A NEW MINITIOUNER

« SINGLE CHANNEL » MINITIOUNER-S

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INTRODUCTION

The launch of the QO-100 satellite and its very efficient wideband transponder has made greatly popular the amateur digital television activity.

Anticipating this, for four years now, the REF has been manufacturing and distributing semi-kits for digital television reception.

In collaboration with the initial designer of the hardware and software, Jean-Pierre F6DZP, we made available to the community a receiver called “MinitiounerPro”, suffixed “Pro” to differentiate it from the first Minitiouner kits distributed by our English friends at BATC.

The most complete “Pro” receiver offers the possibility to have simultaneous reception on two bands, between 144 and 2450 MHz

To date, about 700 Minitiouners have been distributed by REF, both in France and in Europe, viral marketing has done a great job.

The MinitiounerPro is a semi-kit, that is to say that the SMD technology components, surface mounted, are already soldered and there are only a few through-hole components left to be mounted on the board, a few LEDs and a connector , this which remains within everyone's reach.

This kit was designed by the REF team which carried out the prototypes, the industrial production and its distribution via the REF association online store.

We have often been asked to provide an enclosure, but the low added value of our online store on this item compared to availability on the NET has prevented us from doing so until now.
With the objective of providing everyone with the simplest possible receiver at the most reasonable price, we have adapted the design of the Minitiouner to offer a smaller, simpler receiver, with an enclosure, while keeping software compatibility with the MinitiounerPro.

Of course, some concessions had to be made on functions less often used, such as the possibility of external relay commands, the output of TS streams in parallel format or double reception.

This gives us a simpler schematic, a smaller PCB, and the possibility to use a standard case which will then be provided as part of the new kit.

