BLANKOM®

Professional Headend Solutions

Operating instructions

TWIN Terrestrial Streamer

DVB-T (COFDM) → 2 x CI → IP & ASI monitoring

Contents

TSI 108
Part N°: 9741.01

...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 x00 or Bus Extender BEB x00!

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 safetyrelevant execution of the DIN EN 60728-11 [6] is necessary!

2. Device variants

TSI 108	9741.01	DVB-T → 2 x CI → IP & ASI monitoring

Minimum software requirements for Headend Controller HCB x00:

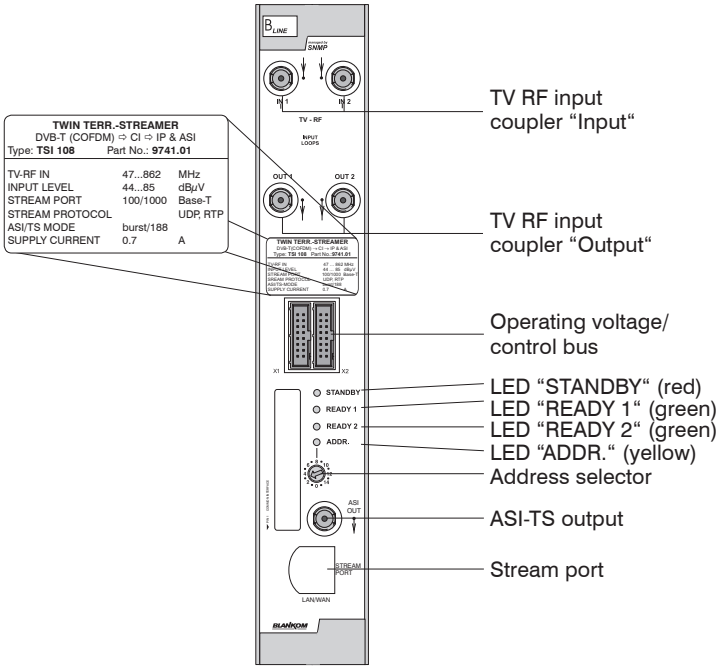
9650.03:	version 2.34*
9650.04/.05:	version 3.25*
9652.01:	version 3.25*
9653.01	version 3.27*

*) Updates: www.blankom.de

3. General

The TWIN Terrestrial Streamer TSI 108 is a module of the head end system B-LINE, which is conceived as a complete system for middle sized networks. The TSI 108 demodulates DVB-T signals (COFDM) into 2 transport streams, which are sended out over IP. A Common Interface slot enables the use of CA-Modules for the reception of scrambled DVB-T signals/ programmes. Additionally the processed transport streams with the descrambled services are available on the ASI output, and the max. 16 IP transport streams too. All the components are programmed via a central control unit and will function independently thereafter. The status of the modules are displayed via LED's (see chapter 7.2 „Status LED`s on front panel ").

4. Front view



managed by
SNMP

5. Functional description

The tuner selects the DVB-T channel, afterwards the conversion follows into a MPEG transport stream. The data stream is routed by a switching matrix either to the Common Interface or directly to the IP module. A respective CA module with smart card, which is supported by the device, has to be used for descrambling.* Multi service decryption is possible if there are not any restrictions by the CAM itself or by the service provider. The decryption of MPEG-4 services is supported. With this module its possible to choose elementary streams of a service for decryption. So the ressources of the respective CAM/ smart card combination can be used optimally. The SI and PSI tables affected (i.e. the PAT, PMT, SDT, EIT) are automatically corrected. 16 of all programs contained in both transport streams can be selected and transmitted via IP. This is supported by different protocols. Address and port selection are not restricted, but should be orientated itselfs according recommendations of IANA. The module alows the output of one single program transport stream (SPTS) per IP connection, but also the output of one of both multi program transoprt streams (MPTS), that can be decrypted. For monitoring there is an ASI output to check one of the 16 stream channels.

* The design of the Common interface of this module is done according to DVB standards. Because of the dependencies in interaction of the DVB signals, CA modules and smart cards we can not assure a general functional capability for all application possibilities. Please contact our service department for further assistance!

6. Adjustments

6.1 Adjustment with the Headend Controller

- Adjustment of the addresses at the Bus Extender BEB x00 and at the modules
- Activation of the programming mode on each module by selecting the line (BEB x00) and the module position (01... 15) at the Headend Controller(HCB x00)
  → yellow LED illuminates until the beginning of the parameter adjustment
- Adjustment of the TSI 108 parameters (see chapter 9) → green LED is switched on
- After the programming the TSI 108 will be automatically switched into the operating mode
  → yellow LED flashes shortly/ green LED is switched on

6.2 Adjustment with the PC/ laptop

- Prerequisite for the remote programming is an "online-connection" according the IP-standard and an ethernet connection at the PC/ laptop
- Adjustment of the line/ position addresses at the Bus Extender BEB x00 as well as at the modules
- At the Headend Controller HCB x00 input IP address (e.g. 192.168.001.001)
- For "direct connection" between a PC and HCB x00 use crossover cable (RJ 45)
- For connection over a HUB use a normal straight throught patch cable
- Start-up HTML-browser and put in IP address as target address
- If connected correctly the web interface will be opened on the pc and a blue LED (LINK) at the HCB x00 will be lit up.
- All adjustments of the modules are specified on the web interface.

The manual instructions of the Headend Controller HCB x00 and the Bus Extender BEB x00 have to be considered!

6.3 Adjustment with SNMP

- Prerequisite for the SNMP functionality is the use of HCB x00 with enabled SNMP software option CKB 100.
- Supported is SNMP version 1.0 [7].
- Automatic creation of the MIB based on the current head-end configuration by the HCB x00.
- For setting and reading out the parameters and is to receive traps from an SNMP management software required.
- Further Notes on the SNMP functionality of BLANKOM modules are listed in the SNMP manual.

