

# ELAD QSF-06

## Switchable Preselector Filter Board for FDM-DUO with Active Switch and Band Select Output



## USER MANUAL

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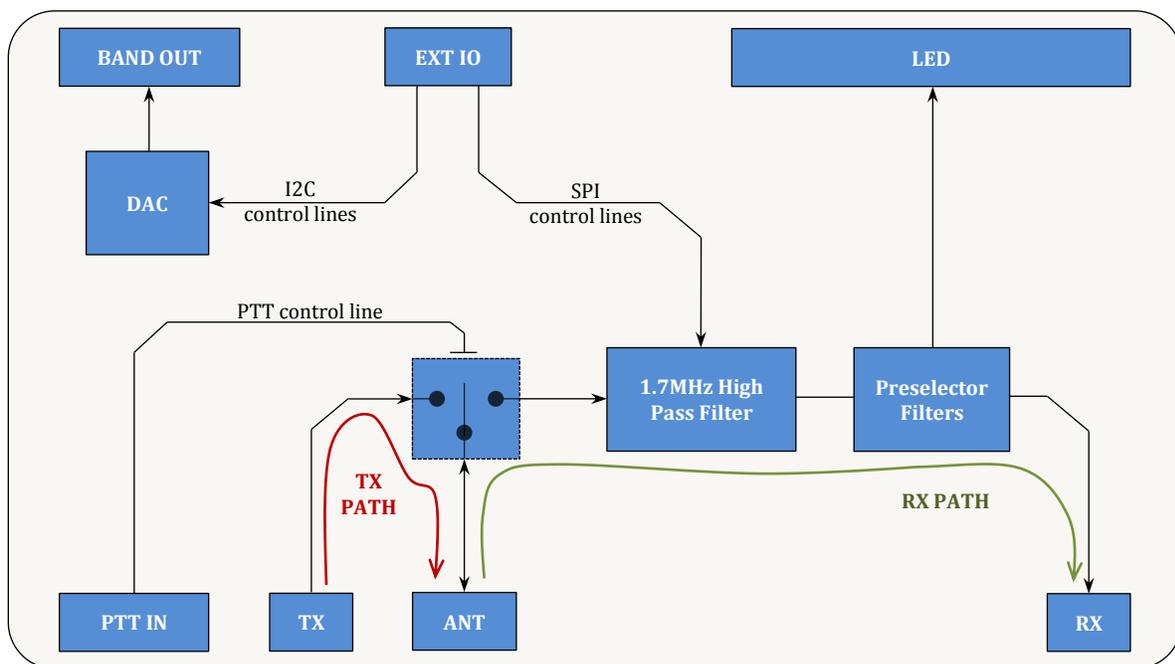
## Revision History

Revision	Date	Description
Rev 1	04/2016	<ul style="list-style-type: none"> <li>• First version.</li> </ul>
Rev 2	05/2021	<ul style="list-style-type: none"> <li>• Updated section <b>5 - Filter Module Family</b>.</li> </ul>

# 1 Overview

ELAD QSF-06 is a switchable preselector that allows the selection between 6 configurable filters. User can configure the internal board by choosing the right set of filters within the filter module family provided by ELAD or self-build. The QSF-06 board has also an on board active switch which ensure fast commutation time between transmission and reception state and a band select output to drive an external amplifier. Using the ELAD FDM-SW2 SDR software it is possible to configure the FDM-DUO to automatically select the proper filter as a function of the tuning frequency.

The block diagram here below represents the QSF-06 board.



## 2 Package Contents

ELAD QSF-06 package contains:

- QSF-06 switchable pre-selector board with FBPY bypass module already installed in slot number 6 (see section **3.3 - Internal Description** for details),
- one 3.5mm male to male jack cable,
- one DB9 male to male flat cable,
- two coaxial cables with PL259 UHF connectors,
- rubber feet,
- user manual.



## 3 Hardware Description

### 3.1 Front Panel Description



#### 1 – Filter LEDs

Selected filter indication. When a filter is in use, the corresponding LED turns on.

#### 2 – State LEDs

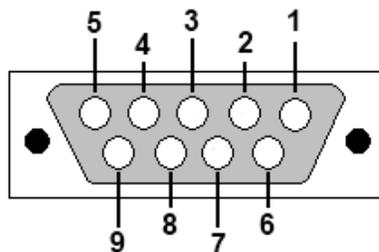
Indication of the current state. The TX led turns on when transmitting and the RX led turns on when receiving .

#### 3 – EXT I/O

DB9 female connector that allows communication with the FDM-DUO.

