

# HD DVB-T/C Encoder/ Modulator

## ABI-MD3004SCT



- ✓ 4x HDMI full-HD video/audio input
- ✓ Integrated H.264 Encoder and DVB-T / DVB-C Modulator
- ✓ Programmable via user-friendly PC-software with GUI
- ✓ Works with any RF coax, fiber or TVoTP wideband amplifier/distribution network
- ✓ Very economic
- ✓ Plug-and-play robust alternative to HDMI extenders
- ✓ Building block for TV head-end
- ✓ Building block for Multisource Multiroom HD system
- ✓ Digital Signage, Hospitality, Residential, Public spaces

ABI-MD3004SCT is an integrated 4-source encoder/modulator that converts up to 4 Full-HD HDMI video/audio signals (from xDSL SetTopBox, Satellite receiver, Media player, PC, Blu-ray player, HD camera,...) to a DVB-T or DVB-C VHF or UHF signal, that can be received by any DVB-T or DVB-C compliant HD-SetTopBox or HD-TV tuner.

The device can be deployed in both private and professional environments:

- Send HD pictures and video in sports bars, fitness centres, stores, hotel lobby, travel station, waiting room,...
- Build a compact TV head-end for hotels, hospitality, trading rooms,...
- Create a reliable and flexible HD Multisource Multiroom residential distribution system
- Digital Signage

The small size allows easy integration into shallow enclosures, overhead plenum, furniture, switchboard panels. Units can be combined to create more channels.

---

## Contents

---

2	Contents
2	Safety
3	Application example
3	Characteristics
4	Installation
	Getting started
	Installing DTV management program
	Preparing the HDMI sources
	Preparing the MD3004
5	Launching the management program
	Launching the Management Program DTV
	Main buttons
	Establish USB Communication with DTV program
8	DVB-T or DVB-C configuration
	HDMI parameter setting
	Modulator parameter setting DVB-T (or DVB-C)
	Adding HDMI programs to the Modulator channels
	Disconnecting an HDMI source
12	Switching DVB-T / DVB-C
13	Appendix 1: Original Network ID per country (Europe)
14	Appendix 2: European Channel numbering
15	Appendix 3: Constellation versus Maximum Bitrate (DVB-T)

