		dez
Operator ID	0		dez
Cable DSL	Off	Off	
Network carrier ID	0	0	dez
Net ID	0	0	dez
manual TS data	Off	Off	
Orginal TS-ID	0	0	dez
Orginal Network ID	0	0	dez
PID elimination filter			
PID 1	Off 0	Off 0	dez
PID 2	Off 0	Off 0	dez
PID 3	Off 0	Off 0	dez
PID 4	Off 0	Off 0	dez
PID 5	Off 0	Off 0	dez
PID 6	Off 0	Off 0	dez

Update Clear Transmit

Back

Name of device, item number, address in headend

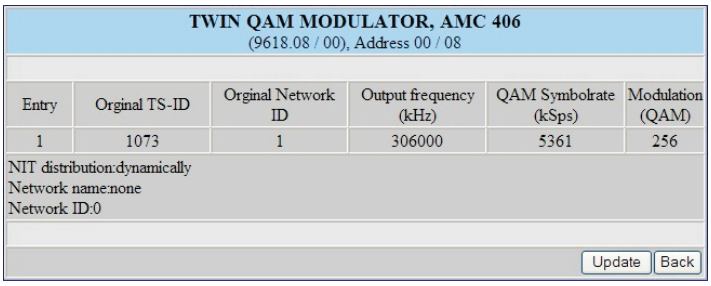
Output

Output frequency	adjustment range 45 000 … 862 000 kHz
QAM-Symbolrate	adjustment range 1000 …7000 kSps
Spectrum Inversion	selection normal (regular/invers)
Operating mode	selection Transcoder/Testsignal/Testlevel
Encoder Mode	DVB-C / ITU Annex B (channel 1+2)
NIT processing	activation or deactivation
Network name	freely selectable (max. 30 characters)
Network ID	freely selectable (0 … 65535) (channel 1+2)
CAT processing	activation or deactivation
CA system ID	freely selectable (0 … 65535) (channel 1+2)
Operator ID	freely selectable (0 … 65535) (channel 1+2)
Cable DSL	activation or deactivation
Network carrier ID	freely selectable (0 … 65535)
Net ID	freely selectable (0 … 65535)
Transport stream	manual changes: activation or deactivation
Original TS-ID	freely selectable (0 … 65535)
Original Network ID	freely selectable (0 … 65535)

PID elimination filter

PID 1	On/Off, range (0 … 8191)
PID 2	On/Off, range (0 … 8191)
PID 3	On/Off, range (0 … 8191)
PID 4	On/Off, range (0 … 8191)
PID 5	On/Off, range (0 … 8191)
PID 6	On/Off, range (0 … 8191)
Update	refresh screen
Clear	discard changes
Transmit	send changes

8.3 NIT Entries (Menu 2)



TWIN QAM MODULATOR, AMC 406
(9618.08 / 00), Address 00 / 08

Entry	Orginal TS-ID	Orginal Network ID	Output frequency (kHz)	QAM Symbolrate (kSps)	Modulation (QAM)
1	1073	1	306000	5361	256

NIT distribution:dynamically
Network name:none
Network ID:0

Update Back

Name of device, item number, address in headend

NIT entries with all information available

8.4 Device status and software versions (Menu 3)

TWIN QAM MODULATOR, AMC 406 (9618.08 / 00), Address 00 / 08			
Channel	1	2	
ASI-Input			
Status	*SYNC*	*no SYNC*	
Input data rate	38,061	0	kbps
Useful bitrate	33,903	0	kbps
Packet length	204	0	Bytes
Version			
APL Controller	9618.08-81.01 AP-Controller V1.24 19.08.2008 MF		
FPGA Controller	9619.05-88.01 MC FPGA-Controller(1) V4.14 02.10.2007 JR		
FPGA	9619.05-87.01 FPGA Transportstream Manager V3.00 30.03.2007 WE		
ASI FPGA Controller	9850.02-88.01 FPGA Download Controller V1.35 08.09.2008 MF,PK		
ASI FPGA	9850.02-87.01 ASI Input FPGA V1.42 31.07.2008 WE,MF		
Information			
Temperature APL	89 °F		
Device number	0227027		
Device index	00		
	Update	Back	