7. Meaning of the LED`s

7.1 LED‘s at the stream port

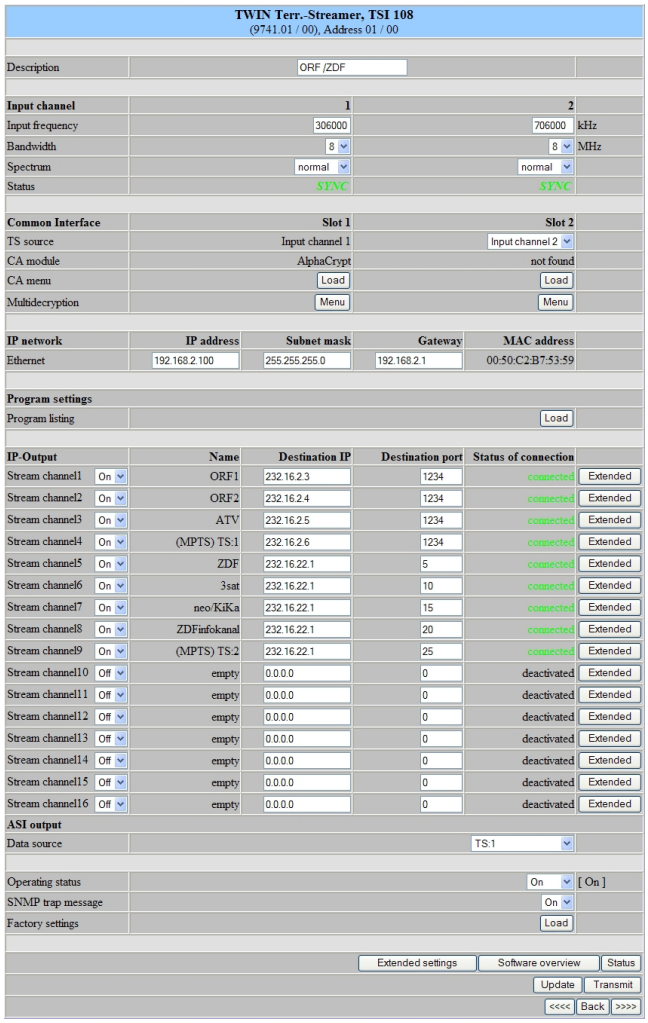
Meaning (Colour)	Status	Meaning of display
GbE connect LED (green)	permanently on	cable connection with GbE
	off	no cable connection with GbE
Data LED (yellow)	permanently on	port active
	flashing	data being exchanged

7.2 Status LED‘s on front panel

Designation (Colour)	Status	Meaning of display
STANDBY (red)	permanently on	Module is in standby
	flashing	Module faulty (hardware error)
READY 1/ 2 (green)	permanently on	Module working properly
	flashing	Error warnings, depending on signal: - tuner 1/ 2 not synchronized (e.g. there is no input signal) - Error of decryption - stream channel to the receiver is broken
ADDR. (yellow)	illuminated/ flashing	remote control connection/ data being exchanged

8. Programming by web server*

8.1 Main menu



TWIN Terr.-Streamer, TSI 108
(9741.01 / 00), Address 01 / 00

Description	ORF /ZDF				
Input channel	**1**		**2**		
Input frequency	306000		706000	kHz	
Bandwidth	8		8	MHz	
Spectrum	normal		normal		
Status	SYNC		SYNC		
Common Interface	**Slot 1**		**Slot 2**		
TS source	Input channel 1		Input channel 2		
CA module	AlphaCrypt		not found		
CA menu	Load		Load		
Multidecryption	Menu		Menu		
IP network	**IP address**	**Subnet mask**	**Gateway**	**MAC address**	
Ethernet	192.168.2.100	255.255.255.0	192.168.2.1	00:50:C2:B7:53:59	
Program settings					
Program listing	Load				

IP-Output		**Name**	**Destination IP**	**Destination port**	**Status of connection**	
Stream channel1	On	ORF1	232.16.2.3	1234	connected	Extended
Stream channel2	On	ORF2	232.16.2.4	1234	connected	Extended
Stream channel3	On	ATV	232.16.2.5	1234	connected	Extended
Stream channel4	On	(MPTS) TS:1	232.16.2.6	1234	connected	Extended
Stream channel5	On	ZDF	232.16.22.1	5	connected	Extended
Stream channel6	On	3sat	232.16.22.1	10	connected	Extended
Stream channel7	On	neo/KiKa	232.16.22.1	15	connected	Extended
Stream channel8	On	ZDFinfokanal	232.16.22.1	20	connected	Extended
Stream channel9	On	(MPTS) TS:2	232.16.22.1	25	connected	Extended
Stream channel10	Off	empty	0.0.0.0	0	deactivated	Extended
Stream channel11	Off	empty	0.0.0.0	0	deactivated	Extended
Stream channel12	Off	empty	0.0.0.0	0	deactivated	Extended
Stream channel13	Off	empty	0.0.0.0	0	deactivated	Extended
Stream channel14	Off	empty	0.0.0.0	0	deactivated	Extended
Stream channel15	Off	empty	0.0.0.0	0	deactivated	Extended
Stream channel16	Off	empty	0.0.0.0	0	deactivated	Extended

ASI output		
Data source	TS:1	
Operating status	On	[On]
SNMP trap message	On	
Factory settings	Load	

Extended settings | Software overview | Status

Update | Transmit

<<<< | Back | >>>>

Name of device, item number, address in head end

Description — Name of programme (max. 30 characters)

Input channel
Input frequency — adjustment range: 47000 ... 862000 kHz
Bandwidth — selection: 6, 7, 8 MHz
Spectrum — selection: normal, inverted
Status — displays whether **SYNC**hronization or **noSYNC**hronization with input

Common Interface
TS-Source — slot 1 always input channel 1 assigned, slot 2 - selection: input channel 1 or 2
CA-Module — displays the type of the CA module per slot
CA-Menu — see menu 2
Multidecryption — see menu 3

IP-Network
Ethernet — input of IP address, subnet mask and Gateway, display of the MAC address

Program settings
Program listing — see menu 1

IP-Output — per stream channel (1 ... 16) :
- selection: On/ Off (of the channel)
- displays the name
- input of the destination IP
- input of the destination port
- displays the status of connection
- routing to the menu 7 (extended set tings)

ASI-Output
Data source — selection: stream channel 1... 16, TS1,TS2

Operating status — selection: On, Off, Reset
SNMP-Trap message — On/Off, if SNMP option in HCB x00 is enabled,otherwise “locked“ is displayed
Factory settings — see menu 9

Routing to the appropriate adjustment menu:
Extended settings — see menu 8
Software overview — see menu 11
Status — see menu 10