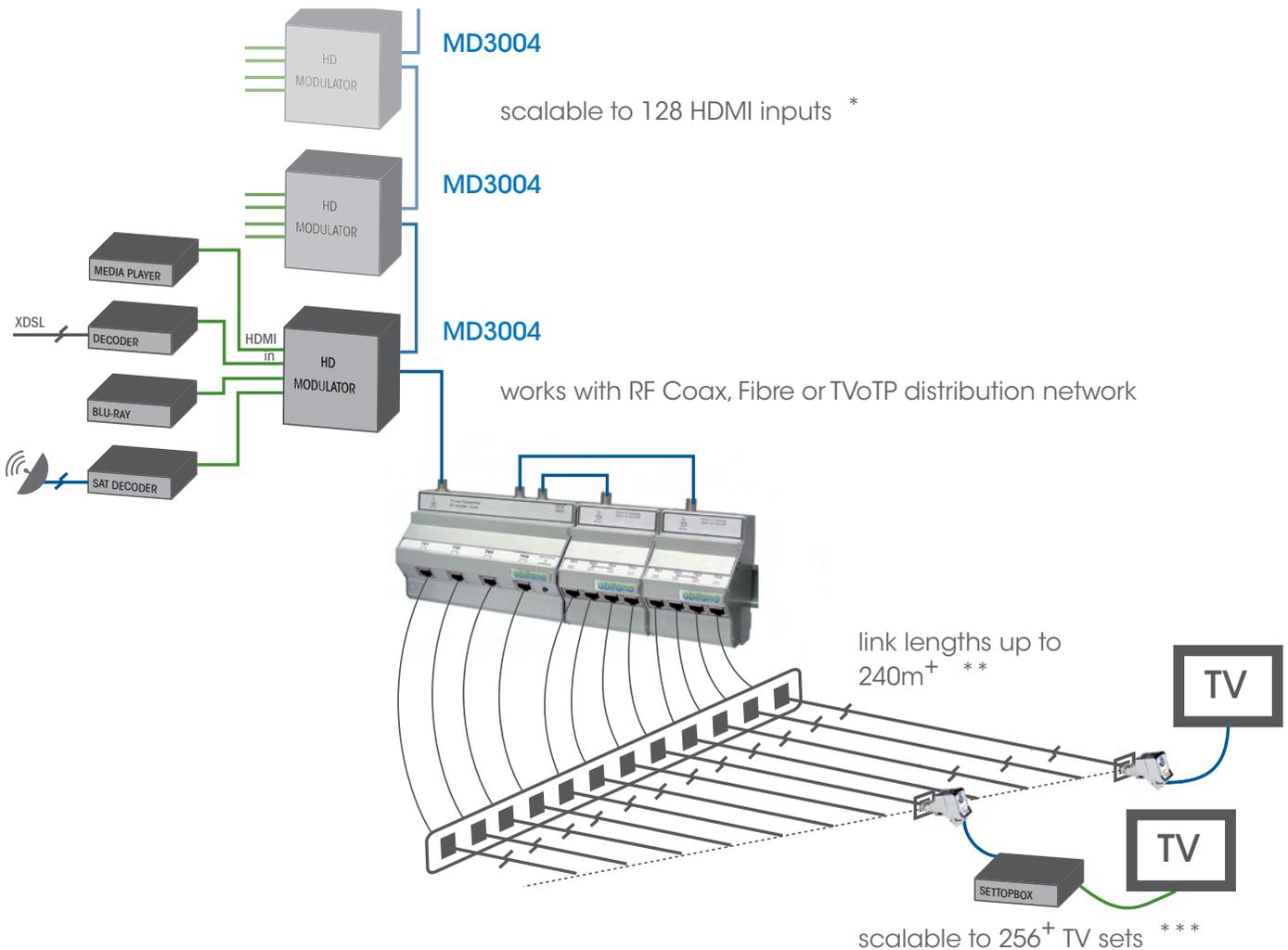
---

## Safety

---

- All the safety and operating instructions should be read before the product is operated.
- Slots and openings in the cabinet are provided for ventilation, to ensure reliable operation of the product and to protect it from overheating. These openings must not be blocked or covered.
- This product should be operated only from the type of power source delivered with the product.
- If an outside antenna or cable system is connected to the product, make sure the antenna or cable system is grounded to provide some protection against voltage surges and built-up static charges.
- For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna or cable system. This will prevent damage to the product due to lightning and power-line surges.
- Do not attempt to service this product yourself. Opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

## Application example



\* depends on infrastructure bandwidth

\*\* depends on cabling technology used

\*\*\* depends on cabling attenuation

## Characteristics

### Input signals

- Feedthrough VHF-UHF: RF 50-862MHz on F female connector
- Video & Audio inputs: 4x HDMI on 4 HDMI Type A female connectors

### Encoder

- Video resolution: 720p, 1080i@50Hz, 1080p@24Hz
- Video compression: H.264/MPEG-4 AVC
- Audio compression: MPEG-1 L2 (ISO/IEC 11172-3), AAC-LC
- Configurable: Programm name, SID, NID, LCN, EIT

### DVB-T Modulation (ETSI EN 300744)

- Number of carriers: 2K/8K
- Guard interval: 1/4, 1/8, 1/16, 1/32
- Code rate: 1/2, 2/3, 3/4, 5/6, 7/8
- Constellation: QPSK / 16, 64 QAM
- Frequency range: 170MHz to 230MHz and 470MHz to 862MHz
- 3 adjacent channels possible

### DVB-C Modulation (ETSI EN 300429)

- Constellation: 16, 32, 64, 128, 256QAM
- Frequency range: 50MHz to 862MHz
- 4 adjacent channels possible

### Output

- Output level: 75 to 95 dBµV
- Channel bandwidth: 6-8MHz
- MER: better than 35dB

### Dimensions

- WxHxD(mm): 250x200x38
- Weight: 0,6kg

### Power supply

- 5VDC, 17W
- 100-264VAC 50-60Hz adapter included

### Getting started

For simplicity, we'll call the ABI-MD3004SCT encoder modulator "MD3004" in this manual.

