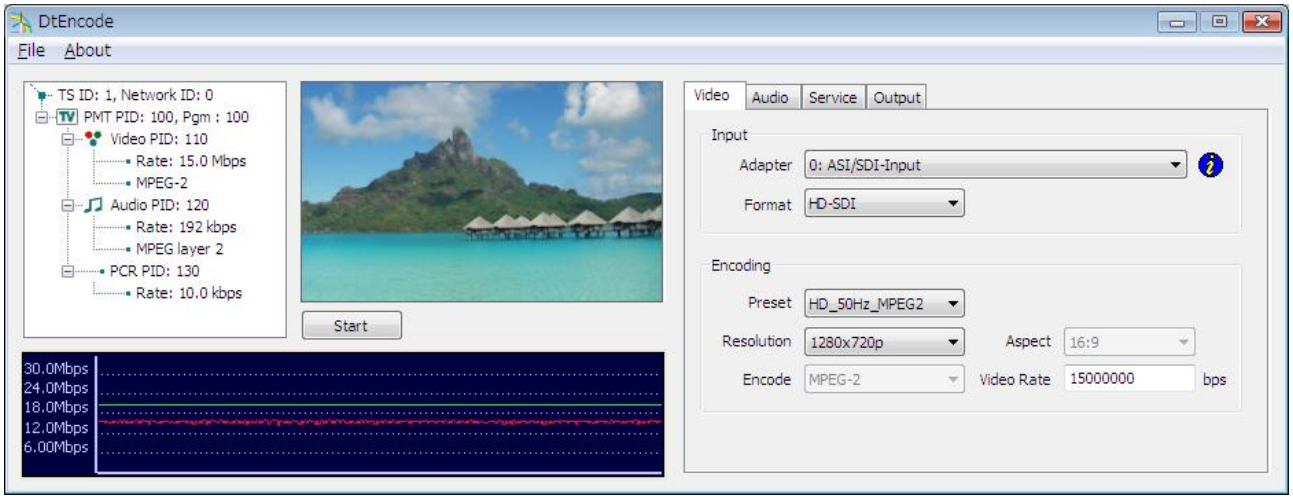
DTC-315 - DtEncode



Real-Time Video and

Audio Encoding Software

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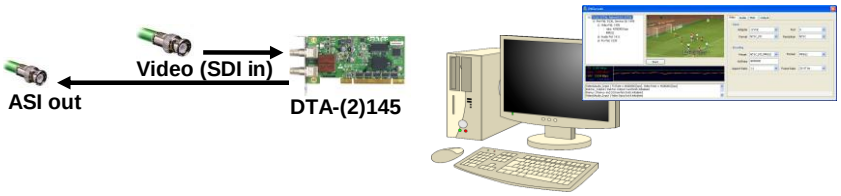
1. Introduction

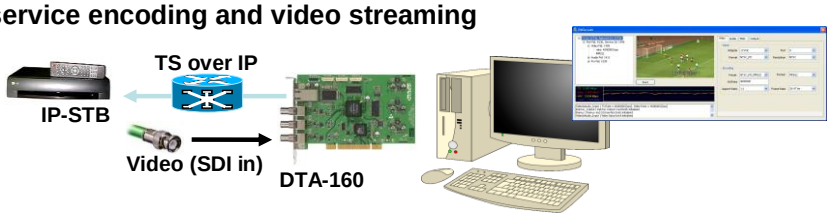
DtEncode is a cost-effective software package designed for real-time video and audio encoding. DtEncode is intended to be installed by the user on any qualifying PC and works in conjunction with DekTec input and output devices.

Some common practical applications that can be achieved using DtEncode are shown below:

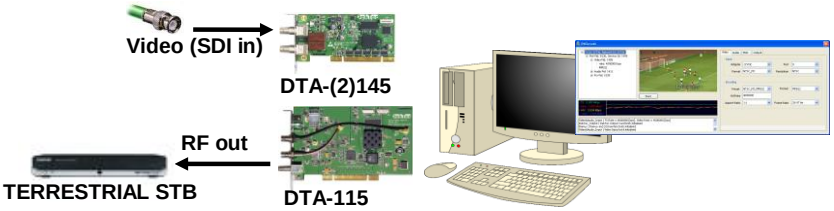
Live video capture and streaming from any DekTec output adapter



IP TV service encoding and video streaming



Local RF broadcasting



The application is designed in a user-friendly way. The GUI displays information about the incoming video source, the encoded Transport Stream composition and its rate, and provides all necessary controls for the configuration of video, audio, service and output encoding. Chapter 5 gives an overview of the GUI and details how to configure your DtEncode for your specific needs.

The application has integrated functionalities for continuous generation of SD (Standard Definition), HD (High Definition) and Mobile TV streams. Users can set-up continuous encoding from any DekTec SDI input adapter as well as from third party video capture board through DirectShow. The encoded stream can be played out from any DekTec output adapter.

The user can save and record DtEncode settings in an XML file.

DtEncode enables simple configuration to create a service including Elementary-Stream PIDs, Program/Service ID and TS ID as well as a Network ID. DtEncode only generates an SPTS (Single Program Transport Stream). For advanced re-multiplexing and TS configuration, it is advised to combine DtEncode with DekTec DTC-700 MuxXpert.

DtEncode permits fine tuning of parameters for DekTec output adapters and provides an adapted GUI depending on the type of adapter and the targeted output network.