* For further details see the HCB manual

8.2 Loading the programme list (menu 1)

TWIN Terr.-Streamer, TSI 108
(9741.01 / 00), Address 01 / 00

Input channel 1		Stream channel															
Service ID	Program name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
13001	ORF1	◉	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
13002	ORF2	○	◉	○	○	○	○	○	○	○	○	○	○	○	○	○	○
13003	ORF2 W	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
13004	ORF2 N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
13012	ATV	○	○	◉	○	○	○	○	○	○	○	○	○	○	○	○	○
*****	(MPTS) TS:1	○	○	○	◉	○	○	○	○	○	○	○	○	○	○	○	○
Input channel 2		**Stream channel**															
Service ID	**Program name**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
514	ZDF	○	○	○	○	◉	○	○	○	○	○	○	○	○	○	○	○
515	3sat	○	○	○	○	○	◉	○	○	○	○	○	○	○	○	○	○
517	neo/KiKa	○	○	○	○	○	○	◉	○	○	○	○	○	○	○	○	○
516	ZDFinfokanal	○	○	○	○	○	○	○	◉	○	○	○	○	○	○	○	○
*****	(MPTS) TS:2	○	○	○	○	○	○	○	○	◉	○	○	○	○	○	○	○
Disable program		**Stream channel**															
Service ID	**Program name**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
0	empty	○	○	○	○	○	○	○	○	○	◉	◉	◉	◉	◉	◉	◉

Update Transmit

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This menu contains a list of all services available in the data stream. In the matrix there is a selection of the services per stream channel. Settings are adopted or changed by clicking the “Transmit” button.

8.3 CA menu (menu 2)

TWIN Terr.-Streamer, TSI 108
(9741.01 / 00), Address 01 / 00

AlphaCrypt 3.18 (c) Mascom GmbH

Module Mainmenu
1/ Information
2/ Smartcard
3/ Email Messages
4/ Parental Control
5/ Module Options
6/ Quit
Select item and press OK

Select Menu 1-6: Transmit

<< Back | Main menu | Next >>

Update | Back

Name of device, item number, address in head end

On these pages all menus implemented in the CA module are offered.The available menus are selected individually or are invoked one-by-one to do necessary settings or to get all informations about the CA module.

8.4 Multi-decryption menu (menu 3)

TWIN Terr.-Streamer, TSI 108
(9741.01 / 00), Address 01 / 00

Program name	Decoding settings	Status
ORF1 dec.PID's:5	Service completely	stored
ORF2 dec.PID's:5	Service completely	stored
ATV dec.PID's:4	Service completely	stored

dec.PID's total:14

☐ Clear entries

Selection | Testing selection | Transmit / Back

When calling this menu the selection of the services of the adjusted transponder, which were selected for decryption and whose decryption was successfully, appears. Indicated are the programme name with the number of the decoded PID's, the decryption settings and the status of the programme. "Stored" means, that the service was successfull decrypted and saved in the CA-service-list. Using the check box "Clear entries" and the "Transmit/ Back" button the entire selection will be deleted and no services are decrypted afterwards. By using the "Selection" button and the appropriate selection of the services in the multi-decryption selection menu (menu 4) the list of the services to decrypt can be changed.
Using the "Testing selection" button calls the test menu (menu 5), in which the decryption state of all programmes in the CA-service-list will be tested again and possible occurring errors will be listed.

8.5 Multi-decryption selection (menu 4)

TWIN Terr.-Streamer, TSI 108
(9741.01 / 00), Address 01 / 00

Program selection			Decoding settings						
Selection	CAM	Program name	Status	private Streams	other Audio Streams	MPEG1/2 Audio Streams	Subtitling Streams	VBI Data Streams	PID drop list
☑	1	ORF1	free	☑	☑	all	all	☑	
☑	1	ORF2	free	☑	☑	all	all	☑	
☐	1	ORF2 W	coded	☐	☐	no	no	☐	
☐	1	ORF2 N	coded	☐	☐	no	no	☐	
☑	1	ATV	free	☑	☑	all	all	☑	

☐ Reset CA-Modul

Simultaneous decoding of several programs depends on CA-Module and Smartcard!

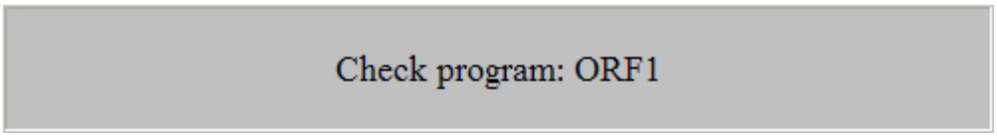
Update | Transmit

Back

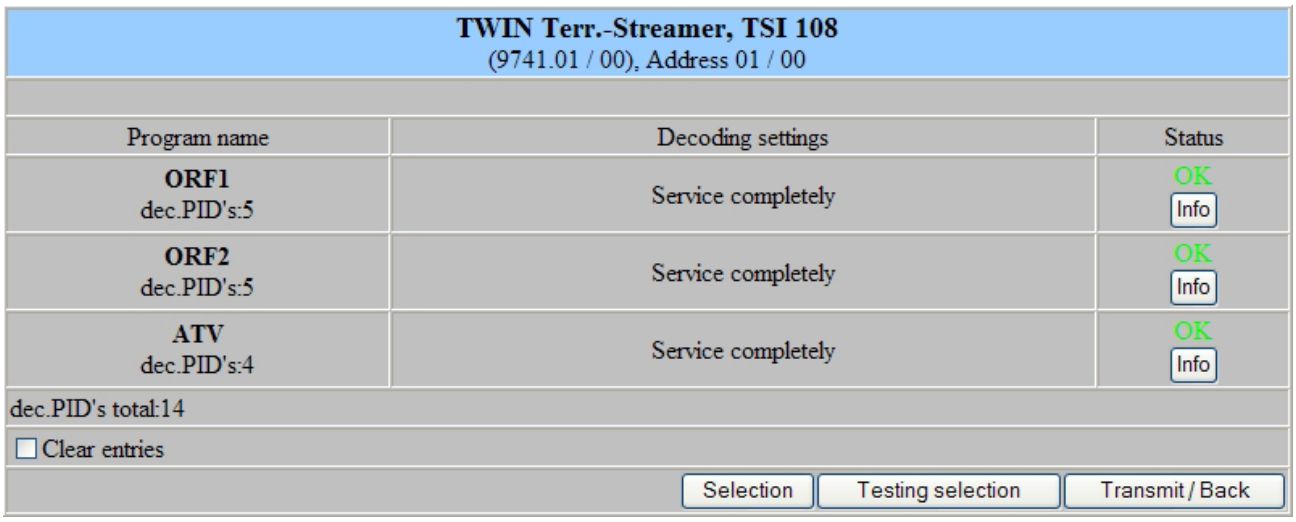
In this menu all services of the adjusted transponder and their CA status are listed. The services are selectable for decryption. For each of this selected services one can determine, what streams or PID's are to be decrypted. That's important because the maximum number of the decryptable PID's is limited and this limit has a different size per CA module.
In the selection boxes "MPEG 1/ 2 Audio Streams" respective "Subtitling Streams" all, no or individual streams are selectable. If one wants to select more than one stream, but not all , the selection field "all" in the box is to be selected and in the column "PID-Drop list" all PID's have to be entered, that shall not be decrypted.*
In the column "PID-Drop list" all PID's are listed, that shall not be decrypted. The PID's can be given in decimal or hexadecimal format and have to be separated by a semicolon. The maximum number of PID's is 10.**
Individual CA modules have to be initialized once again before the CA services will be sent to the module. To do so the option "Reset CA-Modul" can be activated.