### Installing DTV management program

The management program comes as an executable file, and works on a PC from Windows 7 up to Windows 10. The PC should have a spare USB interface port to connect to the MD3004.

When you install the program, it is possible that at the end of the process, Windows tells you that the installation failed. Disregard this message as well and try running the program. If it does not work, try installing a second time.

### Preparing the HDMI sources

Please pre-configure the HDMI sources (video resolution and refresh rate, audio format and sampling speed) and check their proper operation directly on an HDMI screen before connecting them to the MD3004. Limit the HDMI output of the sources to max 1080p@24Hz. The resulting video bitrate can go as high as 12Mbps.

Please be aware that some video sources like Google Chromecast cannot be configured individually and will always start up at 1080p 60Hz. There is afterwards no possibility to turn down resolution or refresh rate. Please do not use this type of device.

It is very difficult to identify the nature of a signal distortion or failure on a end-to-end system if this step has not been done properly on forehand.

### Preparing the MD3004

The 4-input ABI-MD3004 is supplied with a 5V external power supply.

Install the unit properly, eventually ground the coax input to an equipotential safety ground.

Connect the RF output to the distribution network and the RF input to the aerial or to another MD3004's output in case a larger number of modulated signals is required.

Connect the power supply to mains.

Connect the 5V plug to the MD3004.

The front panel LED will light green, signalling that there is power supply.

Both rear panel's LEDs will light red during boot-up of the unit.

The LED adjacent to the HDMI inputs will start blinking green when the unit is ready to operate.

---

## Launching the management program

### Launch the Management Program DTV.

The start screen is now blank.



Configuration Menu buttons  
Main Menu buttons

## — Launching the management program —

### Main Menu buttons

On the left-hand side are 8 main-menu command buttons, explained below.

<b>PLEASE READ THE FUNCTIONS OF THESE BUTTONS CAREFULLY BEFORE USING THEM, THE EFFECT IS IMMEDIATE AND MAY STOP PROPER OPERATION OF THE UNIT FOR A PROLONGED PERIOD OF TIME.</b>	
	USB communication button: activates the dialog between PC and MD3004. When pressed, the right-hand screen fills with information and the layer-2 command buttons are activated.
	Sets up a communications link between the unit and a server, via the PC. This feature is NOT AVAILABLE at this time.
	Go-to-folder button
	Reboot button: pressing this button will IMMEDIATELY make the MD3004 cease operation and reboot. The result is loss of modulated signal for a period which can extend up to several minutes.
	Save config button: this button will open a browse window that allows saving the MD3004's present state as a configuration file in a folder of your own choice. It is recommended to do this before every change of configuration, in order to be able to go back to the original state.
	Get config button: this button will open a selection window that allows loading a previously saved configuration file to be uploaded to the MD3004, thus returning the unit to it's previous state.
	DVB-T/DVB-C switchover button: pressing this button will IMMEDIATELY force the MD3004 to reboot and switch from DVB-T mode (aerial symbol) to DVB-C (coax symbol). This switchover reboot takes up to 1 minute, be careful not to press this button accidentally. Please be patient and ignore the fact that the program may show "Not responding" on the top of it's window.
	Generate Report button: this button will open a browse window that allows saving the MD3004's operational data as a html-format report file in a folder of your own choice
<p><b>Be careful not to press these command buttons at random or during operation, without prior understanding of the consequences, because they will IMMEDIATELY execute and change the operation status of the unit.</b></p>	