**This is NOT a standard serial port.**

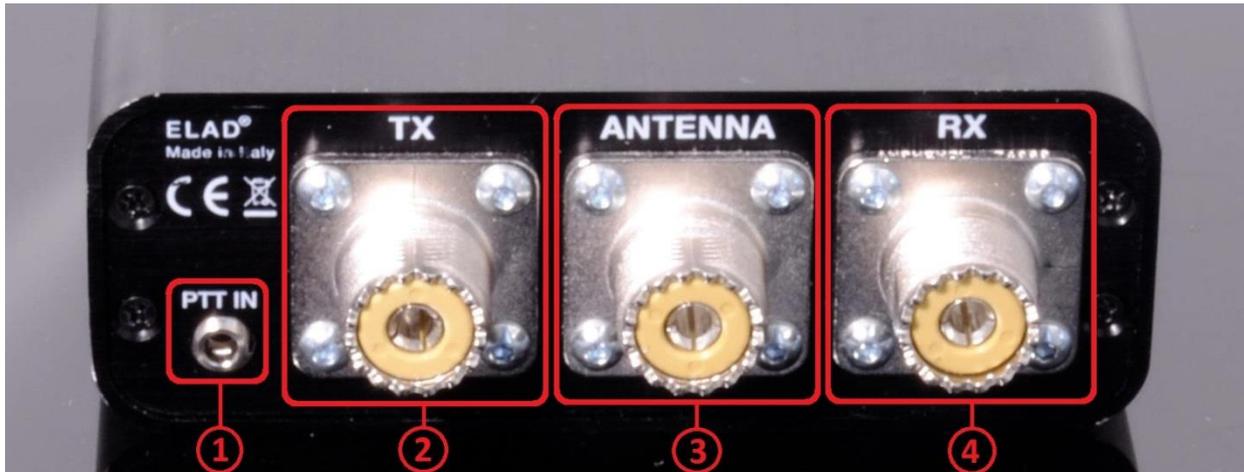
- Pin 1: SPI Latch
- Pin 2: I2C SCL
- Pin 3: SPI Clock
- Pin 4: I2C SDA
- Pin 5: Ground
- Pin 6: Not Connected
- Pin 7: Not Connected
- Pin 8: SPI Data
- Pin 9: +5V



#### 4 – BAND

3.5mm stereo jack connector that provides analog voltage to drive a linear power amplifier (see section 6 - **Band Select Output** for details).

## 3.2 Rear Panel Description



### 1 – PTT IN

3.5mm stereo jack connector that receives transmission and reception information from the FDM-DUO.

### 2 - TX

SO239 UHF connector. Must be connected to the RTX/TX connector of the FDM-DUO.

### 3 - ANTENNA

SO239 UHF connector. Must be connected to the antenna.

