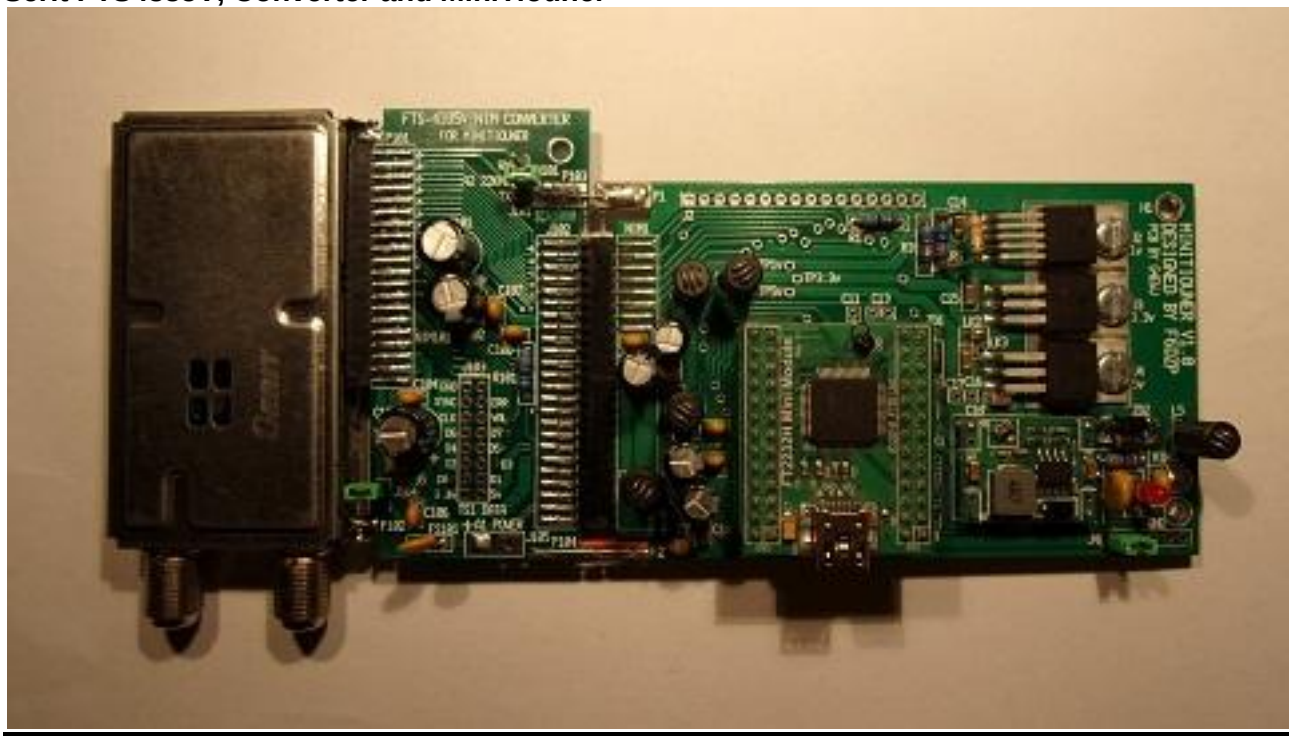
BATC Kit MTK2 for MiniTiouner

Serit FTS4335V NIM Converter

Document Change Log

2017-02-22	v1.01	First release
2017-02-25	V1.02	Minor mods
2017-03-01	V1.03	Minor mods

Serit FTS4335V, Converter and MiniTiouner



Overview

MiniTiouner is a device for receiving digital TV transmissions on the amateur radio or broadcast bands. It is designed by F6DZP and is driven by his MiniTioune software running on a PC.

Prior to February 2017 the MiniTiouner design used a Sharp (BS2F7V0169) or Eardatek (EDS-4B47FF1B+) tuner or NIM receiver module for reception but these have now become obsolete.

These have now been replaced by the Serit FTS4335V NIM which has several advantages over the Sharp and Eardatek NIMs:

- increased frequency range from 144-2450MHz without the need for a converter
- DVB-S2 capability with advanced features
- dual simultaneous reception using different frequencies and modes

However, the FTS4335V has a different pinout and slightly different power supply requirements from the Sharp and Eardatek tuners and this converter kit, designed for use with the BATC MTK1 MiniTiouner kit, enables the FTS4335V to be used in single receive mode in place of the Sharp or Eardatek.

Note that the FTS4335 is available in 2 variant V and H – this kit is designed for the V version and cannot be used with the H model, as the rows of pins are swapped over.