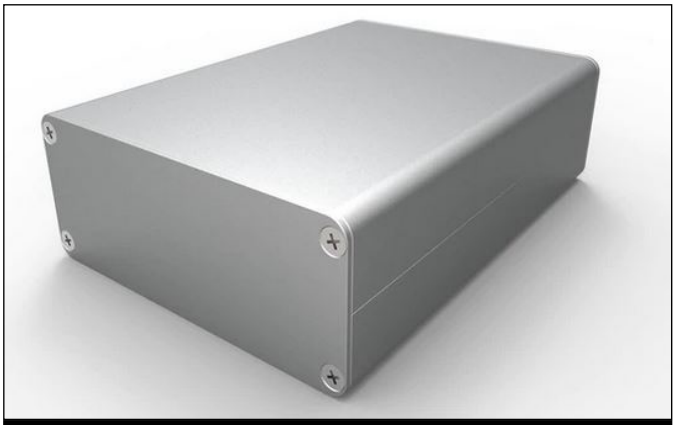

Figure 1 : Box

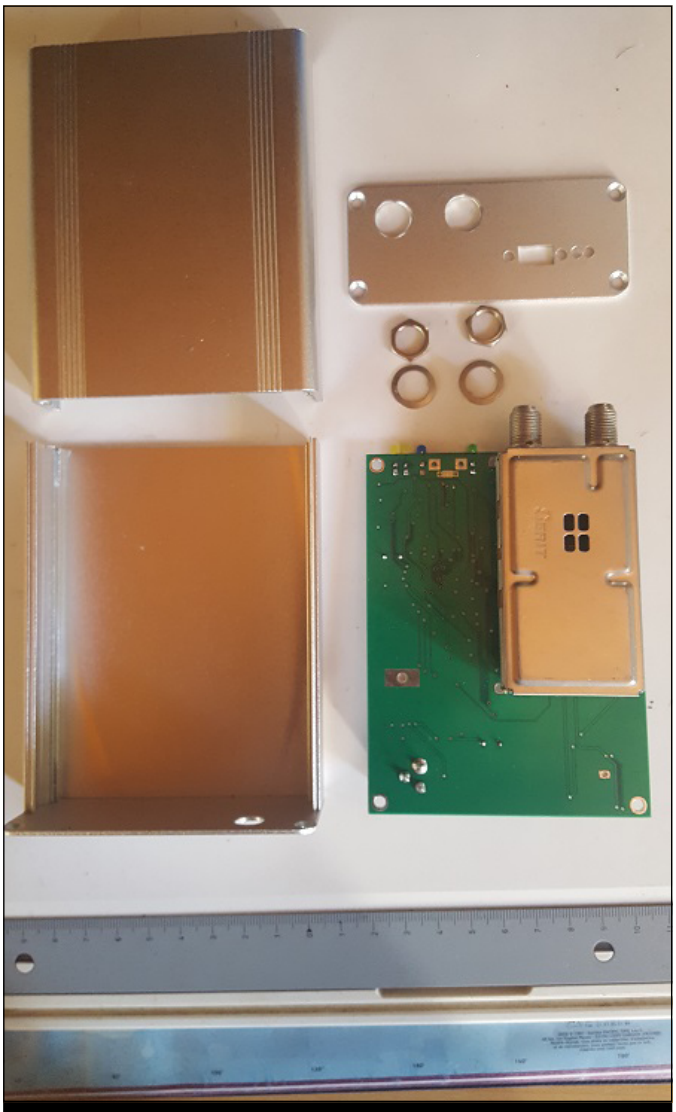

Figure 2 : Kit

100% compatible with F6DZP's “Minitioune” and “Scan & Tioune” software, this new receiver allows everyone to start quickly reception from the QO-100 satellite and, of course, also direct “terrestrial” reception of amateur DATV, which is now supplanting analogue television.

Analog television technology is abandoned by commercial television, and so DATV could only gain usage in the amateur domain, thanks to its spectral efficiency.

A very high-quality fluid image can be broadcasted in DATV over a bandwidth at least twenty times lower than analog equivalent. We must salute the superb work of F6DZP in this field where for more than 10 years, Jean-Pierre has been promoting these technologies in the amateur world.

This new version is still a semi-kit solution that is offered to you. It comes in the form of a printed circuit board made of pre-assembled SMD components. The choice of this technology allows costs to be reduced by use of professional automatic assembly equipment at factory. The only remaining task for the user is to solder the LED diodes, t o place the NIM and to assemble both in the enclosure provided.

POWER SUPPLIES:

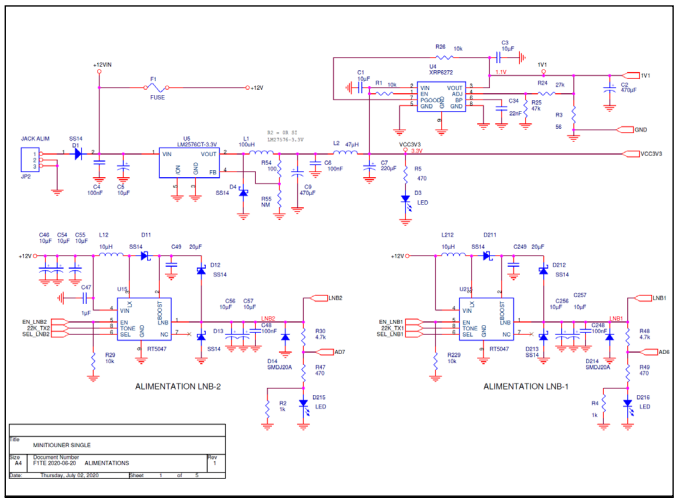

Figure 3 : Power supply

On diagram above, we identify the general power supply which will provide the 3.3V voltage necessary for the various components. This switching power supply the U5 chip has a double filtering to produce a voltage free from switching noise.

From this voltage of 3.3 V, U4 generates 1.1V voltage necessary for the tuner “NIM”. The two chips U15 and U215 are used to generate the voltages +14 V and +18 V necessary in case of use of an LNB on the satellite bands. This allows to select the polarization, horizontal or vertical, of the received signal.

These polarization voltages are controlled by the Minitioune software and you must make sure that the voltage is correctly programmed at 0 V by the software if you are using something else than an LNB connected to the inputs of the NIM tuner, and in particular a shorted conventional terrestrial antenna.

USB CONNECTION :