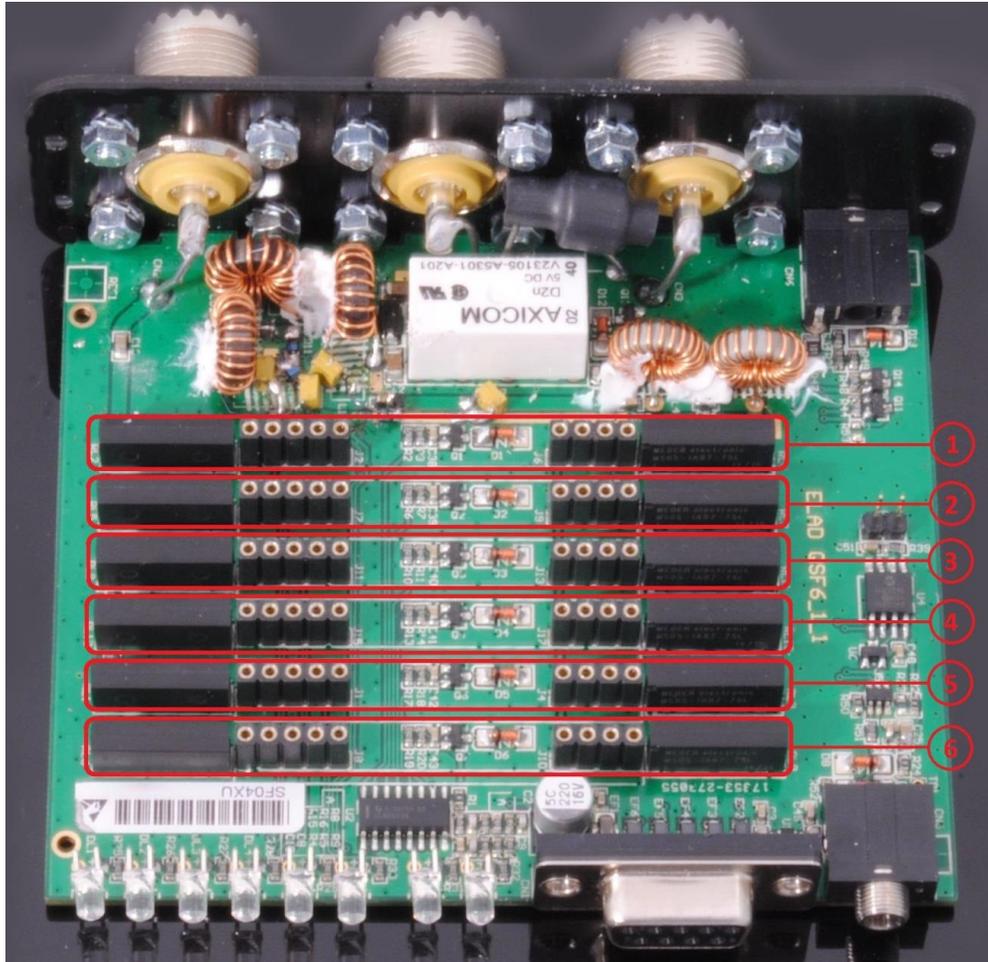
### 4 – RX

SO239 UHF connector. Must be connected to the RX connector of the FDM-DUO.

### 3.3 Internal Description

The picture below shows the positions of the six slots.

**NB: if the bypass module is used, it must be placed in slot number 6.**

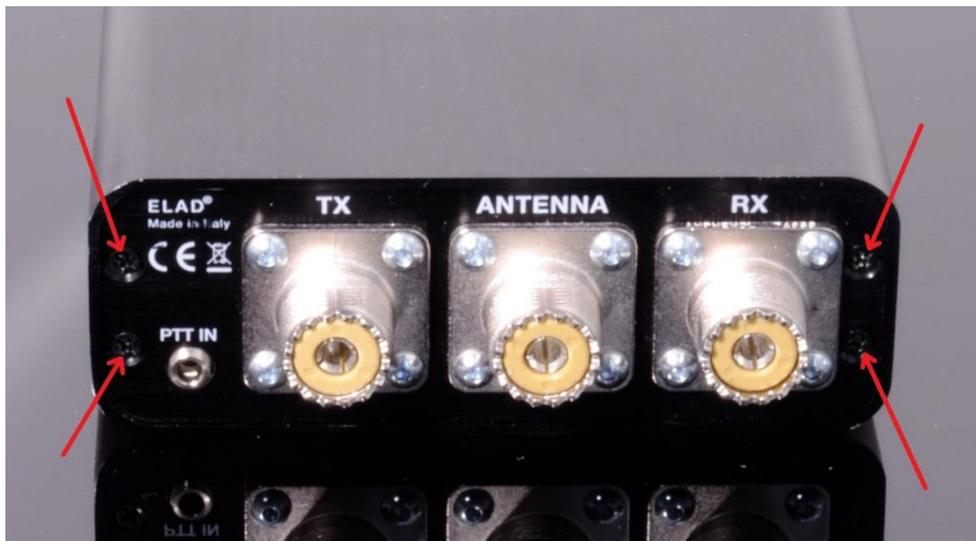


## 4 Filter Installation

To install a new filter it is necessary to open the QSF-06 enclosure. To do that, first remove the two standoffs of the DB9 connector present on the front panel.



Then, remove the four screws of the rear panel.



Now it is possible to extract the printed circuit board together with the rear panel like shown in the picture below.



Once extracted, insert the desired filters in the chosen positions. The filter modules have a polarized connection, i.e. they cannot be inverted because their connectors have a different number of pin.



At last, relocate the printed circuit board inside the enclosure and screw in the four screws and the two standoffs.