* "Other Audio Streams" includes all AC3-, DTS- and AAC-Streams. „Private Streams" selects all streams which are not captured by the other selection fields.
** Particularly Pid's can be given here, which are active only at times and no authorisation for decryption is available for them.

8.6 Multi-decryption test (menu 5)



First all services, which are saved in the CA-service-list, will be tested for the current decryption status.



TWIN Terr.-Streamer, TSI 108
(9741.01 / 00), Address 01 / 00

Program name	Decoding settings	Status
ORF1 dec.PID's:5	Service completely	OK Info
ORF2 dec.PID's:5	Service completely	OK Info
ATV dec.PID's:4	Service completely	OK Info

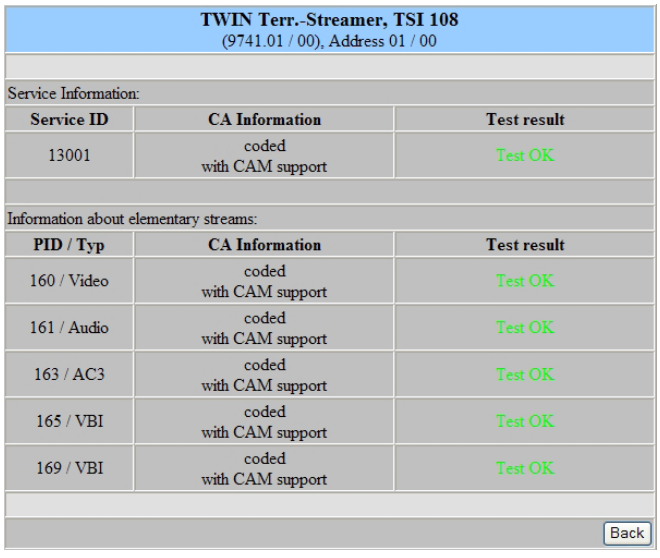
dec.PID's total:14

☐ Clear entries

Selection | Testing selection | Transmit / Back

After the end of the test the multi-decryption menu (menu 3) appears, where in the “Status“-column the test result of the respective service is stated by using the “Info“ button, the relevant information page of the test (menu 6) is displayed.
By clicking of the “Transmit/ Back“ button all settings are transmitted. The “Selection“ button routes back to menu 4 to correct input values, e.g. too much PID‘s were selected.

8.7 Multi-decryption test information (menu 6)



TWIN Terr.-Streamer, TSI 108
(9741.01 / 00), Address 01 / 00

Service Information:

Service ID	CA Information	Test result
13001	coded with CAM support	Test OK

Information about elementary streams:

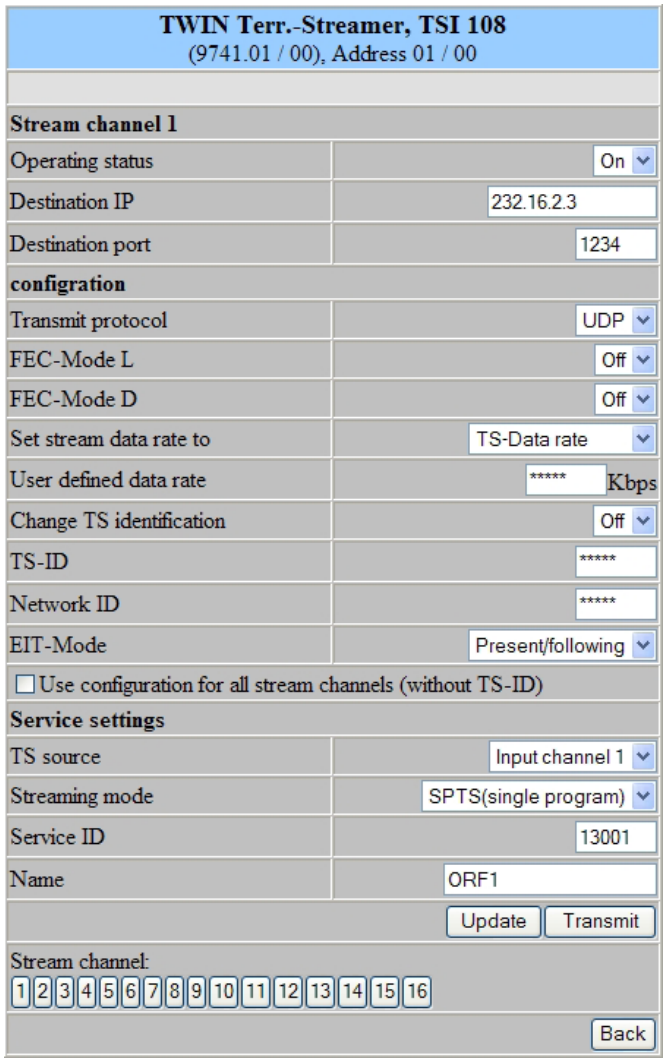
PID / Typ	CA Information	Test result
160 / Video	coded with CAM support	Test OK
161 / Audio	coded with CAM support	Test OK
163 / AC3	coded with CAM support	Test OK
165 / VBI	coded with CAM support	Test OK
169 / VBI	coded with CAM support	Test OK

Back

Name of device, item number, address in head end

On this page informations about the test result of the selected service are displayed. First the final result of the test with service ID and CA information is listed, than for each requested PID the type, the CA information and the test result.