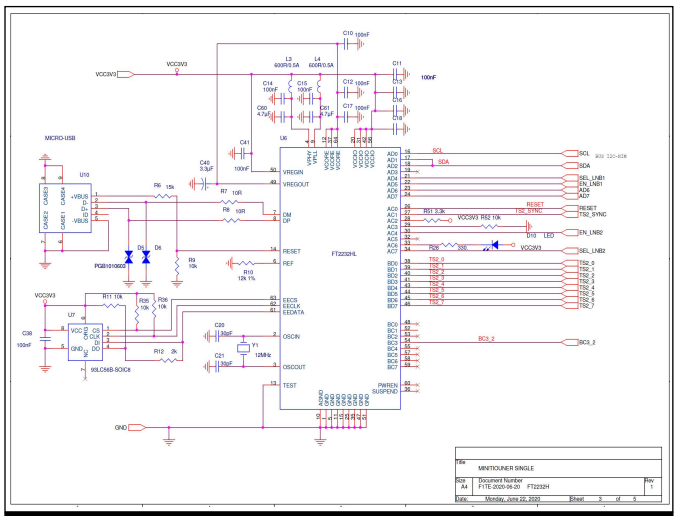

Figure 4 : USB

This function is performed by FTDI 2232H chip which provides the USB connection between the PC software, and the NIM tuner which delivers the "TS" transport stream : the digital stream received and decoded. All commands controlling the receiver are transmitted via this bidirectional channel.

The USB connector is a micro-USB model compatible with many cables used on smartphones and other USB equipments. This type of connector, is widely used and very convenient, despite a potential fragility. A similar connector is used on SDR Adalm-Pluto transceivers.

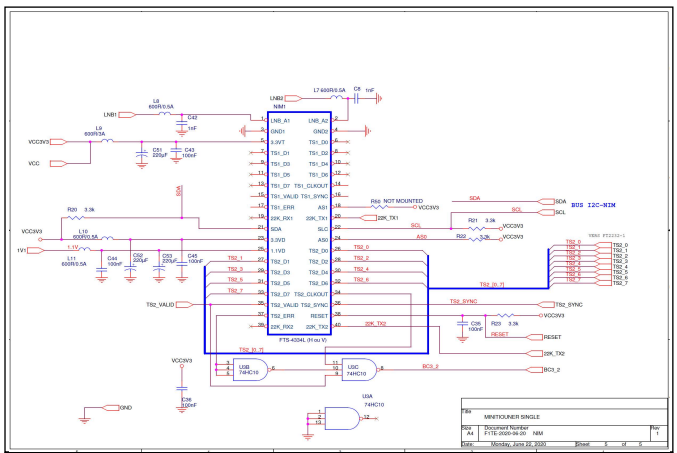

Figure 5 : NIM

There are two models, horizontally or vertically mounted, of this NIM. For this version, we have opted for horizontal mounting under the printed circuit, opposite side to the components.

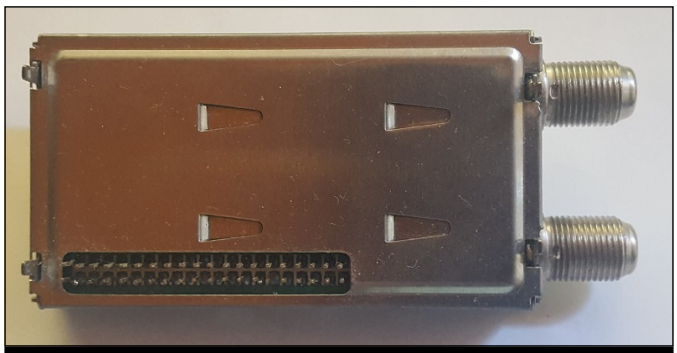

Figure 6 : NIM

The 2X20-pin female connector which receives the NIM is a SMD model soldered at factory this time on the printed circuit. The NIM is a special model which receives without gap from 144 MHz to 2450 MHz.

ASSEMBLAGE :

The enclosure dimension are: 88 x 38 x 110 mm. Front and back panels are supplied non drilled.