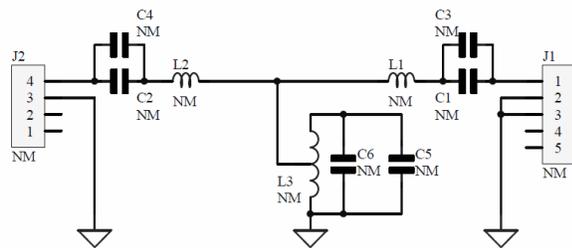
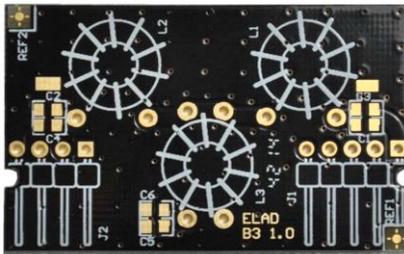
## 5 Filter Module Family

The table below lists the filter modules available from ELAD :

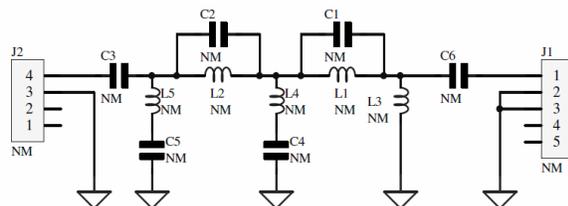
Module Code	Module Description	Module Code	Module Description
FBPY	Bypass module (*)	FBP40-1	Band Pass 40 m
FLP05M-1	Low Pass 500 kHz	FBP30-1	Band Pass 30 m
FHP05M-1	High Pass 500 kHz	FBP20-1	Band Pass 20 m
FHP1M7-1	High Pass 1700 kHz	FBP17-1	Band Pass 17 m
FPCB-B3	Empty module for self-made filters	FBP15-1	Band Pass 15 m
FPCB-H5	Empty module for self-made filters	FBP12-1	Band Pass 12-10 m
FBP160-1	Band Pass 160 m	FBP1321	Band Pass 13-21MHz
FBP80-1	Band Pass 80 m	FBP2135	Band Pass 21-35MHz
FBP60-1	Band Pass 60-49 m		

(\*) The bypass module is included with the QSF-06 Preselector.

### 5.1 FPCB-B3 Module Schematic



### 5.2 FPCB-H5 Module Schematic



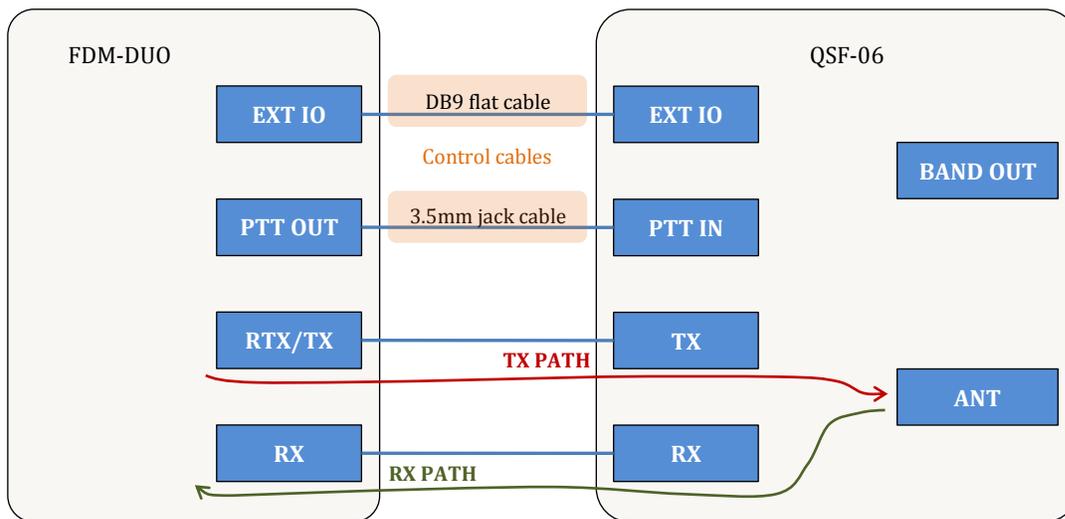
## 6 Band Select Output

The FDM-DUO selects automatically the correct voltage according to the current tuning frequency. The voltages generated by the QSF-06 are listed below.