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2. Specifications and Minimum Requirements

2.1. Minimum PC Requirements

Platform	Windows XP, Vista, Server 2003
Processor	● Core2 Duo 3.0GHz for 1xSD, ● Core2 Quad i7 processor is required for HD MPEG2 encoding ● Core2 Quad i7 3.03Ghz (or higher) processor is required for HD H264 encoding
RAM	512MB for 1xSD (minimum), 2GB for HD (minimum)

2.2. Supported DekTec Adapters

DtEncode supports the following DekTec output adapters:

Type	Description	Input(s)	Output(s)
DTA-102	DVB-SPI (LVDS) Output Adapter for PCI Bus		1x DVB-SPI
DTA-105	Dual DVB-ASI Output Adapter for PCI Bus	1x DVB-ASI**	1x DVB-ASI
DTA-107	DVB-S/S2 Modulator / Upconverter for PCI Bus		1x DVB-S/S2
DTA-110	QAM Modulator / UHF Upconverter for PCI Bus		1xQAM-A/B/C
DTA-110T	OFDM Modulator UHF Upconverter for PCI Bus		1x DVBT/H/ QAM/ISDBT/ ATSC/ DTMB
DTA-115	Multi-Standard Modulator with VHF/UHF Upconverter	1x DVB-ASI**	1x DVBT/H/ QAM/ISDBT/ ATSC/ DTMB
DTA-122	DTA-122 DVB-SPI (LVDS) Input Adapter for PCI Bus		
DTA-145	Multi-Purpose ASI/SDI Adapter for PCI Bus	1x SDI/ASI*	1x SDI/ASI
DTA-160	GigE TS-over-IP + 3 ASI Ports for PCI Bus	1x Gig-E 3x DVB-ASI**	
DTA-2144	Quad ASI/SDI Adapter for PCI Express	4x DVB-ASI**	
DTA-2145	Multi-Purpose ASI/SDI Adapter for PCI Express Bus	1x SDI/ASI*	1x SDI/ASI
DTU-245	ASI/SDI Input+Output USB Adapter***	1x SDI/ASI	1x SDI/ASI
DTE-3100	Networked DVB-ASI Output Adapter		1x DVB-ASI

* 2x Output, or 1x Input + 1x Output
** Bi-directional Input/Output ASI port
*** For DtEncode, the use USB adapters is only recommended for ASI outputs

DtEncode supports the following DekTec SDI input adapters:

Type	Description	Input(s)	Output(s)
DTA-124	Quad ASI/SDI Input Adapter for PCI Bus***	4x ASI/SDI	
DTA-145	Multi-Purpose ASI/SDI Adapter for PCI Bus	1x SDI/ASI*	1x SDI/ASI
DTA-2144	Quad ASI/SDI Adapter for PCI Express	4x SDI/ASI**	
DTA-2145	Multi-Purpose ASI/SDI Adapter for PCI Express Bus	1x SDI/ASI*	1x SDI/ASI
DTA-160	GigE TS-over-IP + 3 ASI Ports for PCI Bus	1x Gig-E 3x SDI/ASI****	

* 2x Output, or 1x Input + 1x Output
** bi-directional Input/Output ASI port
*** The DTA-124 can only support a maximum of three simultaneous SDI inputs

3. DtEncode Software Installation

3.1. Installation

The DtEncode software installation is self-explanatory. The "DtEncode SetUp.exe" program will guide you through the installation process.

The latest version of 'DtEncode SetUp.exe' can be found in the download section of the DekTec website, at http://www.dektec.com/downloads.

DtEncode requires the Dta1xx device driver for PCI cards or Dtu2xxx device driver for USB adapters. The setup program includes an option to install the Dta1xx/Dux2xxx device driver. It is recommended to always install the included driver. The installation process will automatically check the version number of the driver, and leave the current driver on the system if it is newer than the driver in the install package.

3.2. Cautions and Recommendations

- Virus-detecting software (e.g. Norton Internet Security, McAfee Internet security), Windows Update tasks or any wake-up or screen saver routines affect system performance especially when achieving continuous 24H encoding set-ups. This may result into DtEncode buffer overflow, data loss or data corruption, or discontinuity of video frames. Therefore it is recommended to disable any such software from your system.

4. DTC-325 DtEncode Revision History

Revision	Date	Change
V1.0.3.6	2010.04.06	• H264 SD and Multiplexing encoding performance improve • support for ViewCast Osprey latest drivers • support for IP detailed settings (FEC,..)
V1.0.2.5	2010.02.16	• Correction for selection of DekTec input adapter with multiple ports • Correction of DtEncode init failed when no sound device
V1.0.1.4	2010.02.01	• Modifications and correction for XML setting file • Support for Windows Vista and Windows 7 • Correction for QAM modulation output
V1.0.0.2	2009.12.02	• First release

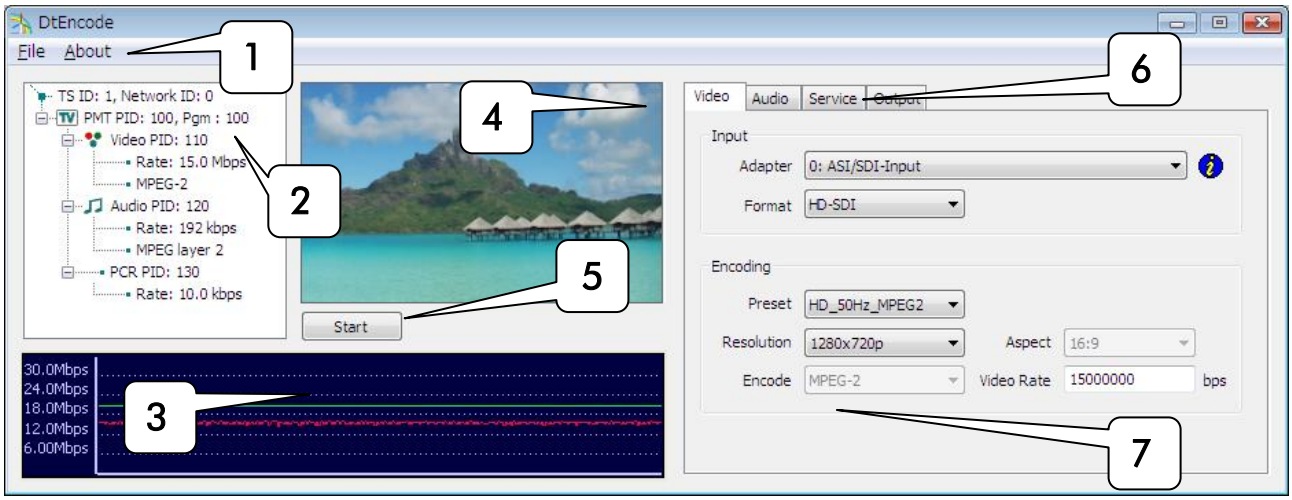
5. DtEncode Overview

5.1. Launching DtEncode

Start the DtEncode program from the Start Menu: **start->All Programs->DekTec->DtEncode**, or, if available from your desktop, click on the DtEncode shortcut.