## Launching the management program

### Establish USB Communication with DTV program

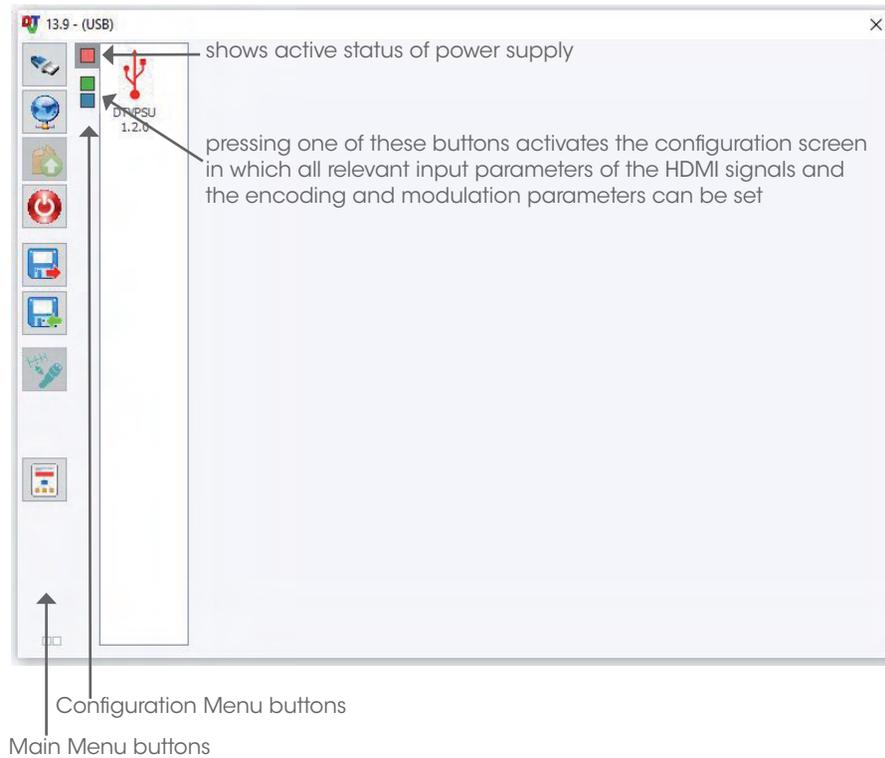
Connect the MD3004 to a PC's USB port with the supplied USB lead.

The DTV program immediately initiates the communication with the MD3004.

A message "Found, Getting configuration" is popping up briefly in the bottom left corner of the window.

If the communication cannot be established properly, a message "Found no hardware" is popping up briefly in the bottom left corner of the window.

You will now notice that the layer containing the Configuration Menu buttons becomes active



**PLEASE BE CAREFULL NOT TO INTERRUPT OR DISCONNECT THE USB COMMUNICATION DURING SWITCHOVER BECAUSE THIS CAN CAUSE YOUR PC TO CRASH (with possible loss of open file) AND THE MD3004 MAY END UP IN AN UNKNOWN STATUS**