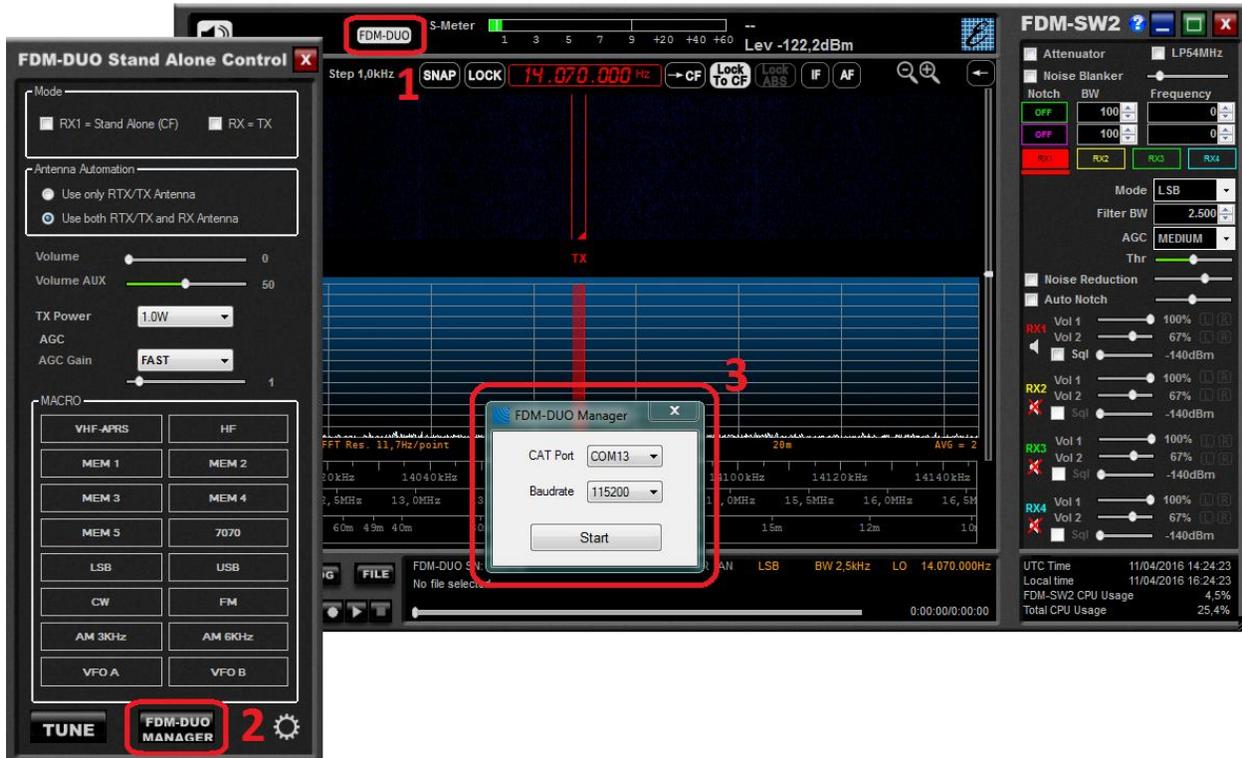
Band	Frequencies	Output Voltage
160m	1.800M - 2.000M	0.33
80m	3.500M - 3.800M	0.66
60m	5.250M - 5.450M	1.00
40m	7.000M - 7.200M	1.00
30m	10.100M - 10.150M	1.30
20m	14.000M - 14.350M	1.60
17m	18.068M - 18.168M	2.00
15m	21.000M - 21.450M	2.30
12m	24.890M - 24.990M	2.70
10m	28.000M - 29.700M	3.00
6m	50.000M - 54.000M	3.30

## 7 Using QSF-06 with the FDM-DUO.

To use the QSF-06 board connect it to the FDM-DUO like shown below. Be careful to connect all the control cables correctly.