8.8 Extended settings of the stream channels 1 ... 16 (menu 7)



Name of device, item number, address in head end

Stream channel x displays the channel, that will be adjusted
Operating status selection: On/ Off
Destination IP input of the destination IP number
Destination port input of the destination port
In selecting the destination port please note a distance of 5, if FEC modes were activated.

configuration
Transmit protocol selection: RTP, UDP
FEC-Mode L selection: Off, 1 ... 20
FEC-Mode D selection: Off, 4 ... 20
Set stream data rate to selection: User defined, TS-Data rate, Service data rate
User defined data rate input of the data rate in kbps (only if "Set stream data rate to user defined", adjustment range: 0..65535)
Change TS-Identification selection: On/ Off
TS-ID input of the TS-ID**
Network-ID input of the network ID**
EIT-Mode selection: EIT completly*, present/ following
Use configuration for all stream channels if box is clicked, all configuration settings are adopted for the other 15 stream channels

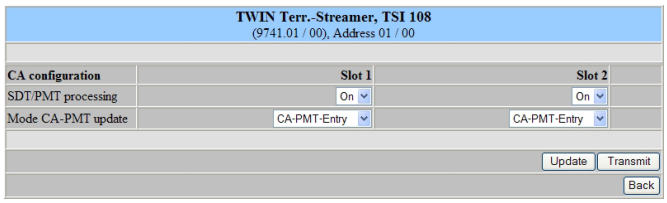
Service settings
TS-Source selection: input channel 1 or 2
Streaming Mode selection: SPTS (one programme), MPTS (all programmes)
Service ID adjustment range: 0..65535***
Name service name (max. 30 characters)

Stream channel routing to the next stream channel, that should be adjusted

* only selectable if "Change TS-Identification Off"
** input only if "Change TS-Identfication On" is selected
*** input only if "Streaming mode SPTS" is selected

The manual configuration of service settings is necessary only if the requested service is not available in the programme list. Normally all settings of the service are adopted when the service is selected in the list.
The EIT present/ following will be equipped with TS ID and network ID and is outputting unchangedly except the necessary CRC32 correction.

8.9 Extended settings (menu 8)

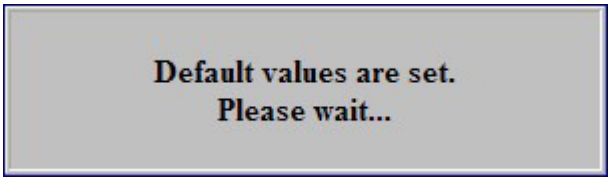


Name of device, item number, address in head end

CA-Configuration datas per slot
SDT/PMT-Proc. selection: On/ Off
Mode CA-PMT-Update selection: CA-PMT-Entry, CA-PMT-Listing

8.10 Factory settings (menu 9)

When this menu item is requested, at first a security query whether it really set all parameters to the factory default settings pops up.



Affirming the query, all settings stored in the EEPROM will be deleted and replaced by the default settings. The module will go back to these default values. In particular all network settings (IP address, subnet mask, gateway and destination IP per channel) are set on address 0.0.0.0 . Once the setting process is over, there will be an automatic return to the main menu. It takes about one minute.

8.11 Status of the device (menu 10)

TWIN Terr.-Streamer, TSI 108
(9741.01 / 00), Address 01 / 00

Input channel	**1**	**2**	
Status	*SYNC*	*SYNC*	
Frequency	305999	705997	kHz
Noise margin	2.2	12.0	dB
BER	< 1 E-6	< 1 E-6	
Parameters	Modulation: 64 QAM Guard-Intervall: 1|4 FEC: 7|8 FFT: 8 K	Modulation: 16 QAM Guard-Intervall: 1|4 FEC: 2|3 FFT: 8 K	

Common Interface	**Slot 1**	**Slot 2**
Decoder status	No messages available	No messages available

IP-Output	**Name**	**Status**	**Data rate**
Stream channel 1	ORF1	To be running	8470 Kbps
Stream channel 2	ORF2	To be running	8845 Kbps
Stream channel 3	ATV	To be running	3033 Kbps
Stream channel 4	(MPTS) TS:1	To be running	19683 Kbps
Stream channel 5	ZDF	To be running	5815 Kbps
Stream channel 6	3sat	To be running	3611 Kbps
Stream channel 7	neo/KiKa	To be running	3462 Kbps
Stream channel 8	ZDFinfokanal	To be running	2271 Kbps
Stream channel 9	(MPTS) TS:2	To be running	12704 Kbps
Stream channel 10	empty	deactivated	*****
Stream channel 11	empty	deactivated	*****
Stream channel 12	empty	deactivated	*****
Stream channel 13	empty	deactivated	*****
Stream channel 14	empty	deactivated	*****
Stream channel 15	empty	deactivated	*****
Stream channel 16	empty	deactivated	*****

Data rate IP output	200998 Kbps

Information	
System status	No messages available
Temperature externally	100
Temperature internally	104
Device number	0000000
Device index	00

Update Back

Name of device, item number, address in head end

Input channel displays datas for channel 1 and 2
Status displays whether **SYNC**hronization or **noSYNC**hronization with input
Frequency displays adjusted really input frequency in kHz
Noise margin displays in dB
BER bit error rate
Parameters displays modulation, guard intervall, FEC, FFT size

Common Interface displays per slot
Decoder status displays available messages

IP-Output displays status and data rate per stream channel
An error indicator in the “Status“ column has generally indicate a too low data rate choosen.