Name of device, item number, address in headend

ASI-Input

Status	**Sync**hroninsation or **no sync**hronisation with ASI input
Input data rate	data rate with null packets in kbps
Useful bitrate	data rate without null packets in kbps
Packet length	length of packets (188/204) in byte

Version

Software version of the controller of the front circuit board

Software version of the FPGA controller

Software version of the TS manager

Software version of the ASI NIM controller

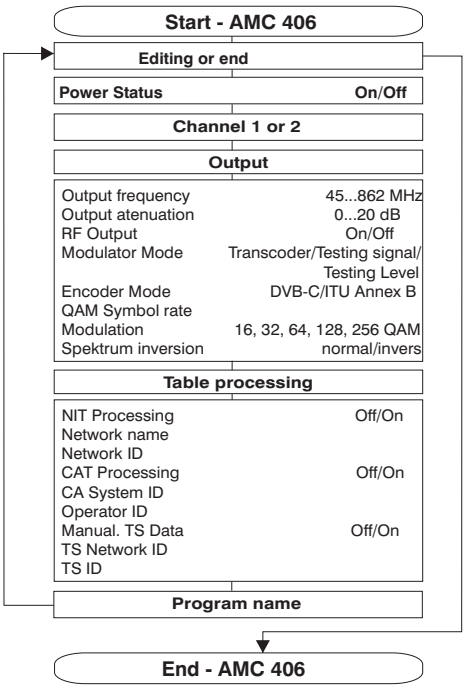
Software version of the ASI NIM FPGA

Information

Temperature APL	temperatur of the front circuit board
Device number	display of the device number
Device index	display of the device index

update refresh screen

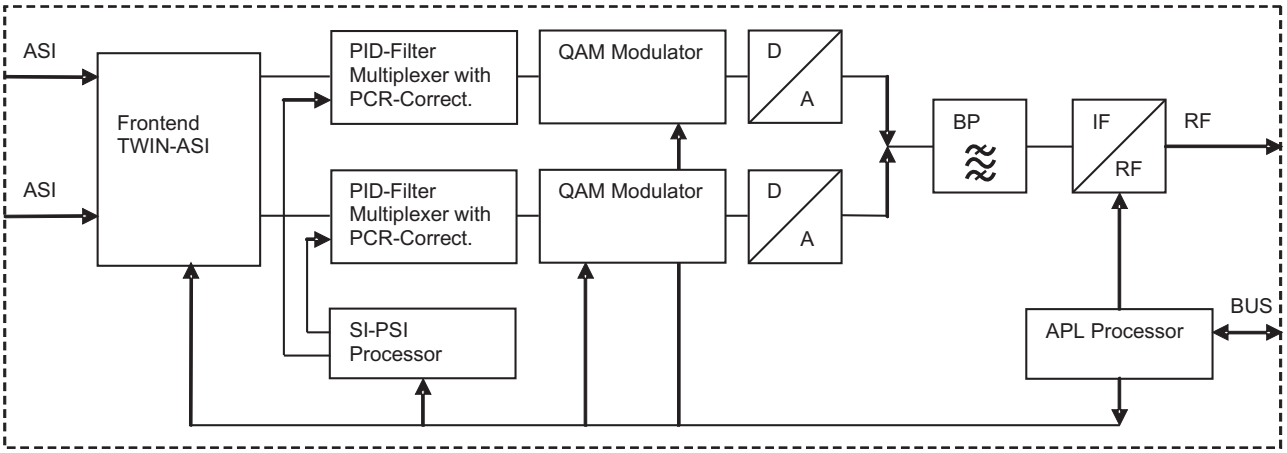
9. Menu control with Headend Controller (HCB 100)