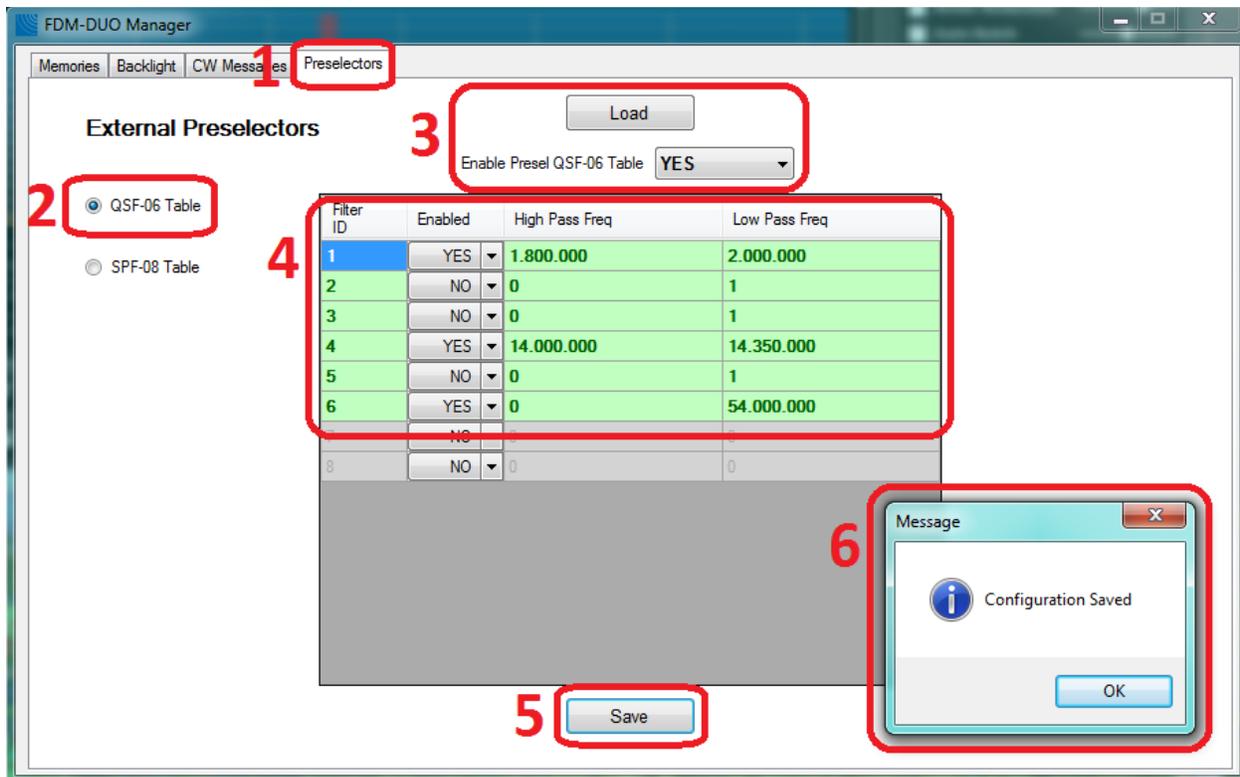


The filters configuration is stored in the FDM-DUO internal memory. To modify and save this configuration use the “FDM-DUO Manager” feature in the ELAD FDM-SW2 SDR Software.



1. Click on the “FDM-DUO” button.
2. In the “FDM-DUO control panel”, click on the “FDM-DUO MANAGER” button.
3. Choose the right COM port, the right baud rate (menu 70 of the FDM-DUO) and click on “Start”. You need to connect the CAT USB port of the FDM-DUO to the computer to perform this operation.

The loading process may take some time, depending on the baud rate selected.



Then.

1. Select the “Preselectors” tab.
2. Choose the “QSF-06” option.
3. Enable the QSF-06 management if not already done.  
The “Load” button allows you to retrieve from the FDM-DUO the current configuration.
4. Set a filter. The settings table is formed by 6 rows, one for each filter slot of the QSF-06 board. Each row contains 4 fields :
  - the filter ID / slot number : from 1 to 6,
  - the state of the filter/slot : enabled or not,
  - the beginning frequency of the filter use, otherwise called “high pass frequency”,
  - the end frequency of the filter use, otherwise called “low pass frequency”.
 For each row choose the “Enable” state and if enabled, enter the desired High Pass and Low Pass frequencies which specify the activation band of the filter.
5. Press the “Save” button to store the configuration in the FDM-DUO internal memory.
6. A message box appears to confirm the operation or indicate a negative outcome.

Some rules to keep in mind :

- the frequency to enter is in Hertz,
- the High Pass frequency must be strictly slower than the Low Pass frequency,
- in the same way the Low Pass frequency must be strictly higher than the High Pass frequency,
- in case of use of the FBPY bypass module, insert it to the last slot (number 6).

Filter ID	Enabled	High Pass Freq	Low Pass Freq
1	YES	1.800.000	2.000.000
2	NO	0	1
3	NO	0	1
4	YES	14.000.000	14.350.000
5	NO	0	1
6	YES	0	54.000.000
7	NO	0	0
8	NO	0	0

For example, considering the configuration of the screenshot above, you can insert this filters :