Dual receiver

The Serit tuner is capable of receiving more than one signal simultaneously; however this converter kit can only receive one signal. There is provision for a socket on the converter PCB to connect to the second receive output of the FTS4335V for experimentation, but software is currently not available to use it.

Even though only one transmission can be received at any time with this converter PCB, it is possible to select which of the two antenna sockets is used, allowing one of two antennas / converters to be connected.

RF amplifier and filtering

The FTS4335V does not have an RF preamp built in, so more gain after the antenna will be required for weak signals. It is essential that band pass filtering for each band, and probably a Satellite line amp to provide adequate gain, is used before the tuner input.

Mounting the unit

It may be possible to re-orientate the converter PCB and the NIM by using right-angled connectors, to fit into an existing box. This is left to the constructor.

These instructions relate to the SCV1080 version of the converter PCB and Build A components list. All components are through hole.

Contents

Lay out the components on the sheet enclosed with the kit and check that they are all present. The sockets and headers may vary in type, depending on component availability.

A:	PCB	1	
B:	Resistor 390k 1%	1	fits on the MTK1 MCP1826S 1v regulator
C:	2x12way or 2x25 way header	2 / 1	connects converter PCB to MiniTiouner
D:	2x20 way or 2x10 way socket	1 / 2	connects FTS4335V to converter PCB
E:	Resistor 3k3	1	value not critical
F:	Ceramic caps 100nF 50v	5	
G:	Header 3 pin	1	
H:	Header 2 pin	1	
I:	Resettable fuse 350mA	1	
J:	Electrolytic Caps 1000uF 6.3v	3	
K:	Jumpers	2	

Note: J103 for the experimental TS1 data connection is not supplied
J105 is a pair of connection pads rather than a physical connector
H101 is a 3.5mm mounting hole

Construction

It is suggested that the components are fitted in alphabetical order.

Apart from the NIM sockets which mount on the edges of the PCB, all components mount on the top of the PCB.

Preparation:

Note that the FTS4335V requires a 1.1v supply rather than the 1.0v for the Sharp and Eardatek. If you are not using the BATC MTK1 MiniTiouner, then you should investigate how to change your 1.0v regulator circuit to provide 1.1v

Disconnect the Sharp or Eardatek NIM before continuing.

A: PCB

The PCB is tinned with leaded solder and leaded solder is recommended.

The PCB copper coating is 2 oz, which is double the standard thickness. This should help to reduce voltage drops along high current tracks. You may find that you need to apply the soldering iron for slightly longer than usual.

B: Resistor

R99 390k 1% orange, white, black, orange, brown

This is fitted to the MCP1826-ADJ 1v regulator (U2) circuit on the MTK1 MiniTiouner PCB.

Leave R5 in place and solder the 390k resistor in parallel with it. Keep the resistor legs for later.

Without any NIM connected, connect a supply to the MiniTiouner and check that 1.1v nominal can be measured at test point TP1v on the MiniTiouner PCB. The allowable range is 1.07v to 1.13v.

Disconnect the supply from the MiniTiouner.

Remember to remove this resistor if the MiniTiouner is ever used with the Sharp or Eardatek NIMs.

C: MiniTiouner Connection Headers

J102 2 off 2x12 way, or 1 off 2x25 way

These double ended headers are used to connect the converter PCB to the MiniTiouner.

If using the 2x25 way header, cut off the 4 endmost pins (top and bottom, left and right) as only 2x24 way is needed.

If the pins on the two sides of the connector are of different lengths, the longer side is the one that plugs into the MiniTiouner. One of the 2x12 way header types has one side 0.1mm longer than the other, if you want to be really precise.

Insert the connectors into the MiniTiouner.

Support the converter PCB so that it is level with the MiniTiouner PCB and slide the pins of the header onto the edge of the converter PCB, so that the header is firmly against the edge of the converter PCB.

The edges of the MiniTiouner PCB and the converter PCB should line up.

Check that the top pins are in the centre of the pads.

Solder a pin at each end of the top.

Check that the pins on the bottom side of the converter PCB are aligned with the pads.

With the converter PCB supported, solder all the top pins.

Solder all the bottom pins.

Detach the converter PCB from the MiniTiouner.

D: NIM Connection Sockets

NIM1 1 off 2x20 way socket or 2 off 2x10 way socket

Slide the pins of the socket onto the edge converter PCB and make sure that the pins are centred on the pads and that the socket is at right angles to the PCB.