DtEncode application icon:

5.2. DtEncode Application General Layout



Application general view

	Item	Explanation
1	Menu Bar	This area displays Menu controls.
2	TS Tree View	This area displays the hierarchical view of the resulting TS.
3	Rate Graph	This area displays in real time the TS bitrate (total rate) and the data bitrate.
4	Source Video Viewer	This window provides for visual monitoring of the input. When performing HD encoding, to reserve the maximum performance for the encoding process, this video monitor only refreshes every second.
5	Start Button	This button permits to Start/Stop the encoding process.
6	Tab Menu Bar	Four Tabs permit the configuration of various settings of DtEncode
7	Setting per Tab	This area provides detailed settings for video, audio, service and output configuration

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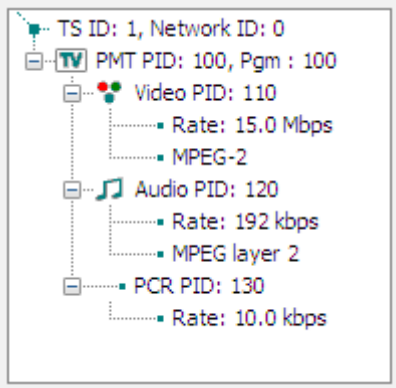
5.3. Menu Bar

The Menu Bar permits to store and save configuration files as wells as check common information (version, etc..) about the DtEncode application.

Menu	Sub-Menu	Explanation
File		Permits management of DtEncode configuration files (.xml)
	Load	A window will permit you to select the settings file to load
	Save	The current settings file will be saved to a destination of your choice
	Save As	The current configuration will be saved to a new file name and destination
About	About	You can verify the License Information. Version information, Copyright, URL

Please check Annex G for details about the XML structure of the configuration file XML.

5.4. TS Tree View



The TS Tree View shows the TS overall structure in a hierarchical view. It includes:

- TS global information: TS ID and Network ID

  The TS ID (16bits) extracted from the PAT and the Network ID (16bits) extracted from the NIT.

- Program/Service information

  PMT PID (13bits) as contained in the PAT and the Program/Service ID (16bits) as contained in the PAT and the PMT.

- Elementary stream information

  Elementary PID (13bits) values as defined in the PMT. Elementary PID can be Video PID, Audio PID, PCR PID, Data PID, Caption PID or other. For each Elementary Stream, bitrate (bps, kbps, Mbps) and the compression format (ex: "MPEG2") are indicated.

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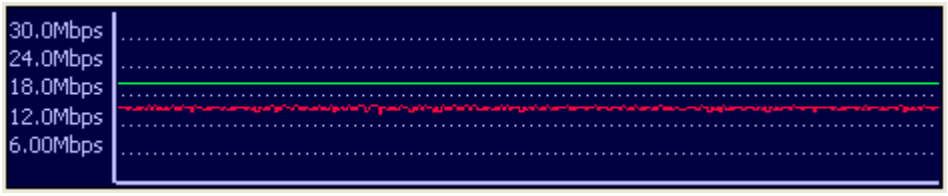
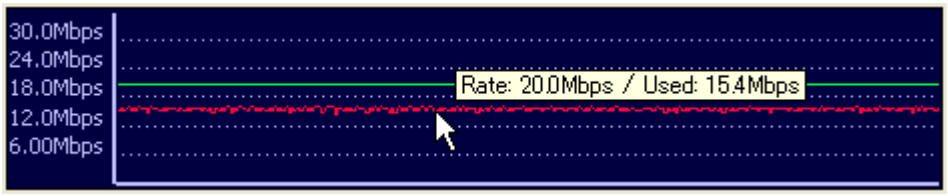
5.5. Rate Graph



This area displays the total TS rate (green) and data rate (red). The data date is equal to the total TS rate minus the rate of the null (or padding) packets:

"Data rate" = "Total TS rate" – "Null rate".

The horizontal axis shows the time while the vertical axis shows the TS rate on a scale that is adjusted automatically.



The TS rate and Used rate data rate) values are displayed in a tooltip if you hold the cursor above the graph.

5.6. Source Video Viewer

This window provides a real-time visual monitor for the input signal.

This screen will be black if there is no input signal, or no input synchronization, or if there is a problem with the input adapter. The refresh rate of this input window depends on the complexity of the encoding, and may be very slow for HD H264 encoding.

5.7. Start Button

These buttons can be used to Start and Stop the encoding process.

It is recommended to Stop and Start the encoding each time a setting is changed, so to permit the application to take into account the new changes.