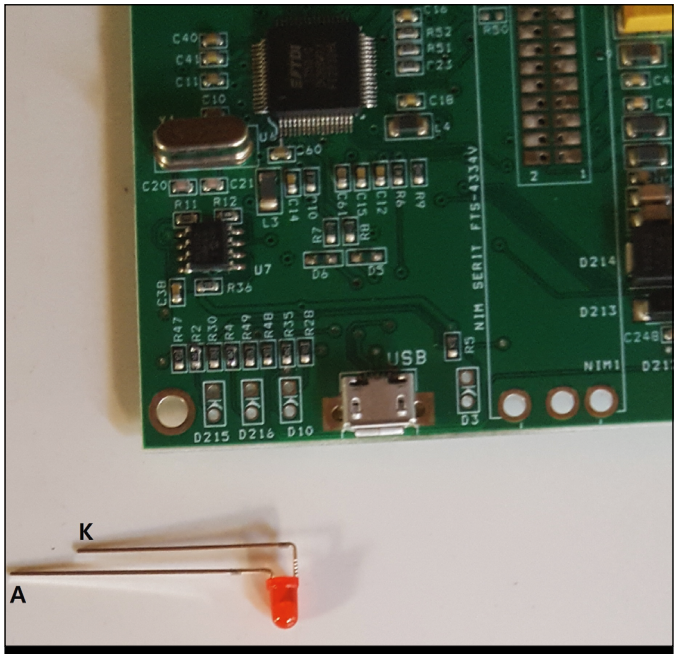

Figure 7 : LED assmbly

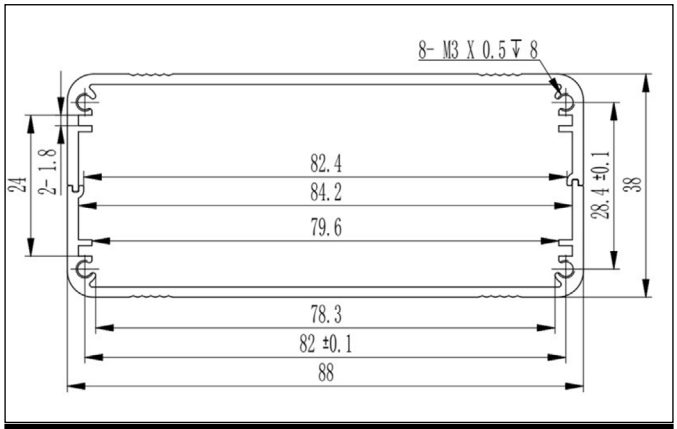

Figure 8 : Pro l du boîtier

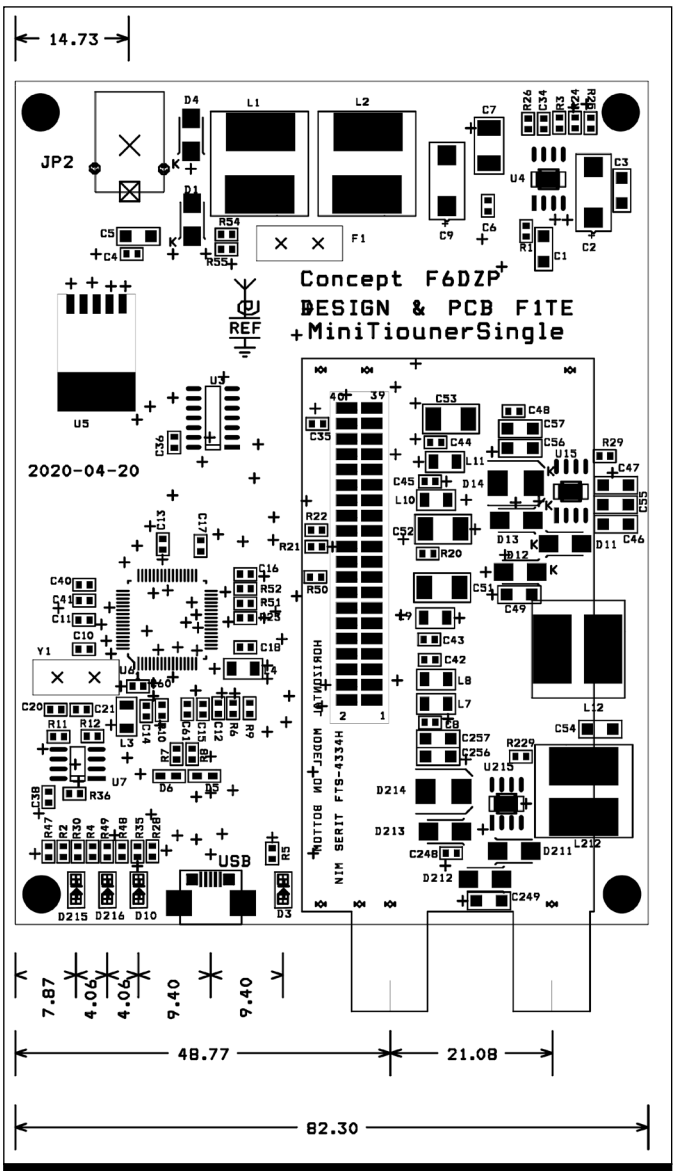

Figure 9 : Cotes de CAO

Once the LED diodes are soldered, you must mount the NIM on its connector positioned on the face opposite the components and immobilize it to the GND pads by a few soldering points.

Then proceed with the drilling of the front and rear panels according to the drill plans below.