Data rate IP output displays data rate

Information
System status displays available messages
Temperature externally displays external temperature of the device
Temperature internally displays internal temperature of the device
Device number display of the device number
Device index display of the device index (hardware)

8.12 Software overview (menu 11)

TWIN Terr.-Streamer, TSI 108 (9741.01 / 00), Address 01 / 00	
Version	
AP-Controller	9741.01-81.01 Steuercontroller Anschluß-LP V1.00 27.04.2010 JR,JH
CA Bootcontroller	9730.01-88.01 FPGA Boot Controller(2) V1.01 11.11.2009 JR
CA FPGA-Image	9740.01-87.02 FPGA CA-Controller V0.03 27.04.2010 WE
CA NIOS-Application	9740.01-90.03 TS-CA-Manager V1.03 09.04.10 S.
IP Bootcontroller	9730.01-88.01 FPGA Boot Controller(1) V1.01 11.11.2009 JR
IP FPGA-Image	9740.01-87.01 FPGA DualCore IP-CPU V1.02 09.03.2010 MF
IP NIOS-Application CPU1	9740.01-90.01 NIOS IP-CPU V1.03 21.04.2010 AS
IP NIOS-Application CPU2	9740.01-90.02 NIOS TS-CPU V1.03 21.04.2010 MF
	Back

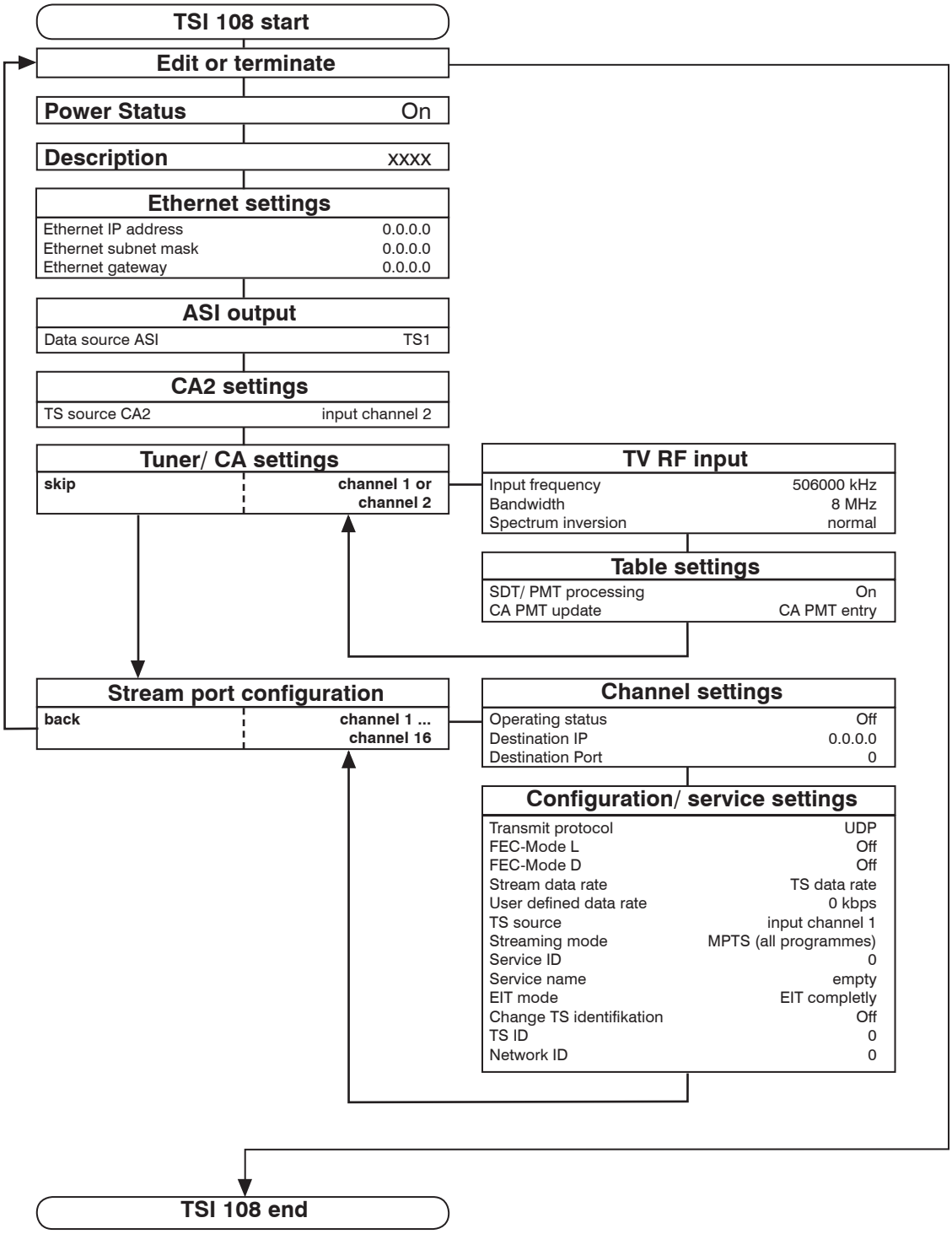
Name of device, item number, address in head end

Software versions
Displays the software versions for the controllers as follows:

- Controller of terminals board
- CA-Bootcontroller
- FPGA CA-Controller
- TS-CA-Manager
- IP-Bootcontroller
- FPGA IP-Controller
- IP-CPU
- TS-CPU

9. Manual menu control at the Headend Controller (HCB x00)

The values in the blocks settings are the default values. After pushing the button “default“ settings on the main page, all settings stored in the EEPROM are erased and reset to default values. The device is set to these values again (see also chapter 8.10).