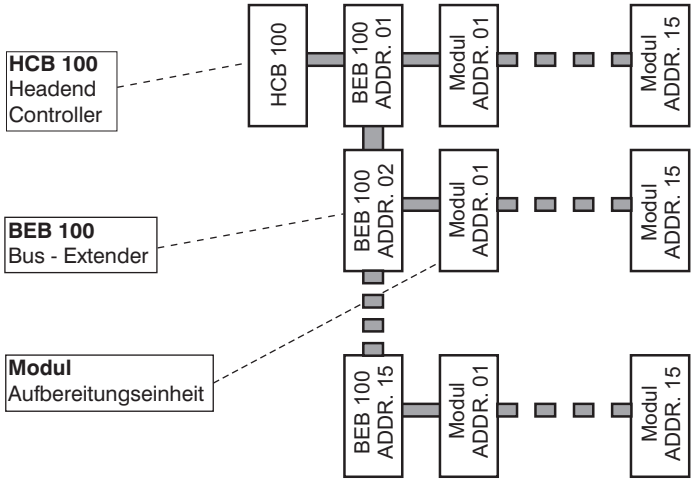
10. Trap-Messages

lfd. Nr.	Message	Type	Notice
01	Power fail	CRITICAL	internal hardware failure / short circuit
02	System reset	WARNING	reset by internal error
03	Signal OK	INFORMATION	Module working faultless
04	ASI not sync	WARNING	No ASI input signal
05	TS-FPGA not sync	WARNING	No valid TS in FPGA
06	QAM Modulator not sync	WARNING	Modulator overflow
07	Internal controller reset	WARNING	Internal initialisation

11. Block diagram

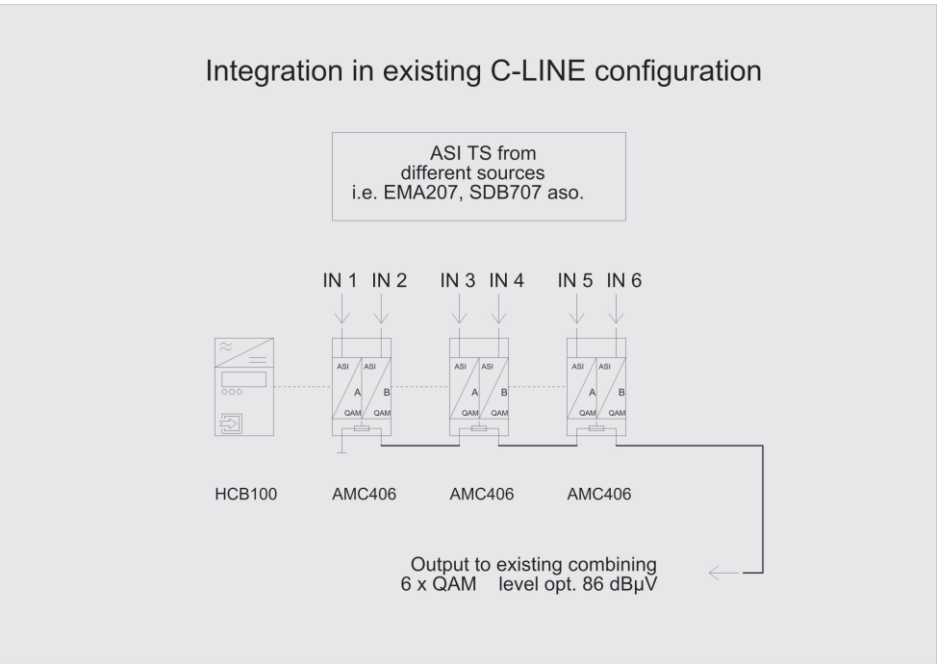


12. Headend BUS structure



The number of the possible module connections (00 ... 15) to a BEB 100 depends on the total power consumption of this line!

13. Example of use



14. Technical Datas

ASI Input

Level range	200 … 880 mV_{pp}
Data rate	270 Mbps
Connector	BNC socket
Impedance	75
ASI polarity	regular / inverted

ASI Signal processing

Data rate	0.625 … 78 Mbps
ASI Transmission mode (Input)	continuous, burst
TS Transmission mode (Input)	188, 204
Signal processing	EN 50083-9 [3]

QAM Modulator

Symbol rate	1.725 - 6.9 MSps	
QAM Modulation	ITU-T J.83 Annex B, DVB-C	
	Annex B	***DVB-C***
QAM Constellation	64; 256	16; 32; 64; 128; 256
Roll off	12 %, 18 %	15%
Interleaving	Conv. I=128, J=4	Conv. I=12
Forward error correction (FEC)	Reed Solomon (128,122) + Trellis	Reed Solomon (204, 188,8)
Modulations error rate	40 dB	
Test signals	according adjustment Symbol rate & QAM Constellation	
Measurement signal	unmod.carrier (signal level)	
Shoulder attenuation	45 dB	
Signal processing	EN 300 429 [1]	