## DVB-T or DVB-C configuration

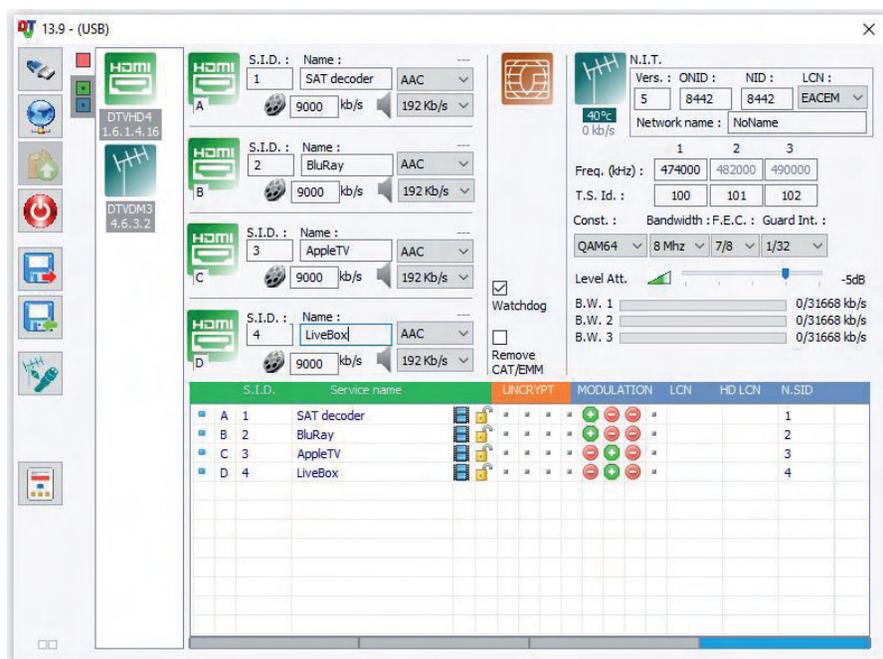
Activate the configuration screen by pressing one of the configuration menu buttons



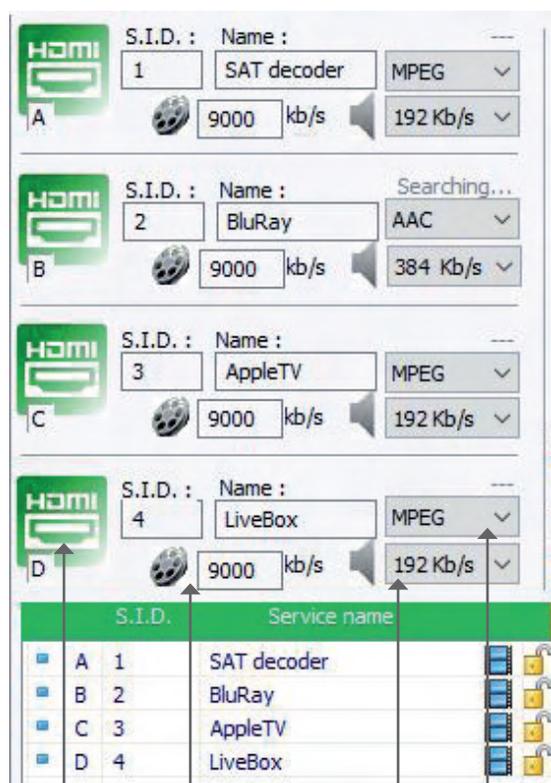
You will now see a 3-part screen.

The left section deals with the HDMI settings.

The right section with the DVB-T or DVB-C settings. (depending on the active mode)



### HDMI parameter setting



HDMI Input program

Audio format

Video bitrate

Audio bitrate

**S.I.D.:** enter here the Service ID number (should be an INTEGER)

**Name:** give a recognisable name that corresponds to the source, for example SAT decoder, Blu-Ray, AppleTV, MediaPlayer,...

**Audio format:** choose between AAC and MPEG

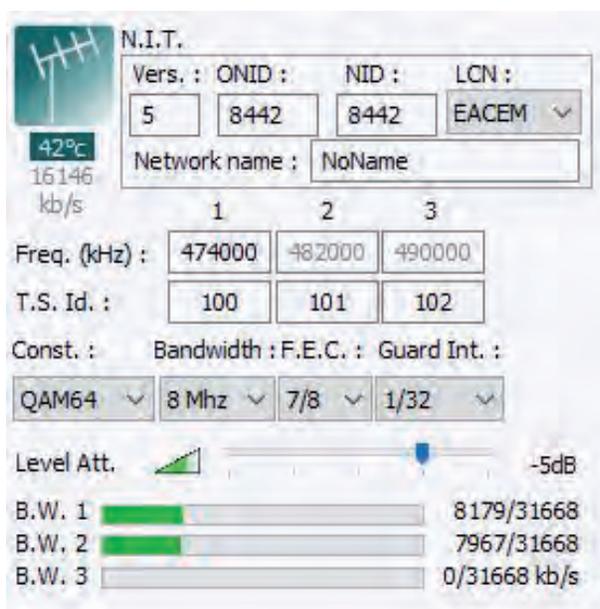
**Video bitrate:** select a value between 4000 and 12000 kb/s (should be an INTEGER)