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5.8. Settings Tabs

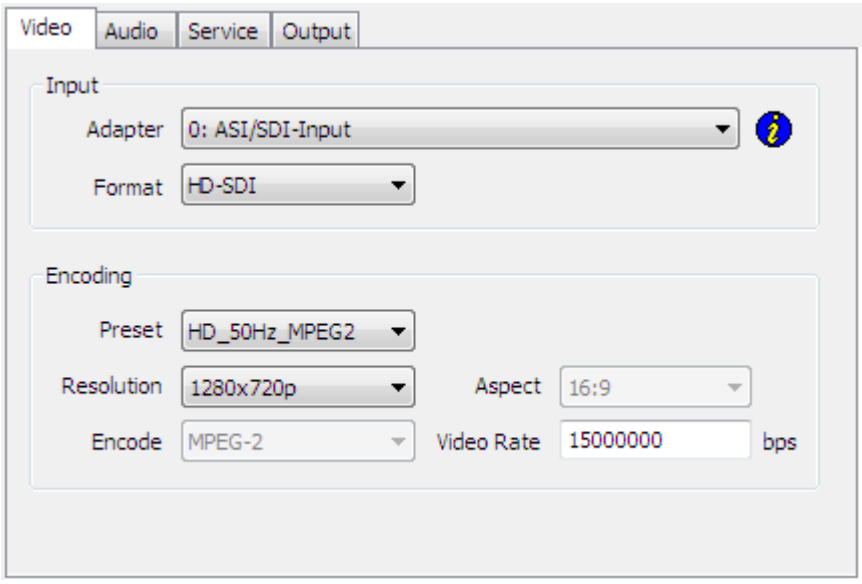
Through this menu, you can select one of four Tabs:

1. Video: Video Input and Video Encoding parameter configuration.
2. Audio: Audio Encode parameter configuration.
3. Service: Service Information parameter configuration.
3. Output: Output TS and Output Interfaces (ASI, RF…) parameter configuration.

5.9. Settings Screen

5.9.1 Video Parameter

This screen permits video input and video encoding configuration.



Details are as below:

Item1	Item2	Explanation
Input		This area permit to select the physical input for encoding
	Adapter	DtEncode detects automatically input hardwares supported by DtEncode (DekTec input adapters, third party video capture board…) and update the list of Adapter. For each adapters, following informations are reported. Format : [INPUT I/F TYPE (Product Name, PORT NUMBER)] For example : ASI/SDI-Input(DTA-145 port 1) DtEncode adds the current PC Screen capture input to the list of video inputs. **CAUTION: For the third party adapters (non DekTec), please sure that the video card is correctly detected on the system and that the latest drivers from this third party are used. Also, before using it with DtEncode, confirm firstly the normal**

<table>
<tr><td></td><td></td><td>reception of video by using the software tools provided by this third party.</td></tr>
<tr><td></td><td>Adapter Information</td><td>Please push (i) button if you want. You can display selected adapter information.</td></tr>
<tr><td></td><td>Format</td><td>This is the nature of the input signal. For DekTec adapter, DtEncode will detect automatically SD-SDI(PAL) or SD-SDI(NTSC), but other input signal are possible with third party video capture boards: Composite, Component, S-Video, HDMI, HDSDI.</td></tr>
<tr><td>Encoding</td><td></td><td>This area permits to configure the video encoding</td></tr>
<tr><td></td><td>Preset</td><td>A list of encoding Preset are available:
<table>
<tr><th>preset</th><th>res.</th><th>Encode</th><th>aspect , signal</th></tr>
<tr><td>SD_PAL_MPEG2</td><td>SD</td><td>MPEG2</td><td>4:3, PAL</td></tr>
<tr><td>SD_NTSC_MPEG2</td><td>SD</td><td>MPEG2</td><td>4:3, NTSC</td></tr>
<tr><td>SD_PAL_H264</td><td>SD</td><td>H264</td><td>4:3, PAL</td></tr>
<tr><td>SD_NTSC_H264</td><td>SD</td><td>H264</td><td>4:3, NTSC</td></tr>
<tr><td>HD_50Hz_MPEG2</td><td>HD</td><td>MPEG2</td><td>16:9, 50Hz</td></tr>
<tr><td>HD_59Hz_MPEG2</td><td>HD</td><td>MPEG2</td><td>16:9, 59.94Hz</td></tr>
<tr><td>HD_50Hz_H264</td><td>HD</td><td>H264</td><td>16:9, 50Hz</td></tr>
<tr><td>HD_59Hz_H264</td><td>HD</td><td>H264</td><td>16:9, 59.94Hz</td></tr>
<tr><td>1SEG_H264</td><td>QVGA</td><td>H264</td><td>16:9, 15.00 Hz</td></tr>
</table></td></tr>
<tr><td></td><td>Resolution</td><td>Specify the video resolution for encoding video.
Mobile : QVGA (320x180)
SD : SD (PAL), SD (NTSC)
HD : 1920x1080i, 1440x1080i, 1280x720p</td></tr>
<tr><td></td><td>Encode</td><td>Specify the Encoding Format MPEG2 or H.264
MPEG2 : ISO/IEC 13818-2
H.264 : ISO/IEC 14496-10</td></tr>
<tr><td></td><td>Aspect</td><td>Specify the Aspect Ratio for the resulting video
4:3 : SD
16:9 : SD and HD</td></tr>
<tr><td></td><td>Video Rate</td><td>This is the encoded video bitrate [bps]. You can edit this directly.</td></tr>
</table>

5.9.2 Audio Parameter

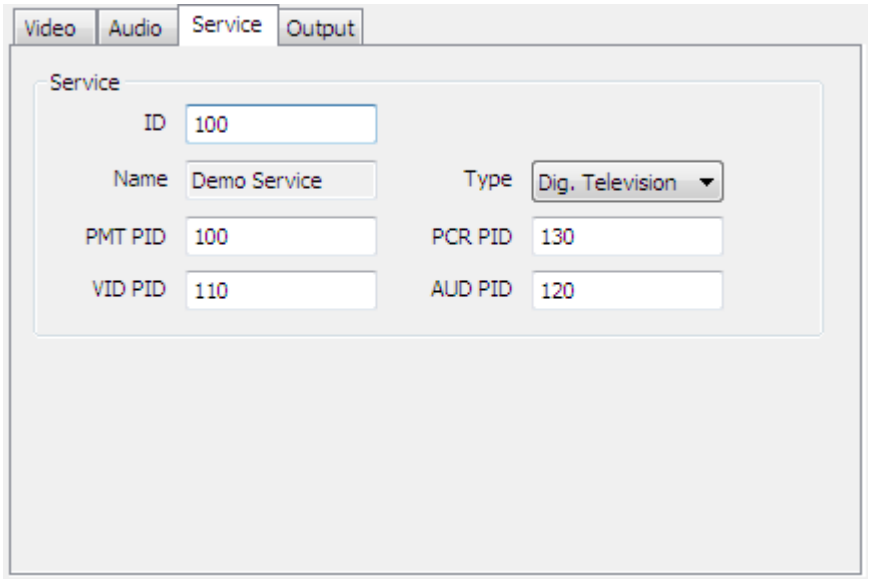
This screen permits audio encoding configuration.