Position the front and rear faces for pointing to visualize the countersunk fixing holes.

The holes for the LED diodes are 3mm in diameter, the holes for fixing the tuner F socket are 10mm and the power jack hole on the rear side is 8mm.

For the USB connector, drill two 5 mm diameter holes on each side of the center of the connector, 5/10 of a mm below the axis of the diode holes. The second tangent hole is always tricky to drill, start at 3mm first so you don't have to engage too much material when finishing at 5mm. Finish with a soft watchmaker's file to obtain an oblong hole.

Insert the NIM on its connector and immobilize it perfectly horizontal by soldering the 4 gnd points.

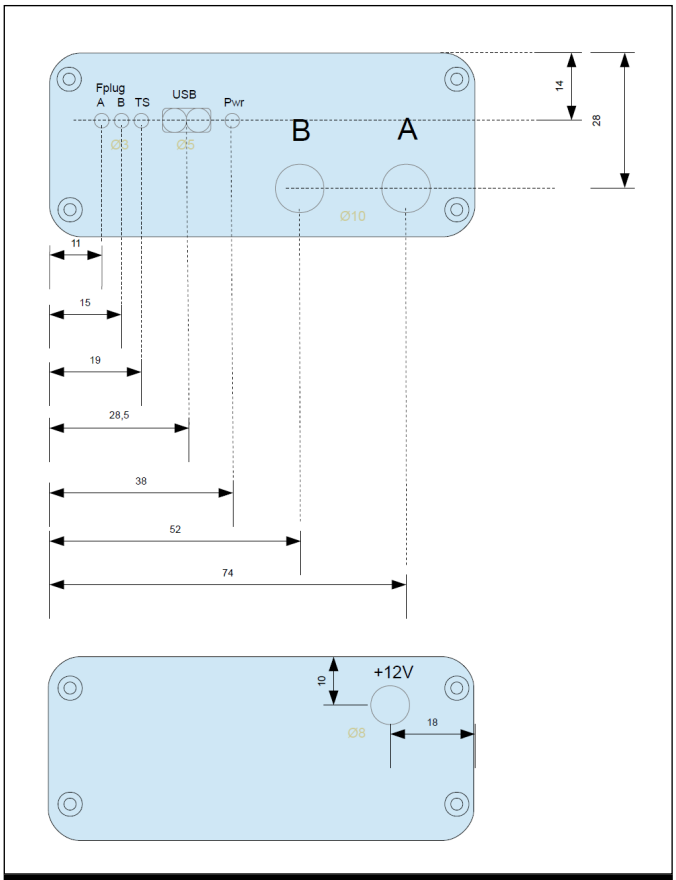

Figure 10 : Drilling plans

Fix the front face on the NIM, possibly placing the washers to ensure that it is perfectly squared.

Commissioning:

The Minitiouner Single is supplied with power via the 2.1 mm jack located at the rear of the box.

As with the MinitiounerPro, a voltage of 12 V 500 mA is required. Never exceed 15 V, this is the maximum that can withstand the RT5047 integrated circuits which generate the voltages 13 V and 18 V for the LNBs.

The operation is checked with the test software TestMyMiniTiouner_V2_5.exe, version V2_5 and later.

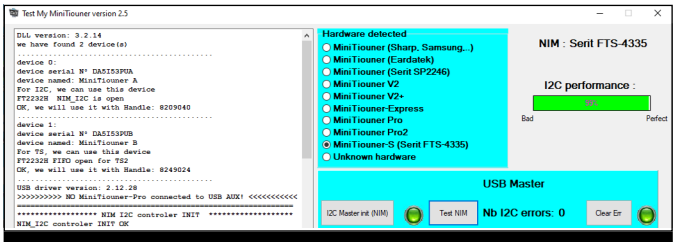

Figure 11 : Test software

The Minitiouner is recognized as a Minitiouner-S, compatible with the versions of this series of BATC, but compared to these kits, it has the advantage of natively managing the voltages of two LNBs connected to the two F plugs of the NIM.
There is therefore no need for any injector or “T-bias” to perform this function.
Regarding the Minitioune software, you must use the versions from V09_9_1i.

Figure 12 : Mintiouner-S ervice

CONCLUSION :

This new model in the Minitiouner range is intended to offer as many people as possible the opportunity to start in DATV, an activity that the REF is pleased to promote.
Software can be downloaded on web site www.vivadatv.org section Téléchargement/download