**Audio bitrate:** select one of the drop-down values (128, 192, 256, 320, 384 kb/s)

## DVB-T or DVB-C configuration

### Modulator parameter setting DVB-T (or DVB-C)

(Right hand section of the screen)



#### N.I.T. (Network Information Table)

**Vers:** version number

**ONID. (Original Network ID):** corresponds to a country code.

Please consult the Appendix1 table to choose the proper decimal code for your country (example 8442=France, 8468 = Germany,...)

**NID (Network ID):** enter the same value as for ONID

**LCN (Logical Channel Number):** choose between EACEM, ITC and NORDIG systems. You can enter a distinct number for each of the sources directly in the table (bottom section of screen).

This is the number that the TV set will show on screen and use to organise the sequence of programs (in this example programs 11, 12, 13, 14).

The four HDMI input streams will be modulated in pairs (2 Transport Streams) on adjacent TV channels: up to 3 channels in DVB-T mode, up to 4 channels in DVB-C mode.

**Frequency:** by setting the frequency of the first channel, the frequency of the second, third and fourth channel is automatically computed by adding the channel bandwidth (usually 8MHz). Please use the proper frequencies according to the frequency plans used in the different regions of the world. For Europe, please consult the Appendix2 Table and select the centre frequency.

For VHF tuners, you can select channels in the range 170-230MHz, for UHF tuners in the range 470-858MHz

**T.S.Id (Transport Stream ID):** enter a distinct integer number for each of the transport streams.

**Const. (constellation):** In DVB-T modulation, you have the choice between three constellations: QPSK, QAM16 and QAM64, 2 bandwidths, 5 coding rates (FEC), and 4 guard interval choices.

Appendix 3 lists the achievable combined bitrate of the videostream for each of the constellation combinations.

The higher the QAM number, the more bandwidth you get for the videostream, but the modulated signal is more sensitive for interference.

**Bandwidth, F.E.C. and Guard Int.:** select the desired values

**Level Att.:** The output level of the RF modulated signals goes as high as 95dBµV. You can attenuate this signal by 20dB by using the slider:

**B.W.1, B.W.2, B.W.3, B.W.4 (Bandwidth):** indication of the bandwidth use on the TV channels chosen for the transport streams of the input signals.

S.I.D.		Service name	UNCRYPT	MODULATION	LCN	HD LCN	N.SID
A	1	SAT decoder					1
B	2	BluRay					2
C	3	AppleTV					3
D	4	LiveBox					4

TV channels for transport streams  
 Logical Channel Number  
 not relevant

## DVB-T or DVB-C configuration

### Adding HDMI programs to the Modulator channels

You can choose which HDMI stream goes to which channel, directly in the table (MODULATION) in the bottom section of the screen.

Before making this choice, the red "-" signs are all active.

S.I.D.	Service name	UNCRYPT	MODULATION	LCN	HD LCN	N.SID
A 1	SAT decoder	[-] [-] [-]	[-] [-] [-]			
B 2	BluRay	[-] [-] [-]	[-] [-] [-]			
C 3	AppleTV	[-] [-] [-]	[-] [-] [-]			
D 4	LiveBox	[-] [-] [-]	[-] [-] [-]			

You add a program (HDMI stream) to a modulator channel by double clicking on the Red "-" icon, which now becomes a Green "+"

Please be aware that the activation of the modulator will take approx.. 12 seconds. You will notice the effect as soon as the B.W. indicator starts working.