Details are as below:

Item1	Item2	Explanation
Input		This area is to specify the audio input signal.
	Sampling	The sampling frequency[Hz] for audio data can be selected as 24000, 32000, 44100, 48000.
encoding		This area is to specify the audio encoding
	Encode	This is Encoding Format MPEG1-L2 or MPEG2-AAC MPEG Layer 2 : ISO/IEC 13818-3 MPEG1-Layer2 AAC : ISO/IEC 13818-7 MPEG2-AAC
	Audio Rate	This is Encoding Rate [bps]. 64000, 80000, 96000, 112000, 128000, 160000, 192000, 224000

5.9.3 Service Parameter

This screen permits configuration of the Service information.



Details are below:

Item1	Item2	Explanation
service		This area is to set service information.
	ID	This is Service ID (16bit). From 0 to 65535.
	Name	This is Service Name. (you can not edit.)
	Type	This is Service Type. (you can select Television, undefined)
	PMT PID	This is PMT PID (13bit). From 48 to 8190 by system.
	PCR PID	This is PCR PID (13bit). From 48 to 8190 by system.
	VID PID	This is Video PID (13bit). From 48 to 8190 by system.
	AUD PID	This is Audio PID (13bit). From 48 to 8190 by system.

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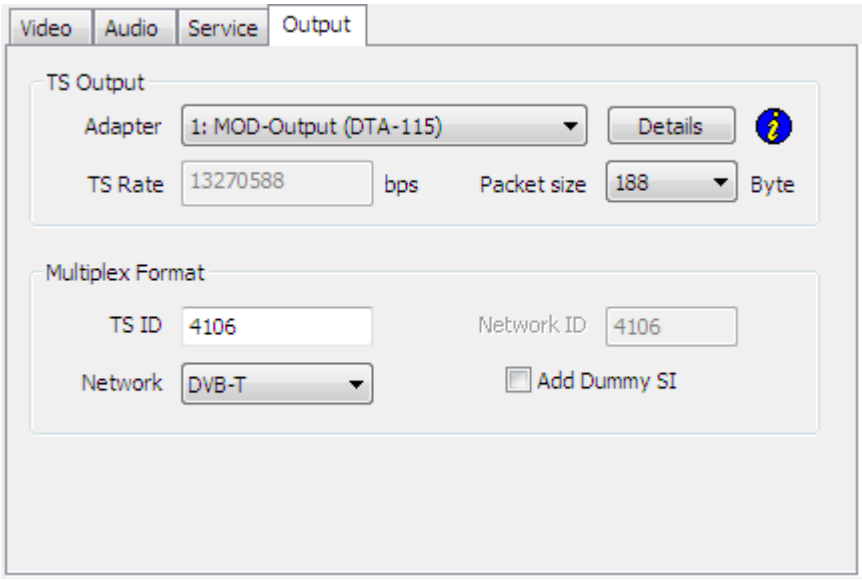
5.9.4 Output Parameter

This screen permits the output TS and the output adapter detailed configuration.



Details are as below

Item1	Item2	Explanation
TS Output		This area is to set physical output
	Adapter	This software detect automatically hardware(RF output board…). Format : [OUTPUT I/F TYPE (Product Name, PORT NUMBER)] For example : QAM-Output(DTA-110)
	Details	This is detail parameter for output I/F.
	Adapter Information	Please push (i) button if you want. You can display selected adapter information.
	TS Rate	This is TS Rate [bps]. You can edit this directly.
	Packet Size	This is TS Packet size. You can select 188byte, 204byte 188byte : Normal TS 204byte : TS + dummy(NULL) 16 byte
Multiplex Format	TS ID	This sets the TS ID(16bit). From 0 to 65535
	Network ID	This sets the Network ID(16bit). From 0 to 65535 (you can not set.)
	Network	This is Network type. You can select: -, ATSC, DTMB, DVB-C, DVB-T, DVB-S, ISDBT-ONESEG, ISDBT-FULLSEG, QAM-B, QAM-C, etc..
	Add Dummy SI	To add Dummy SI (necessary for reception by STB), check this “check box”.

6. Support Contact information

DtEncode is a joint development of **DekTec Digital Video B.V.** and **Village Island Co., Ltd.**
For assistance regarding the use of DtEncode contact us at:

Village Island Co., Ltd.
2-38-14, Okusawa, Setagaya-ku,
Tokyo 158-0083 Japan
Tel: +81 3 5654 7801
Fax: +81 3 5654 7802
email: support@village-island.com
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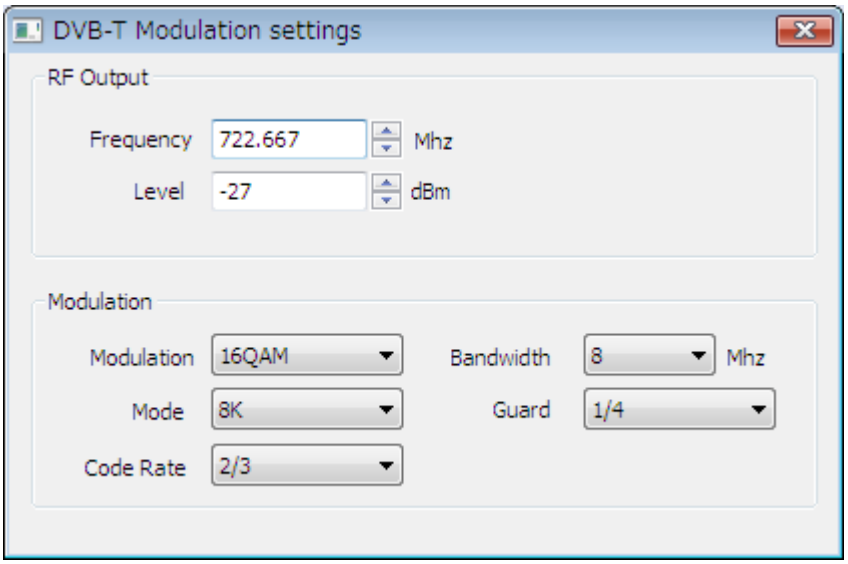
Fax: +31 35 683 10 15
email: support@dektec.com, info@dektec.com
website: http://www.dektec.com