Solder a pin at each end of the top.

Check that the pins on the bottom side of the converter PCB are aligned with the pads.

Solder all pins.

E: Resistor

R101 3k3 orange, orange, black, brown, brown

Keep the resistor legs for later.

F: Ceramic Capacitors

C104, C105, C106, C107, C108 100nF

Fit flush with the PCB.

G: 3 Pin Header

J101

Insert the short end. Solder the middle pin and ensure that the header is vertical before soldering the other pins.

H: 2 Pin Header

J104

Insert the short end. Solder one pin and ensure that the header is vertical before soldering the other pin.

I: Resettable Fuse

FS101

Insert as far as the bend in the legs.

J: Electrolytic Capacitors

C1, C2, C3

As is usual, electrolytic capacitors have a stripe down the negative leg side, whereas the PCB is marked on the positive leg side.

Fit flush with the PCB.

K: Jumpers

Quantity 2

These are used on J101 and J104. See below for details.

MiniTiouner Ground Connections

Insert the converter PCB into the MiniTiouner and support both so that the PCBs are level.

Solder wires from the P103 and P104 ground pads on the converter to the corresponding pads on the MiniTiouner.

Do the same on the bottom side for extra mechanical strength.

It will be easier to disconnect the PCBs in the future if the wires are laid onto the surface of the ground pads, rather than going through the holes.

NIM Ground Connections

Insert the FTS4335V NIM into the NIM101 socket and make sure that it is level.

Connect wires from the P101 and P102 ground pads on the PCB to the ground lugs on the NIM, using the resistor legs from earlier.

FTS4335V Details

Although the FTS4335V is capable of dual simultaneous receive, only single receive is possible with the converter PCB, although the second receive output on J103 is available for experimentation.

As with the Sharp and Eardatek NIMs, there are two antenna connections. These are known as A1 and A2. A2 is furthest away from the NIM pins and this one would normally be used for standard operation.

There are two data ports for the received transport streams, known as TS1 and TS2. TS2 is connected to the MiniTiouner and TS1 is connected to the J103 header (not supplied) on the converter PCB.

A1 and A2 may be connected internally to either TS1 and TS2, or TS2 and TS1. This is controlled by the MiniTioune software.

The MiniTioune software for the FTS4335V is still under development, so the ability to select the antenna input or 22kHz output may not be available yet.

Selecting the antenna input:

On the MiniTioune screen, select the required antenna input, A1 or A2.

If there is no option to select the antenna input, it will default to A2.

MiniTioune.ini File

TS=2 should be set when using the converter PCB.

If this is not set correctly, everything may look good on the MiniTioune screen, with lights, meters and constellation showing that a signal is being received, but there will be no video if TS2 has not been selected as above.

Powering Preamps and Converters on the A2 Antenna Input

Note that unlike with the Sharp and Eardatek NIMs, it is not possible to inject a voltage into one antenna connector and put a jumper on J1 on the MiniTiouner PCB to make the voltage appear on the other antenna connector. J1 has no effect when using the converter PCB.

Power is fed to the A2 antenna connector by putting a jumper on the western 2 pins of J4 on the MiniTiouner PCB, in the same way as for the Sharp or Eardatek NIMs.

Powering Preamps and Converters on the A1 Antenna Input

The A1 antenna input has a separate supply connection using the J105 pads on the converter PCB. Note the +ve marking on the western pad.

E.g. this could be used to feed 18v to an LNB to select horizontal polarisation for Es'hailSat2.

A jumper should be placed on J104 to connect this supply to the A1 antenna input.

This supply goes through FS101, which is a resettable fuse that will allow 350mA before starting to shut down.

The standard resettable fuse in the MTK1 MiniTiouner kit is rated at 200mA, which is too low for devices such as the DG0VE 2m converter, which takes 290mA.

Note that there is no polarity protection on A1 supply, to allow the minimum of voltage drop.

It is recommended not to connect to the MiniTiouner psu circuitry, but directly to a separate supply, or directly to the MiniTiouner external supply.

E.g. a connection could be made from J105 to the eastern end of D2 on the MiniTiouner PCB, through a diode if required. Only the positive wire is required in this case, as the ground is common to both PCBs.

TS2 22kHz Select

This is generally only used by receivers on repeaters, to detect a valid signal. On J101, place a jumper at the 22kHz RX end to feed the 22kHz output of the FTS4335V to pin 11 of the NIM on the MiniTiouner PCB.

G4EWJ 2017-02-25
g4ewj@yahoo.com