In the example below, stream A (Sat decoder) was activated onto channel 1. The video bitrate required for the stream is fluctuating (here 3988 Mb/s out of 31,668 Mb/s available is used up).

**HDMI**

S.I.D. :  Name :  MPEG

kb/s

Watchdog

Remove CAT/EMM

B.W. 1  3988/31668

B.W. 2  0/31668 kb/s

B.W. 3  0/31668 kb/s

S.I.D.	Service name	UNCRYPT	MODULATION	LCN	HD LCN	N.SID
A 1	SAT decoder	[-] [-] [-]	[+] [-] [-]			1
B 2	BluRay	[-] [-] [-]	[-] [-] [-]			
C 3	AppleTV	[-] [-] [-]	[-] [-] [-]			
D 4	LiveBox	[-] [-] [-]	[-] [-] [-]			

Since two Full-HD channels can use up to 12Mb/s each (24Mb/s combined), it is recommended to spread the 4 service streams over the channels.

In the example below, two streams are charged on channel 1, one stream on channel 2, one on channel 3. The available bitrate for each channel with this constellation combination is 31,668Mb/s.

**HDMI**

S.I.D. :  Name :  1080p60 - LPCM

kb/s

Watchdog

Remove CAT/EMM

B.W. 1  15597/31668

B.W. 2  7961/31668

B.W. 3  8341/31668

S.I.D.	Service name	UNCRYPT	MODULATION	LCN	HD LCN	N.SID
A 1	SAT decoder	[-] [-] [-]	[+] [-] [-]			1
B 2	BluRay	[-] [-] [-]	[+] [-] [-]			2
C 3	AppleTV	[-] [-] [-]	[-] [+] [-]			3
D 4	LiveBox	[-] [-] [-]	[-] [-] [+]			4

## DVB-T or DVB-C configuration

To illustrate the effect of constellation, we switch to the less efficient QPSK modulation scheme, in the modulator parameter settings (right hand section).

The available bandwidth is reduced to 10556 Mb/s per channel, the two HDMI streams A and B exceed the available bandwidth.

S.I.D.	Service name	UNCRYPT	MODULATION	LCN	HD LCN	N.SID
A 1	SAT decoder	» » » »	⊕ ⊖ ⊖	»		1
B 2	BluRay	» » » »	⊕ ⊖ ⊖	»		2
C 3	AppleTV	» » » »	⊖ ⊕ ⊖	»		3
D 4	LiveBox	» » » »	⊖ ⊖ ⊕	»		4

### Disconnecting an HDMI source

When one of the HDMI sources is disconnected from the unit's input, the bandwidth meter B.W. is not going down immediately, but the disconnection is signalled on the modulated channel by a message "No Video" on the TV screen.

## Switching DVB-T / DVB-C



DVB-T/DVB-C switchover button: pressing this button will IMMEDIATELY force the MD3004 to reboot and switch from DVB-T mode (aerial symbol) to DVB-C (coax symbol) or vice versa.

This switchover reboot takes time be careful not to press this button accidentally. The DVT software sends a command to the MD3004 to reboot in the other modulation mode.



The process takes up to 1 minutes please be patient.

**PLEASE BE CAREFULL NOT TO INTERRUPT OR DISCONNECT THE USB COMMUNICATION DURING SWITCHOVER!**

**THIS CAN CAUSE YOUR PC TO CRASH (with possible loss of open file) AND THE MD3004SCT TO END UP IN AN UNKNOWN STATUS**

---

## Appendix 1: Original Network ID per country (Europe)

---

Country	ONID
Australia	8228
Austria	8232
Belgium	8248
Taiwan	8350
Czech Rep	8395
Denmark	8400
Estonia	8425
Finland	8438
France	8442
Germany	8468
Indonesia	8552
Ireland	8564
Israel	8568
Italia	8572
Latvia	8620
Netherlands	8720
New Zealand	8746
Norway	8770
Philippines	8800
Poland	8808
Singapore	8894
Slovakia	8895
Slovenia	8897
South Africa	8902
Hungary	8903
Portugal	8904
Spain	8916
Sweden	8945
Switzerland	8948
UK	9018

## Appendix 2: European Channel numbering

European Band III allocations vary from country to country, with channels widths of 7 or 8 MHz. The standard European allocation is 7MHz wide .