RF Output

Max. output level	90 dBµV
Level range	0...20 dB (0.5 dB steps)
Channel allocation	adjacent channel capable
Output Impedance	75
Return loss	14 dB
Spurious	55 dB
Connector	F socket
Through loss	1 dB
Output frequency range	45 ... 862 MHz
Tuning grid	250 kHz

Operation parameters

Power consumption	12 V (± 0,2 V) / 700 mA
Residual ripple of the supply voltage	10 mV_{pp}

Environmental conditions

Temperature range	-10 ... +55 °C
Relative humidity	80 % (not condens.)
Mounting	vertically
Mounting location	splash-proof and drip-proof

Physical information

Dimension (w x h x l)	
without 19” adapter	50 x 276 x 148 mm
with 19” adapter	50 x 301 x 148 mm
Weight	1,400 g

Delivery content

1 x BUS connector
1 x F-connection cable 140 mm

15. Bibliography

[1] EN 300 429: Digital Video Broadcasting (DVB): Framing structure, channel coding and modulation for cable systems

[2] EN 50083-1: Cabled distribution systems for television, sound and interactive multimedia signals, safety requirements

[3] EN 50083-9, CENELEC 1998, cable distribution system for TV-,sound- and interactive multimedia-signals part 9: Interface for CATV-/SMATV headends and comparable professional devices for DVB/MPEG-2-Transferstreams

16. Glossary

ASI	**A**synchronus **S**erial **I**nterface
APL	**A**nschluss**pl**atte (front circuit board)
BER	**B**it **E**rror **R**ate
BW	**B**and**w**idth
CA	**C**onditional **A**ccess
CAT	**C**onditional **A**ccess **T**able
DSL	**D**igital **S**ubscriber **L**ine
DVB	**D**igital **V**ideo **B**roadcasting (-C **C**able, -S **S**atellit, -S2 **S**atellite **2**)
EIT	**E**vent **I**nformation **T**able
ETSI	**E**uropean **T**elecommunications **S**tandards **I**nstitute
FAT	**F**ile **A**llocation **T**able
FEC	**F**orward **E**rror **C**orrection
FPGA	**F**ield **P**rogrammable **G**ate **A**rray
http	**h**yper**t**ext **t**ransfer **p**rotocol
I/Q	**I**n-phase/**Q**uadrature
ID	**Id**entifier
IF	**I**ntermediate **F**requency
IIC	**I**nter-**I**ntegrated **C**ircuit
IP	**I**nternet **P**rotocol
LDPC	**L**ow **D**ensity **P**arity Check **C**ode
LED	**L**ight **E**mitting **D**iode
MAC	**M**edia **A**ccess **C**ontrol
MER	**M**odulation **E**rror **R**ate
MIB	**M**anagement **I**nformation **B**ase
MPEG	**M**oving **P**icture **E**xperts **G**roup
MPTS	**M**ulti **P**rogram **T**ransport Stream
NIM	**N**etwork **I**nterface **M**odule
NIT	**N**etwork **I**nformation **T**able
PAT	**P**rogram **A**ssociation **T**able
PCR	**P**rogram **C**lock **R**eference
PID	**P**rogram **Id**entifier
PMT	**P**rogram **M**ap **T**able
PSI	**P**rogram **S**ervice **I**nformation
QAM	**Q**uadrature **A**mplitude **M**odulation
RF	**R**adio **F**requency
SDT	**S**ervice **D**escription **T**able
SI	**S**ervice **I**nformation
SNMP	**S**ingle **N**etwork **M**anagement **P**rotocol
SPTS	**S**ingle **P**rogram **T**ransport **S**tream
TS	**T**ransport **S**tream

17. History

Version	Date	Modification	Editor
1.00	18.07.2008	Base-document	Poch

Changes due to technical progress possible. Options and other TV standards available upon request!

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