Turbo Decoder
Tool for decoding files from 8-bit Atari turbo cassette tapes

1 Installation and Startup

1.1 Installation

1. Download and install Java Runtime Environment (JRE) or Java Development Kit (JDK), version 8 or newer.
2. Clone the project repository or download a release package and extract it to a program directory <PROGDIR>.

1.2 Startup

Execute the following command: `java -jar <PROGDIR>dist/turbodecoder.jar`, or double click the turbodecoder.exe launcher.

2 Overview

The Turbo Decoder is a tool designed to retrieve data from tapes. The decoding algorithm is a simple Java rewrite of turbo loaders from assembler 6502.

The electric signal can be read from WAVE files. When creating WAVE files, it is recommended to set the tape recorder to get maximum signal amplitude. The WAVE file must be in the following format: PCM, 1 or 2 channels, 44100 - 96000 Hz, 8 or 16 bits per sample.

Another possibility is to read the electric signal directly from the sound card. This source of electric signal is supported, but not recommended.

Turbo systems supported by the decoder are the following: Turbo 2000, Turbo 2000 - kilobyte blocks, Super Turbo, Turbo Tape and B-TAPE, KSO Turbo 2000, Turbo Blizzard, Turbo ROM, Atari Super Turbo (AST format only), Hard Turbo, and Lower Silesian Turbo 2000.

The decoder can also decode raw blocks instead of files.

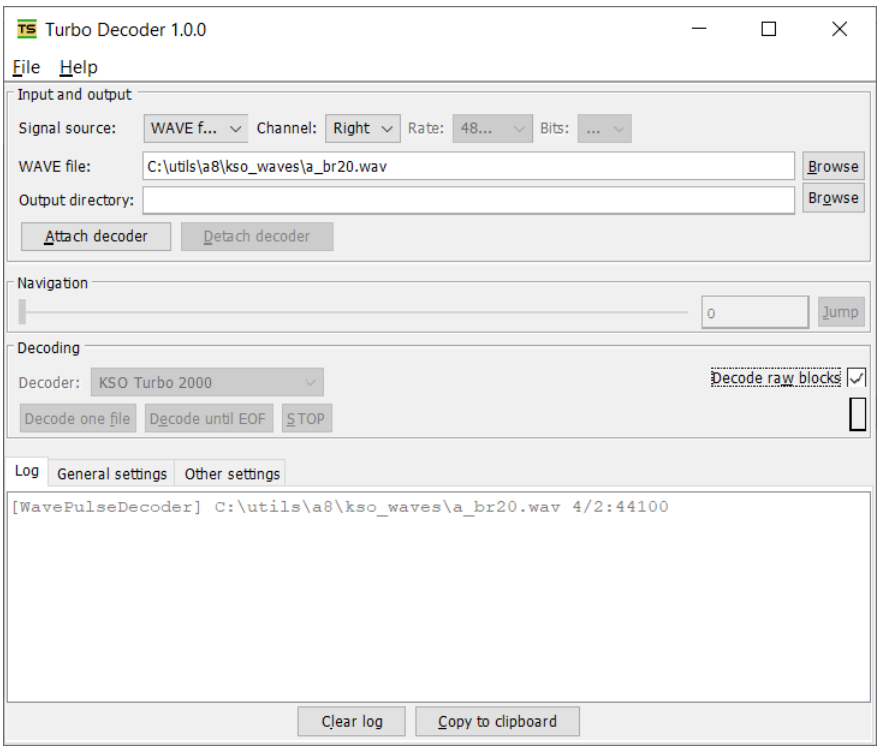

Fig. 1: Turbo decoder

2.1 Preparing the Decoder

Select a source of the electric signal using the *Signal source* combo box.

If the source of the electric signal is a WAVE file, enter the WAVE file name and select input channel using the *Channel* combo box.

If the source of the electric signal is the sound card, select input channel using the *Channel* combo box, select the sampling rate using the *Rate* combo box, and select number of bits per sample using the *Bits* combo box.

Enter the output directory and click the *Attach Decoder* button. The decoder is now ready to decode the electric signal.

2.2 Decoding Files

Use the *Navigation* panel to specify current position in the WAVE file.

The controls on the *Decoding* panel are devoted to perform decoding. Use the combo box *Decoder* to select a turbo system.

To start decoding of one file or all files until the end of the WAVE file, click *Decode one file* or *Decode until EOF* buttons. To stop the decoding process, press the *Stop* button.

You can see the results of decoding in the *Log* tab. If you use a digitized sound editor, you can use the sample numbers enclosed in the curly braces.

If you want to work with different WAVE file, or to select another source of the electric signal, detach the turbo decoder using the *Detach decoder* button.

If the decoder stops responding due to a bad sound card setup, press the *Stop* button while pressing the SHIFT key. This is called emergency stop. After an emergency stop, the decoder must be detached and attached to be ready again.

2.3 Decode Raw Blocks

To decode raw blocks, select the *Decode raw blocks* check box. Turbo decoder reads raw blocks of the selected turbo system. If a block is found, it is decoded until an error occurs or end of block is encountered. No checksums are verified and internal format of the block is not validated.

To decode a single block, click the *Decode one file* button. To decode all blocks until end of file, click the *Decode until EOF* button.

This option is available for special purposes such as decoding data stored in non-standard formats, recovering corrupted files etc.

3 Configuring the Decoder

Use controls on the *General settings* and *Other settings* tabs to configure the decoder.

3.1 Configuring DSP Filters

Turbo decoder features two DSP filters to improve its decoding capabilities.

DC Blocker.

This filter blocks the DC offset like a capacitor by applying a simple online algorithm. You can enable or disable the DC blocker.

Schmitt Trigger.

The Schmitt Trigger is used to convert analog signal to digital. You can set the hysteresis to a desired level (in sample values). Maximum hysteresis is half of sample value range (127 for 8-bit samples, 16383 for 16-bit samples). Setting the hysteresis to zero disables the Schmitt Trigger (and the decoder then just works as a plain comparator).

Increasing the hysteresis can sometimes help to decode poor quality signal. For such signal, the recommended value is **2000** for 16-bit samples and **6** for 8-bit samples.