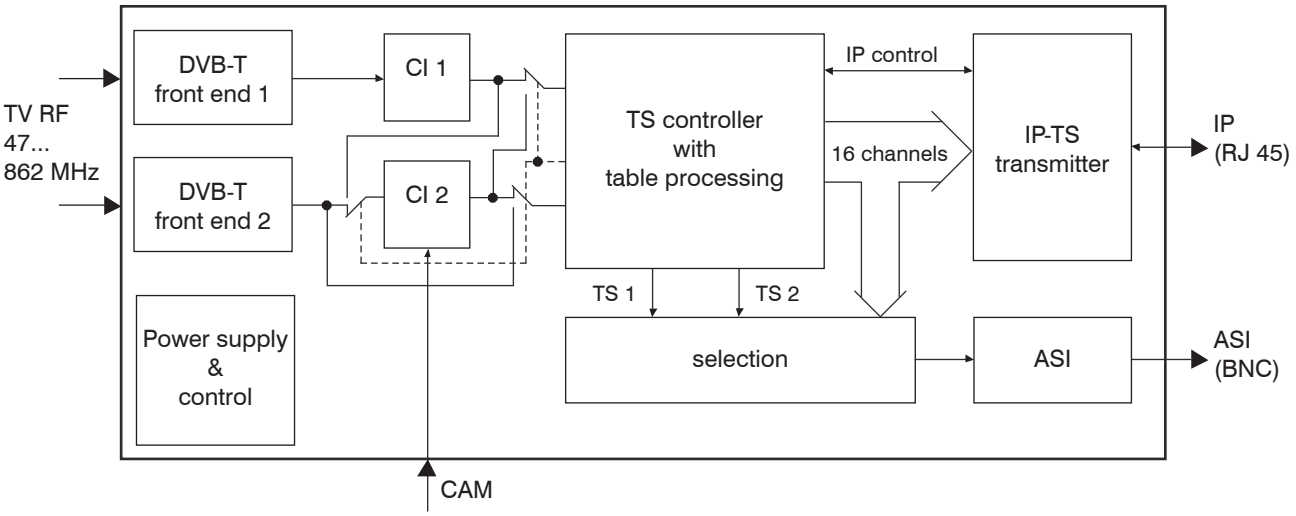


10. Trap messages

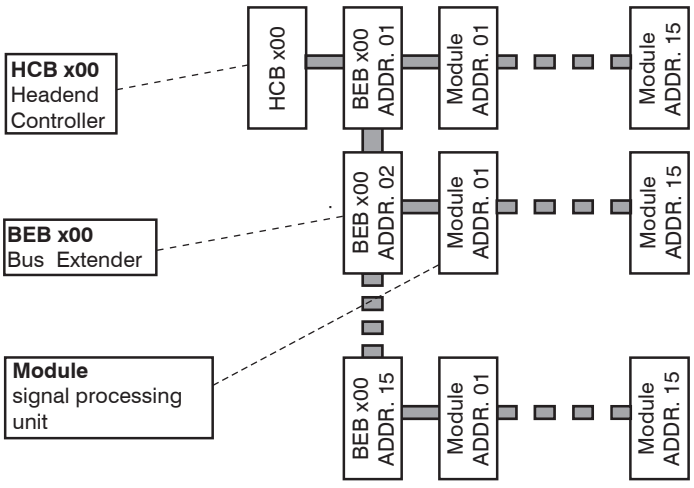
Item	Message	Message type	Explanation
01	Input sync	INFORMATION	input synchronized
02	Input not sync	WARNING	input not synchronized
03	IIC error	CRITICAL	IIC bus or hardware error

Item	Message	Message type	Explanation
04	System reset	WARNING	reset by internal error
05	Internal controller reset	WARNING	error when accessing internal controller
06	Power fail	CRITICAL	power supply error
07	Communication CA-Controller lost	WARNING	error when accessing CA controller
08	Communication IP-Controller lost	WARNING	error when accessing IP controller
09	IP-Streamer fail	WARNING	error in IP streamer
10	IP-Streamer ok	INFORMATION	IP streamer working properly
11	Decoding of service ... fail	WARNING	error on descrambling of service...
12	Decoding of service ... ok	INFORMATION	descrambling of service ... ok

11. Block diagram

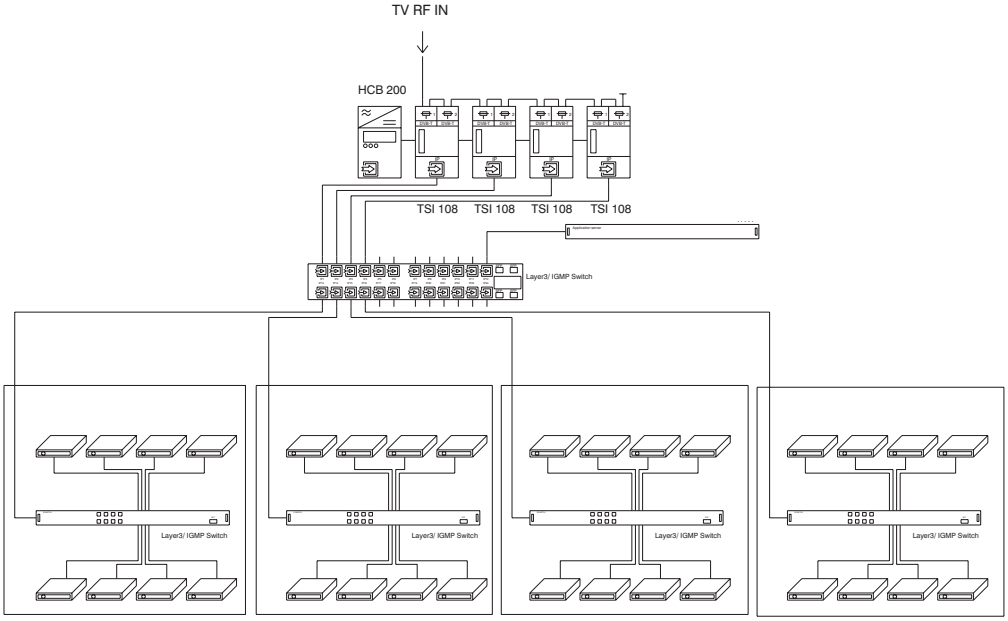


12. Head end bus structure



The number of the possible module connections (00 ... 15) to a BEB x00 depends on the total power consumption of this line!

13. Application example



14. Technical data

VHF/UHF input

Frequency range	47...862 MHz
Frequency step	166.666 kHz, 62.5 kHz
AFC range	± 500 kHz, ± 125 kHz
Input level (AGC)	44 ... 85 dBµV
Minimum input level	
(GI=1/32, BER=2*10^{-4} , Gaussian Channel, typical)	
Code rate	QPSK / 16-QAM / 64-QAM
1/2	30 / 36 / 41 dBµV
2/3	32 / 38 / 44 dBµV
3/4	33 / 39 / 45 dBµV
5/6	34 / 40 / 46 dBµV
7/8	35 / 41 / 47 dBµV

COFDM demodulator/ decoder

Carrier mode	2k, 8k
Code rate	1/2, 2/3, 3/4, 5/6, 7/8
Protection class	1/4, 1/8, 1/16, 1/32
Modulation	QPSK, 16 QAM, 64 QAM
Signal processing	EN 300744 (DVB-T) [1]

ASI output

Data rate	270 Mbps
Polarity	normal
Mode	burst
TS data rate	according adjustments of the stream channel
TS mode	188 Bytes
Output voltage	800 mV$_{pp}$ ± 10 %
Connector	BNC socket
Impedance	75 Ω
Signal processing	EN 50083-9 [2]

Decryption interface

Common Interface	PCMCIA-Slot according EN 50221 [3]
Operating voltage	5 V
Multi-Service decryption	24 services max.