Appendix A: DtEncode specific output controls for DVB-T (*)

When using adapters that supports DVB-T modulation, a detailed configuration window permits to fine tune the RF output.



DTA-115's DVB-T RF output settings window

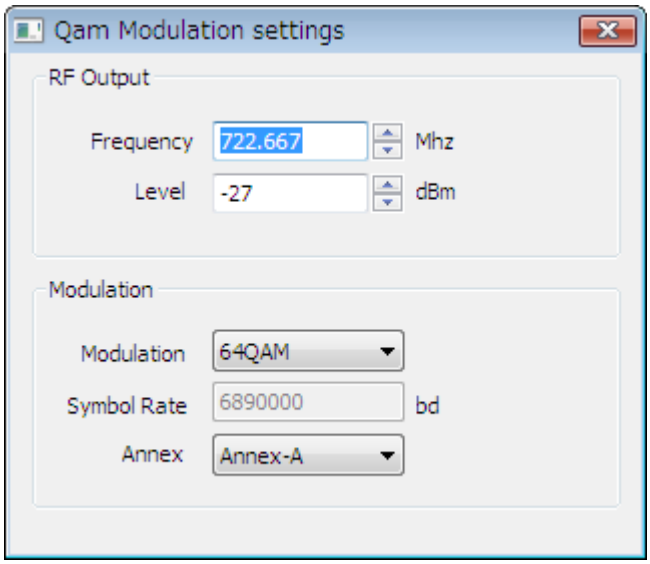
Item1	Item2	Explanation
RF Output		For RF parameters
	Frequency	This is output frequency [MHz] of the RF modulator. You can enter directly the value or use the spin button. (Check your hardware specification for available range of values)
	Level	This is output level [dBm] of the RF modulator (**). You can enter directly the value or use the spin button. The value should be between -27dBm and +3dBM
Modulation		For the Modulation parameters
	Modulation	You can select 16QAM, 64QAM or QPSK.
	Mode	You can select 2K, 4K or 8K
	Code Rate	You can select 1/2, 2/3, 4/5, 5/6, 7/8.
	Bandwidth	You can select 5Mhz, 6Mhz, 7Mhz, 8Mhz.
	Guard Interval	You can select 1/4, 1/8, 1/16 or 1/32.

(*) This is available if your output adapter supports this RF output.

(*) This is only available for DTA-115, DTA-112 and DTA-2115 output adapters

Appendix B: DtEncode specific output controls for QAM (*)

When using adapters that supports QAM modulation, a detailed configuration window permit to fine tune the RF output.



DTA-112's QAM RF output settings window

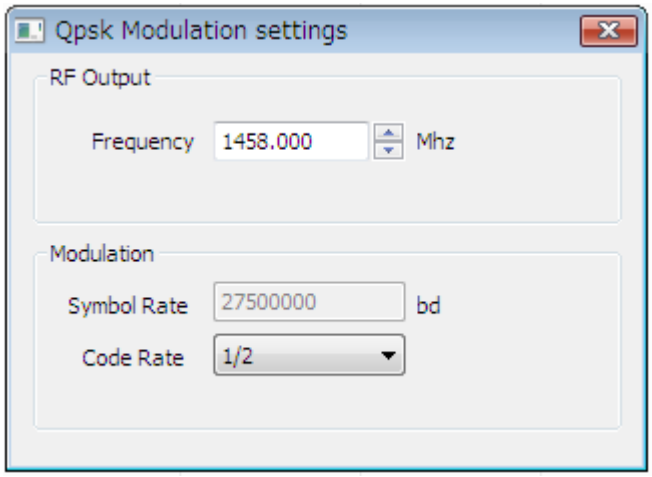
Item1	Item2	Explanation
RF Output		For RF parameters
	Frequency	This is output frequency [MHz] of the RF modulator. You can enter directly the value or use the spin button. (Check your hardware specification for available range of values)
	Level	This is output level [dBm] of the RF modulator (**). You can enter directly the value or use the spin button. The value should be between -27dBm and +3dBM
Modulation		For the Modulation parameters
	Modulation	You can select 64QAM or 256 QAM.
	Annex	You can select between Annex A, B, or C..

(*) This is available if your output adapter supports this RF output.

(**) This is only available for DTA-115, DTA-112 and DTA-2115 output adapters

Appendix C: DtEncode specific output controls for QPSK (*)

When using adapters that supports DVB-S QPSK modulation, a detailed configuration window permits to fine tune the RF output.



