DoP decoder board User's Guide

By Ian Jin, Apr 18, 2017 Ver. 2.0
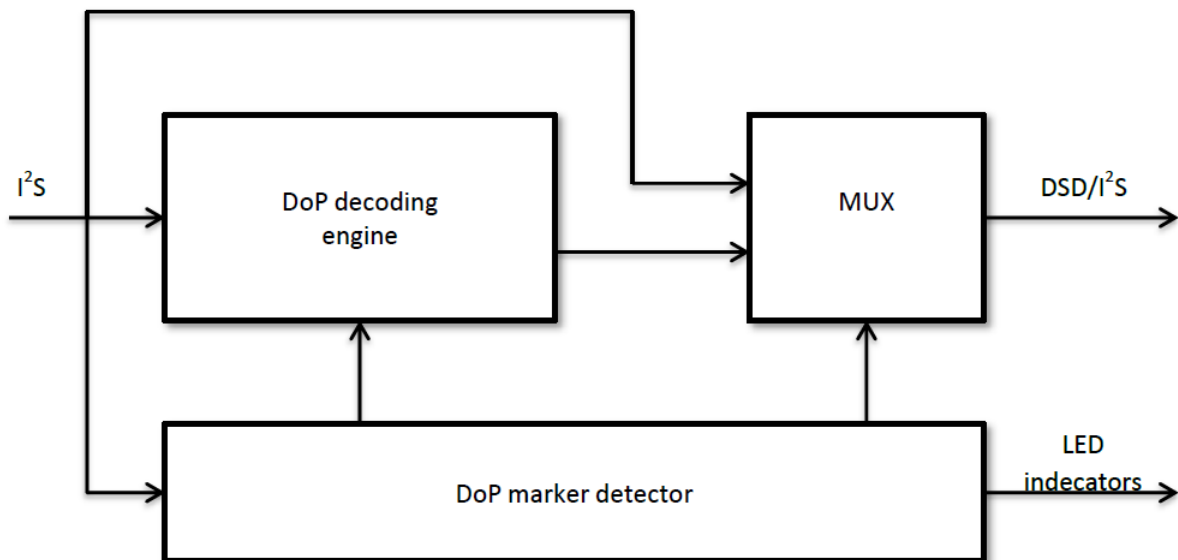
A. Descriptions

DoP is a protocol to transfer native DSD data over 24bit I^{2}S package. The purpose of DoP is to send and receive DSD data by making use of existing I^{2}S or S/PDIF hardware and software. DoP is a bit perfect protocol. Native DSD stream can be re-generated from DoP package in lossless. There will be no difference between the original native DSD stream and DoP re-generated DSD stream.

To convert DoP back to DSD, a software or hardware based DoP decoder is required. A software based DoP decoder is normally designed as part of firmware of music player or USB streamer. While, the hardware based DoP decoder is usually designed as software independent module and works as part of DAC.

This DoP decoder is FPGA hardware based daughter board. It's capable to decode DoP stream from DSD64 to DSD512. Normal I^{2}S data and DSD data will be passed-through without any change. It's very easy to be integrated with any I^{2}S/DSD DAC. IsolatorPi has a reserved socket of this DoP decoder, so it can be plug in right away.