IP output

Network connection (LAN/WAN)	Ethernet, 10/100/1000 Base-T
Plug connection	RJ 45
Protocols	UDP, RTP, ARP
Additional error correction	pro-MPEG Code of practise 3 rev. 2 [4]
Encapsulation	according ETSI TS 102034 [5]

Operating parameters

Voltage/ current (w/o CAM)	12 V (± 0.2 V)/ 700 mA
Residual ripple of supply voltage	≤ 10 mV$_{pp}$

Environmental conditions

Temperature range	-10 ... +55 °C
Temperature range for data keeping	5 ... 45 °C
Relative humidity	≤ 80 % (non condensing)
Method of mounting	vertical
Location of mounting	splash-proof and drip-proof

Miscellaneous

Dimensions (l x w x h)	
without 19”-adapter	50 x 276 x 148 mm
with 19”-adapter	50 x 301 x 148 mm
Weight	1,350 g

Delivery content

1 x bus connector
2 x F connecting cable 140 mm

15. Glossary

AAC	**A**dvanced **A**udio **C**oding
AC3	**A**daptive Transform **C**oder **3** (multi channel audio system of company Dolby)
AFC	**A**utomatic **F**requency **C**ontrol
AP	**A**nschluss**pl**atte (front terminal board)
ARP	**A**ddress **R**esolution **P**rotocol
ASI	**A**synchronous **S**erial **I**nterface
BER	**B**it **E**rror **R**ate
CA	**C**onditional **A**ccess
CAM	**C**onditional **A**ccess **M**odule
CATV	**Ca**ble **Tele**vision
CI	**C**ommon **I**nterface
CCIR	**C**omité **C**onsultatif **I**nternational des **R**adiocommunications
COFDM	**C**oded **O**rthogonal **F**requency **D**ivision **M**ultiplex
DTS	**D**igital **T**heater **S**ystems (multi channel audio system of company with the same name)
DVB	**D**igital **V**ideo **B**roadcasting (-C Cable, -S Satellite, -S2 Satellite 2, -T Terrestrial)
EIT	**E**vent **I**nformation **T**able
FEC	**F**orward **E**rror **C**orrection
FFT	**F**ast **F**ourier **T**ransformation
FPGA	**F**ield **P**rogrammable **G**ate **A**rray
GbE	**G**iga**b**it-**E**thernet
GI	**G**uard **I**ntervall
HTML	**H**yper**t**ext **M**arkup **L**anguage
HTTP	**H**yper**t**ext **T**ransfer **P**rotocol
IANA	**I**nternet **A**ssigned **N**umbers **A**uthority
ID	**Id**entifier
IF	**I**ntermediate **F**requency
IIC	**I**nter-**I**ntegrated **C**ircuit (I^2C-Bus, data bus within device)
IP	**I**nternet **P**rotocol
LED	**L**ight **E**mitting **D**iode
MC	**M**icro**c**ontroller
MIB	**M**anagement **I**nformation **B**ase
MPEG	**M**oving **P**icture **E**xperts **G**roup
MPTS	**M**ulti **P**rogram **T**ransport **S**tream
QAM	**Q**uadrature **A**mplitude **M**odulation
QPSK	**Q**uadrature **P**hase **S**hift **K**eying
PAT	**P**rogram **A**ssociation **T**able
PCR	**P**rogram **C**lock **R**eference
PER	**P**acket **E**rror **R**ate
PID	**P**acket **I**dentifier
PMT	**P**rogram **M**ap **T**able
PLL	**P**hase-**l**ocked **l**oop
RF	**R**adio **F**requency
RTP	**R**ealtime **T**ransport **P**rotocol
SDT	**S**ervice **D**escription **T**able
SNMP	**S**imple **N**etwork **M**anagement **P**rotocol
SPI	**S**erial **P**eripheral **I**nterface
SPTS	**S**ingle **P**rogram **T**ransport **S**tream
TS	**T**ransport **S**tream
TV	**Tele**v**i**sion
UDP	**U**ser **D**atagram **P**rotocol
UHF	**U**ltra **H**igh **F**requency
VHF	**V**ery **H**igh **F**requency

16. Bibliography

[1] EN 300744: Digital Video Broadcasting (DVB) - Framing structure, channel coding and modulation for digital terrestrial television (Endorsement of the English version EN 300744 V1.6.1 (2009-01) as German standard)

[2] EN 50083-9: Cabled distribution systems for television, sound and interactive multimedia signals, part 9: Interfaces for CATV/SMATV head ends and similar professional equipment for DVB/MPEG-2 transport streams

[3] EN 50221: Common interface specification for conditional access and other digital video broadcasting decoder applications; German version EN 50221:1997 + Corrigendum:2000

[4] SMPTE 2022-1: Forward Error Correction for Real-Time Video/Audio Transport Over IP Networks, 2007

[5] ETSI TS 102034: Digital Video Broadcasting (DVB); Transport of MPEG-2 TS Based DVB Services over IP Based Networks, Ver. 1.4.1, 2009-08-04

[6] EN 60728-11: Cable networks for television signals, sound signals and interactive services Part 11: Safety (IEC 60728-11:2005); German version EN 60728-11:2005

[7] RFC 1157 Request for Comments (RFC): RFC Database URL: http://www.rfc-editor.org/rfc.html

[8] ETSI TS 102034: Digital Video Broadcasting (DVB); Transport of MPEG-2 TS Based DVB Services over IP Based Networks, Ver. 1.4.1, 2009-08-04

17. Document history

Version	Date	Modification	Author
1.00	07.04.2010	Basic document	Häußer

Options available upon request! Subjects to changes due to technical progress.

CE Declaration of Conformity

The Manufacturer

BLANKOM Antennentechnik GmbH · Hermann-Petersilge-Str. 1 · 07422 Bad Blankenburg · Germany

herewith declares the conformity of the product

Product name:	TWIN Terrestrial Streamer
Type:	TSI 108
Product number:	9741.01

according to the following regulations

EN 50083-2
EN 60728-11 (as far as relevant)

and additional device-specific regulations, enclosed above, which this product is subjected to.

Date: 07.04.2010

Signature:

(Managing Director)