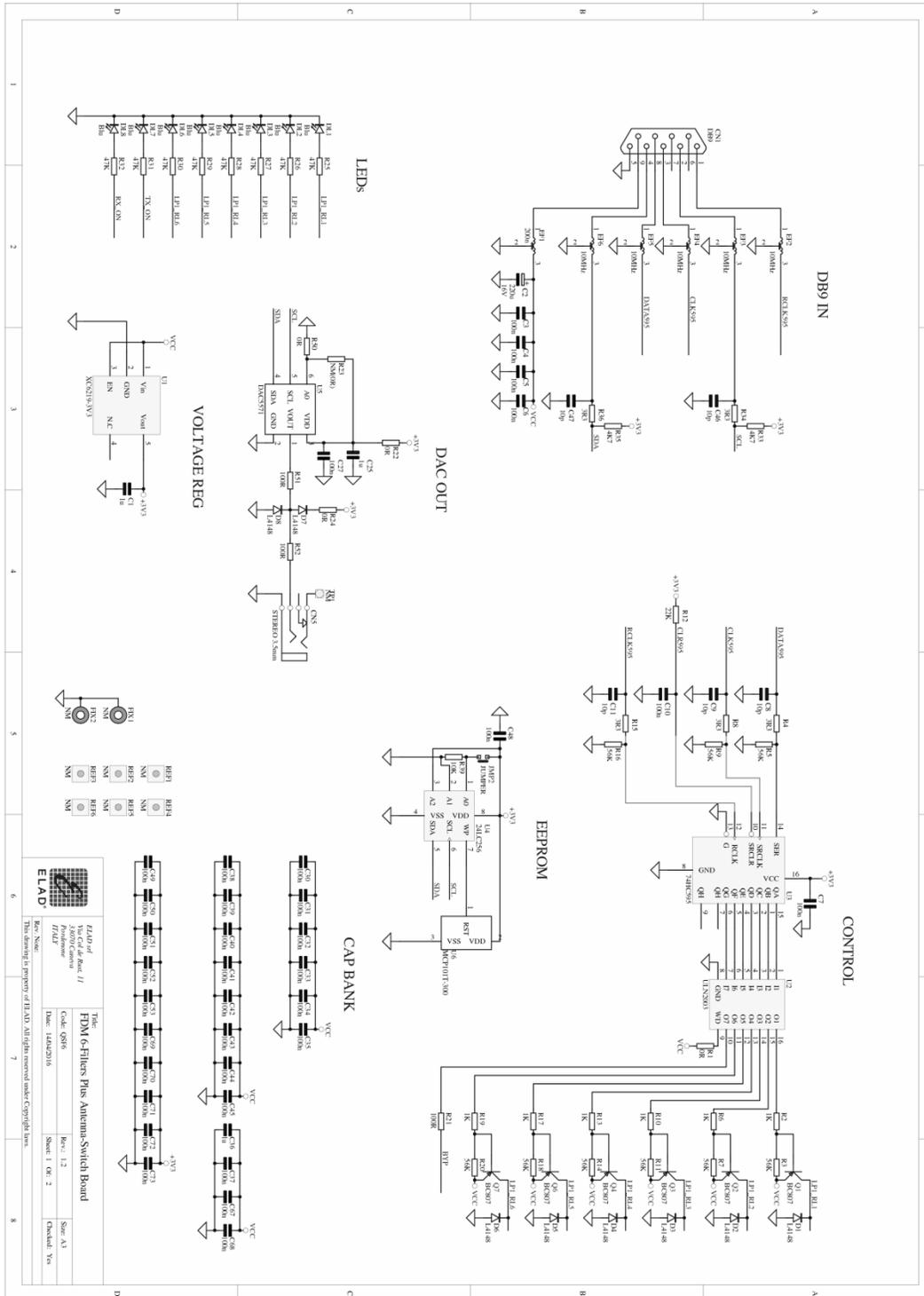
- filter ID/slot 1 : band pass 160 m, FBP160-1 filter module,
- filter ID/slot 2 : none,
- filter ID/slot 3 : none,
- filter ID/slot 4 : band pass 20 m, FBP20-1 filter module,
- filter ID/slot 5 : none,
- filter ID/slot 6 : bypass, FBPY module.

To select the right filter the FDM-DUO analyses the configuration following the ascending order of the slots. If the current tuning frequency is inside the frequency range the filter is selected, if not it passes to the next slot. It is recommended to place the bypass module in the last slot and to enable it in the frequency range which is not covered by the others filter modules.