B. Block diagrams

C. Layout and Dimensions (in mm)

Top view

Bottom view
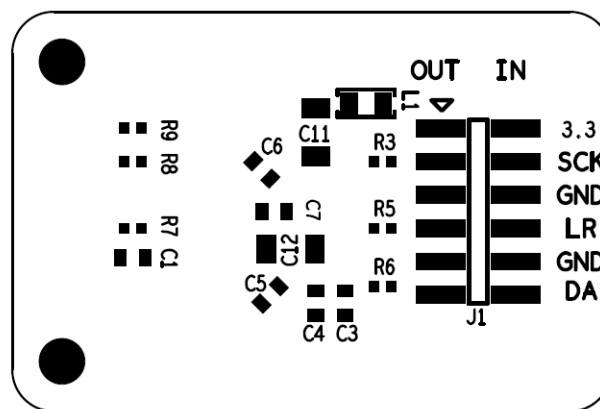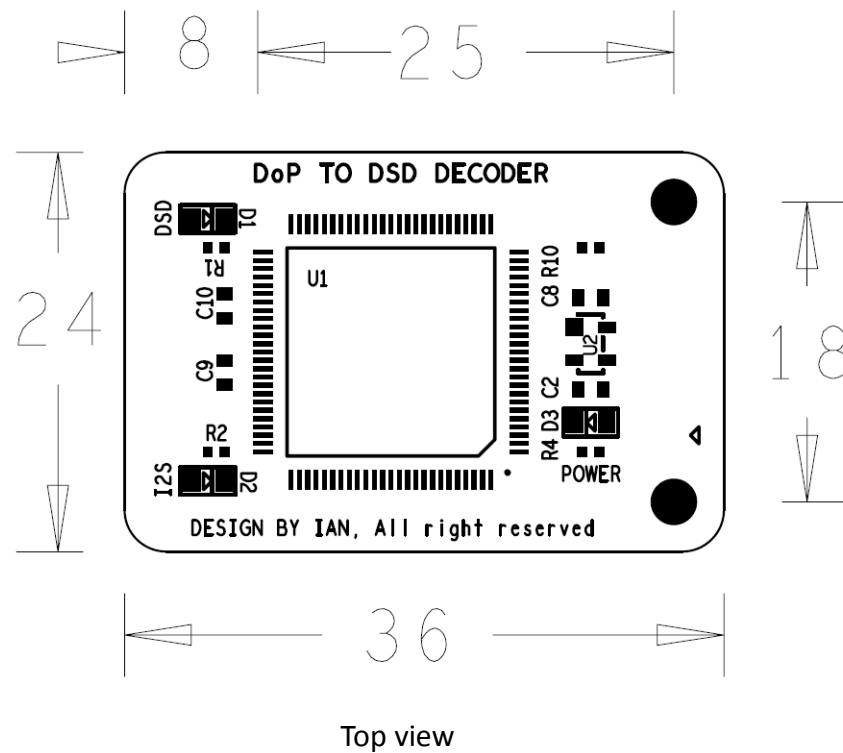
D. Connector

J1:   6*2 PIN 2.0mm female board to board head connector

Description	Signal	Pin numbers		Signal	Description
3.3V 100mA DC power input	3.3V	1	2	3.3V	3.3V 100mA DC power input
I^2S/DSD SCK output signal 3.3V logic level	SCK output	3	4	SCK input	I^2S SCK input signal, 3.3V logic level
Ground	GND	5	6	GND	Ground
I^2S LRCK/DSD DL signal 3.3V logic level	LRCK/DL output	7	8	LRCK input	I^2S LRCK input signal 3.3V logic level
ground	GND	9	10	GND	Ground
I^2S DATA/DSD DR signal 3.3V logic level	DATA/DR output	11	12	DATA	I^2S DATA signal 3.3V logic level

E. LED indicators

LED	Descriptions	Notes
D1	DSD input status	Lit when DoP input signal is received and native DSD signal is decoded to output; Both D1 and D2 are 'off' means no input signal
D2	I^2S input status	Lit indicates I^2S or other non DoP input signal is good and is bypassed to output; Both D1 and D2 are 'off' means no input signal
D3	Power indicator	Lit when board is powered

F. Application Note

1. To integrate with DAC or other digital audio devices:

    Insert this DoP decoder into digital audio signal path via the 12 pin board to board connector J1. Make the I^2S signal path through this DoP decoder. Connect the output of DoP decoder to I^2S/DSD DAC or other following digital audio devices.

2. To integrate with IsolatorPi:

    IsolatorPi was designed with DoP decoder socket. So just need to plug in. RaspberryPi is ready to output native DSD signal now.

G. DoP decoder daughter board picture