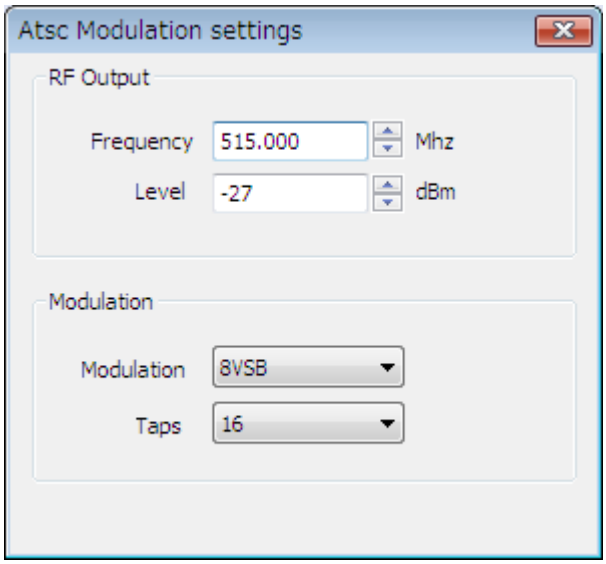
DTA-107's QPSK RF output settings window

Item1	Item2	Explanation
RF Output		For RF parameters
	Frequency	This is output frequency [MHz] of the RF modulator. You can enter directly the value or use the spin button. The value should be between 950Mhz and 2150Mhz
Modulation		For the Modulation parameters
	Modulation	You can select QPSK

(*) This is available if your output adapter support this RF output.

Appendix D: DtEncode specific output controls for ATSC (*)

When using adapters that supports ATSC modulation, a detailed configuration window permits to fine tune the RF output.



DTA-115's ATSC RF output settings window

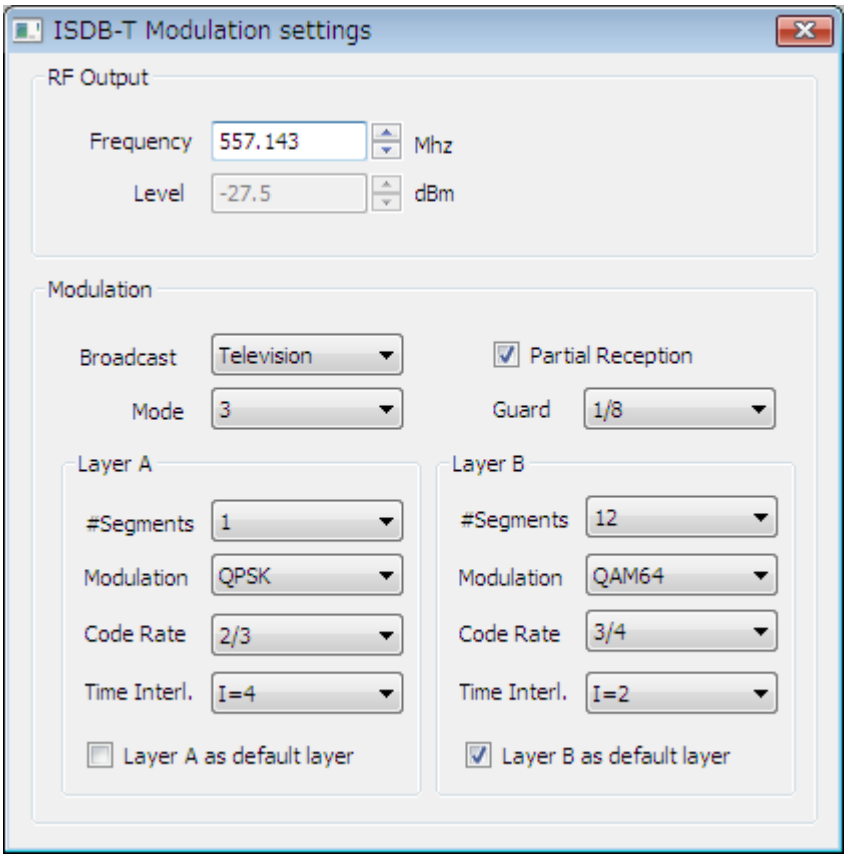
Item1	Item2	Explanation
RF Output		For RF parameters
	Frequency	This is output frequency [MHz] of the RF modulator. You can enter directly the value or use the spin button. (Check your hardware specification for available range of values)
	Level	This is output level [dBm] of the RF modulator (**). You can enter directly the value or use the spin button. The value should be between -27dBm and +3dBM
Modulation		For the Modulation parameters
	Modulation	You can select 8VSB or 16VSB
	Taps	The Taps permit to define a level of perfection for the modulation. Values range from 4 (lower quality, low CPU load) to 64 (best quality, high CPU load). (4, 8, 16, 32, 64)

(*) This is available if your output adapter support this RF output.

(**) This is only available for DTA-115, DTA-112 and DTA-2115 output adapters.

Appendix E: DtEncode specific output controls for ISDB-T (*)

When using adapters that supports ISDB-T modulation, a detailed configuration window permits to fine tune the RF output.



DTA-115's ISDB-T RF output settings window

Item1	Item2	Explanation
RF Output		For RF parameters
	Frequency	This is output frequency [MHz] of the RF modulator. You can enter directly the value or use the spin button. (Check your hardware specification for available range of values)
	Level	This is output level [dBm] of the RF modulator (**). You can enter directly the value or use the spin button. The value should be between -27dBm and +3dBM
Modulation		For the Modulation parameters
	Broadcast	You can select Digital Television, 1seg Radio, or 3seg Radio
	Mode	You can select between 1, 2 and 3.
	Partial Reception	You can check this if you use 1seg service.
	Guard Interval	You can select 1/4, 1/8, 1/16, 1/32