European Bands IV and V are 8MHz wide. The spectrum for TV will be limited to 790MHz for 4G LTE, and a further reduction to 700MHz for 5G is being put up for vote.

Band III (7MHz)			
CH	low	high	centre
E5	174000	181000	177500
E6	181000	188000	184500
E7	188000	195000	191500
E8	195000	202000	198500
E9	202000	209000	205500
E10	209000	216000	212500
E11	216000	223000	219500
E12	223000	230000	226500

Band IV (8MHz)			
CH	low	high	centre
21	470000	478000	474000
22	478000	486000	482000
23	486000	494000	490000
24	494000	502000	498000
25	502000	510000	506000
26	510000	518000	514000
27	518000	526000	522000
28	526000	534000	530000
29	534000	542000	538000
30	542000	550000	546000
31	550000	558000	554000
32	558000	566000	562000
33	566000	574000	570000
34	574000	582000	578000
35	582000	590000	586000
36	590000	598000	594000
37	598000	606000	602000
38	606000	614000	610000

Band V (8MHz)			
CH	low	high	centre
39	614000	622000	618000
40	622000	630000	626000
41	630000	638000	634000
42	638000	646000	642000
43	646000	654000	650000
44	654000	662000	658000
45	662000	670000	666000
46	670000	678000	674000
47	678000	686000	682000
48	686000	694000	690000
49	694000	702000	698000
50	702000	710000	706000
51	710000	718000	714000
52	718000	726000	722000
53	726000	734000	730000
54	734000	742000	738000
55	742000	750000	746000
56	750000	758000	754000
57	758000	766000	762000
58	766000	774000	770000
59	774000	782000	778000
60	782000	790000	786000
61	790000	798000	794000
62	798000	806000	802000
63	806000	814000	810000
64	814000	822000	818000
65	822000	830000	826000
66	830000	838000	834000
67	838000	846000	842000
68	846000	854000	850000
69	854000	862000	858000

not in all countries

5G limitation

4G limitation

### Appendix 3: Constellation versus Maximum Bitrate (DVB-T)

Modulation	Code Rate	Guard 1/4	Guard 1/8	Guard 1/16	Guard 1/32
		Mb/s	Mb/s	Mb/s	Mb/s
QPSK	1/2	4.976471	5.529412	5.854671	6.032086
	2/3	6.635294	7.372549	7.806228	8.042781
	3/4	7.464706	8.294118	8.782007	9.048128
	5/6	8.294118	9.215686	9.757785	10.05348
	7/8	8.708824	9.676471	10.24567	10.55617
16 QAM	1/2	9.952941	11.05882	11.709341	12.06417
	2/3	13.27059	14.74510	15.61246	16.08556
	3/4	14.92941	16.58824	17.56401	18.09626
	5/6	16.58824	18.43137	19.51557	20.10695
	7/8	17.41765	19.35294	20.49135	21.11230
64 QAM	1/2	14.92941	16.58824	17.56401	18.0926
	2/3	19.90588	22.11765	23.41869	24.12834
	3/4	22.39412	24.88235	26.34602	27.14439
	5/6	24.88235	27.64706	29.27336	30.16043
	7/8	26.12647	29.02941	29.27336	31.66845

Discover the wealth of Abitana products on

---

**[www.abitana.com](http://www.abitana.com)**  
**[www.abitanadirect.com](http://www.abitanadirect.com)**  
**[info@abitana.com](mailto:info@abitana.com)**  
**Tel +32 (0)2 412 00 60**