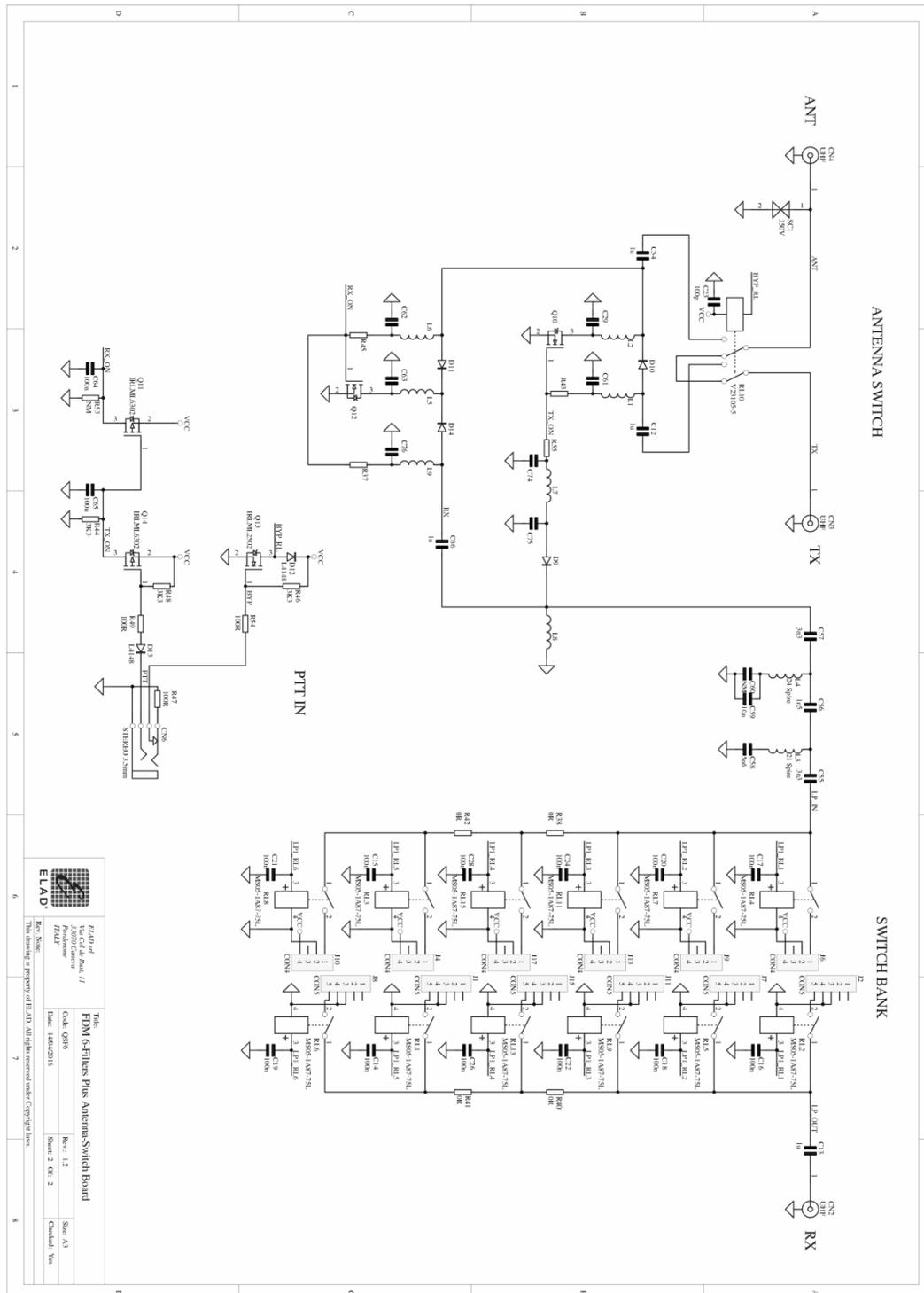
Some cases with the above screenshot :

- tuning frequency set to 1MHz : the filter on the sixth slot is selected,
- tuning frequency set to 1.9MHz : the filter on the first slot is selected,
- tuning frequency set to 14.070MHz : the filter on the fourth slot is selected,
- tuning frequency set to 30MHz : the filter on the sixth slot is selected,
- tuning frequency set to 50MHz : the filter on the sixth slot is selected.

# 8 QSF-06 Schematic



ELAD srl Via C. Gal. Mattei 11 42030/Verona ITALY Date: 14/02/2016	The <b>FDM 6-Filters Plus Antenna-Switch Board</b> Code: QSF6 Rev: 1.2 Sheet: 1 OF 2 Checked: Yes



**NOTE:** please refer to our website <http://sdr.eladit.com> for future updates and information.

## Declaration of Conformity (EC)

The product marked as

**QSF-06**

manufactured by

Manufacturer : ELAD S.r.l.  
Address : Via Col De Rust, 11  
I-33070 CANEVA (PN)

is an amateur kit produced in conformity to the requirements contained in the following EC directives :

- EMC Directive 2014/30/EU
- RoHS Directive 2011/65/EU

This declaration is under responsibility of the manufacturer

ELAD S.r.l.  
Via Col De Rust, 11  
I-33070 CANEVA (PN)

Issued by

Name : Franco Milan  
Function : President of ELAD S.r.l.

CANEVA

Place

May, 25<sup>th</sup> 2021

Date



Signature