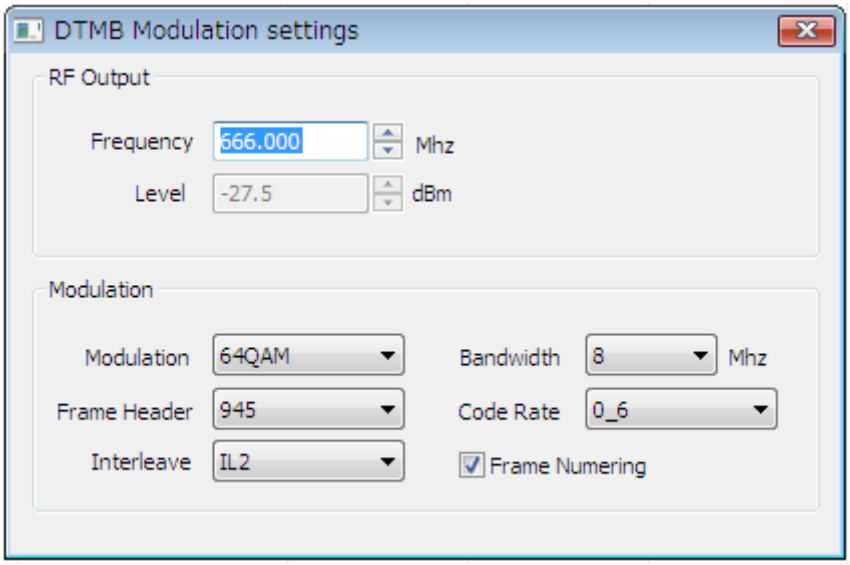
LayerA		This area is to set LayerA part.
	Segments	You can set from 0 to 13 segments. Please attend LayerA + LayerB=13 segments always.
	Moduration	You can select DQPSK, QPSK, 16QAM or 64QAM.
	Code Rate	You can select from 1/2, 2/3, 3/4, 5/6, 7/8
	Time Interlace	You can select I=1, I=2, I=4
	Layer A as default layer	You can check this if Layer A is the default layer.
LayerB		This area is to set LayerB part.
	Segments	You can set from 0 to 13 segment. Please attend LayerA + LayerB=13 segments always.
	Moduration	You can select DQPSK, QPSK, 16QAM, 64QAM .
	Code Rate	You can select from 1/2, 2/3, 3/4, 5/6, 7/8
	Time Interlace	You can select I=1, I=2, I=4
	Layer B as default layer	You can check this if LayerB is the default layer.

(*) This is available if your output adapter supports this RF output and is licensed for ISDB-T.

(**) This is only available for DTA-115, DTA-112 and DTA-2115 output adapters

Appendix F: DtEncode specific output controls for DTMB (*)

When using adapters that supports DTMB modulation, a detailed configuration window permits to fine tune the RF output.



DTA-110's DTMB RF output settings window

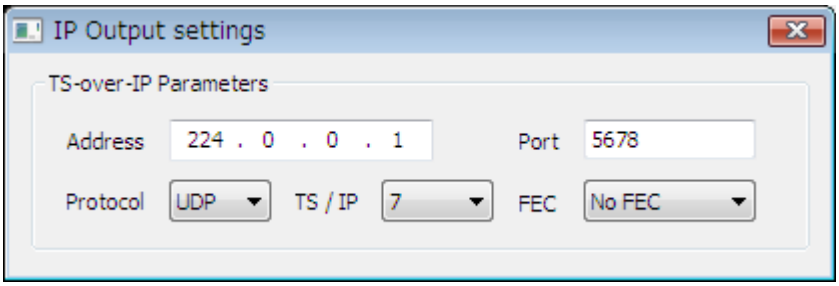
Item1	Item2	Explanation
RF Output		For RF parameters
	Frequency	This is output frequency [MHz] of the RF modulator. You can enter directly the value or use the spin button. (Check your hardware specification for available range of values)
	Level	This is output level [dBm] of the RF modulator (**).. You can enter directly the value or use the spin button. The value should be between -27dBm and +3dBM
Modulation		For the Modulation parameters
	Modulation	You can select 4NRQAM, 4QAM, 16QAM, 32QAM or 64QAM
	Frame Header	You can select 420, 595 or 945
	Interleave	You can select IL1 or IL2
	Bandwidth	You can select 5Mhz, 6Mhz, 7Mhz or 8Mhz.
	Code Rate	You can select 0_4, 0_6 or 0_8
	Frame Numbering	Check to enable to Frame Numbering

(*) This is available if your output adapter supports this RF output and is licensed for DTMB

(**) This is only available for DTA-115, DTA-112 and DTA-2115 output adapters

Appendix G: DtEncode specific output controls for IP

When using adapters that supports IP output, a detailed configuration window permits to fine tune the IP output.



DTA-160's IP output settings window

Item1	Item2	Explanation
IP Parameters		This area is to set IP output
	Address	This is output stream destination IP address.
	port	This is output stream IP port.
	Protocol	You can select UDP or RTP.
	TS/IP	You can select the number of TS packet per IP MTU (from 1to 7).
	FEC	You can fine-tune the FEC parameter. (No FEC or D = from 4 to 16, L = from 1 to 20)

Appendix H: XML configuration file structure

The following example shows an XML configuration file.

```
<?xml version = "1.0" encoding = "UTF-8"?>
<DtEncode ConfigName="MyConfig" ConfigDescription="MyConfigDescription" ConfigCreationDate=
"20091022">
  <Video>                                                                    } Video Part
    <Adapter Type="145" Port="0" Index="0"/>
    <Input Type="SD-SDI (NTSC)"/>
    <Resolution Value="Auto"/>
    <Aspect Value="4:3"/>
    <Encoding Value="MPEG-2"/>
    <Preset Value="SD_NTSC_MPEG2"/>
    <Rate Value="3000000"/>
  </Video>
  <Audio>                                                                    } Audio Part
    <Sampling Value="48000"/>
    <Encoding Value="MPEG Layer 2"/>
    <Rate Value="192000"/>
  </Audio>
  <Mux>                                                                      } MUX Part
    <PgmId Value="4170"/>
    <PmtPid Value="4170"/>
    <PcrPid Value="615"/>
    <VidPid Value="600"/>
    <AudPid Value="601"/>
  </Mux>
  <Output>                                                                   } Output Part
    <Adapter Type="115" Port="2" Index="1"/>
    <Rate Value="13270588"/>
    <PacketSize Value="188"/>
    <TsId Value="4106"/>
    <Network Value="DVB-T"/>
    <Dvbt CodeRate="2_3" Bandwidth="8Mhz" Modulation="qam16"
Guard="1_4" Mode="8K" Interleave="Native"/>
  </Output>
</DtEncode>
```