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# D-ATV.com's IQ modulator switch

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Internet: http://www.d-atv.com

## Introduction

The D-ATV.com DVB-S modulator boards consist of a FPGA baseband board, MPEG encoder and an IQ modulator. We have currently two different IQ modulators available, one for the 23cm frequency range and one for 13cm frequency range.

We deliberately designed two different IQ modulators for the two frequeny bands because we wanted to achieve maximum performance on both frequency bands, something which will be harder to achieve when combining the designs.

On the other hand there seems to be much interest for using two different IQ modulators running with a single D-ATV baseband board.

Therefore we created a simple but effective design which enables you to use both IQ modulators with the existing D-ATV board.

### <u>The design</u>

The design of the IQ switch is rather straightforward. The design uses simple relays for interconnecting the appropriate IQ modulator to the FPGA baseband board. The relays are controlled by a single NPN transistor which is driven with a low voltage level coming from the D-ATV baseband board. Look in the "D-ATV connections.pdf" document for finding the correct output on the baseband board to drive the IQ modulator band switch.

The IQ switch need to be supplied with an external 12V. A separate relay is available for driving the power supply to the both IQ modulator units. This relay is also controlled by the same transistor. The full schematic diagram of the IQ switch is shown in the appendix.

# The PCB board

The PCB layout and component placement are shown in the appendix. The PCB layout is printed on a 1:1 scale and prepared for direct printing on a film. The dimensions of the PCB are the same as for the IQ modulators which equals to  $100 \times 45$  mm.

The PCB is double sided where the toplayer is mainly functioning as a ground layer.

#### Important notes

Care must be taken to keep interconnection cables as short as possible. Too long cables result in distortion of the transmitted frequency spectrum. Best performance is achieved when the IQ switch and the two IQ modulators are "sandwiched". In that case the IQ switch is placed at the bottom, following up to the top respectively the 13cm IQ modulator and above the 23cm IQ modulator.

We included some photographs to show you how we worked this out on our own prototypes.

#### How to get it?

In principle you are free to make your own IQ switch based on the info found in this document. You have to etch your own PCB and you have to buy your parts at Farnell (<u>http://www.farnell.com</u>). If you prefer to buy a ready made unit instead of buying all the components by yourself and putting it on a home etched board, then you can contact us.







Description	Designator	Quantity
1N4148	D1	1
Micro Match 6 pin connector Farnell 148-519	JP1	1
Micro Match 6 pin connector Farnell 148-519	JP2	1
Micro Match 6 pin connector Farnell 148-519	JP3	1
Header, 2-Pin, MC1.5/2-G-3.81 Farnell 370-4725	JP4	1
Header, 4-Pin	JP5	1
Micro Match 8 pin connector Farnell 148-593	JP6	1
Micro Match 8 pin connector Farnell 148-593	JP7	1
Micro Match 8 pin connector Farnell 148-593	JP8	1
Header, 2-Pin	JP9	1
4PCO - G6A-434P Series relais Farnell 176320	K1	1
4PCO - G6A-434P Series relais Farnell 176320	K2	1
Relay Farnell 224492	К3	1
BC846B	Q1	1
Resistor	R1	1





