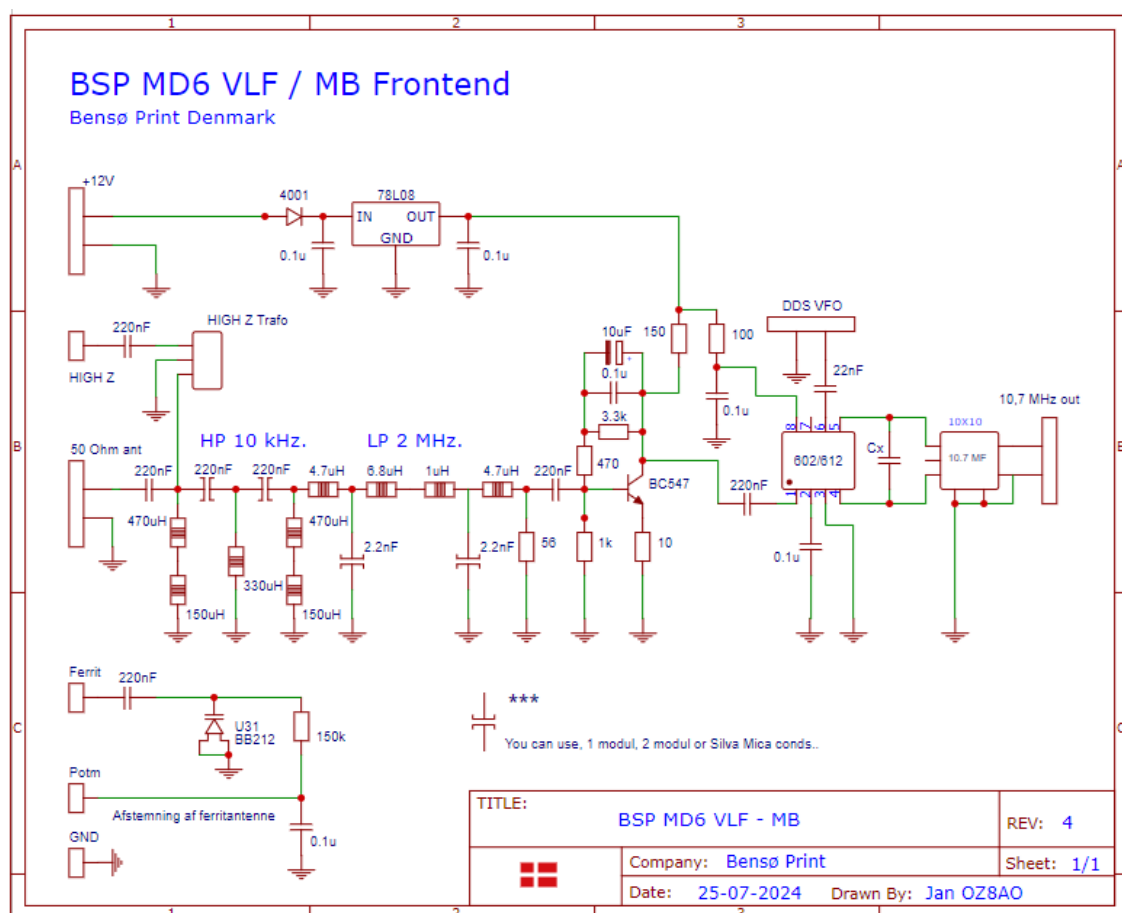
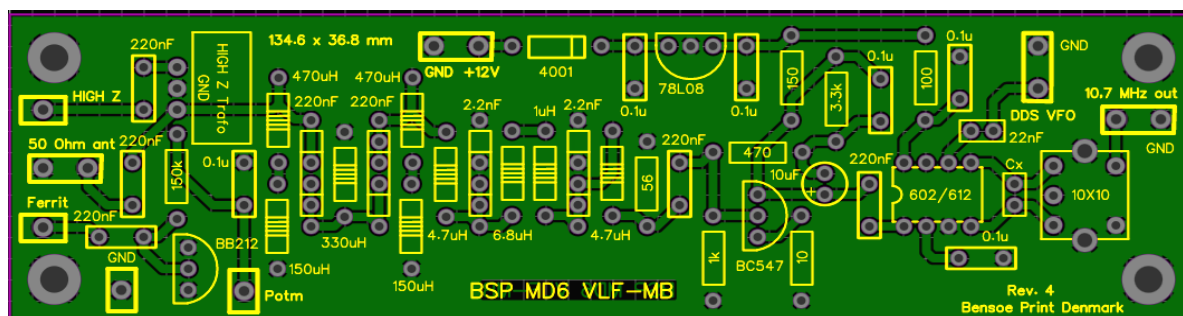


Instructions for mounting of the BSP module MD6 VLF-MB

Bensø Print Denmark.



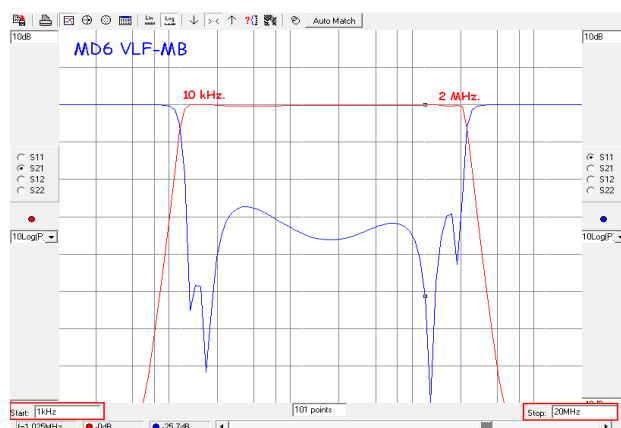
If your PCB is Rev3, 33 Ohm must be changed to 10 Ohm. (gives improved sensitivity).

Description:

BSP MD6 VLF - MB is a so-called 'front-end module'. Its task, like our other front-end modules, is to retrieve and 'mix' the frequency range you want to listen to, to the intermediate frequency of 10.7 MHz. Therefore the modul is the 'first step' in a 'double super receiver'.

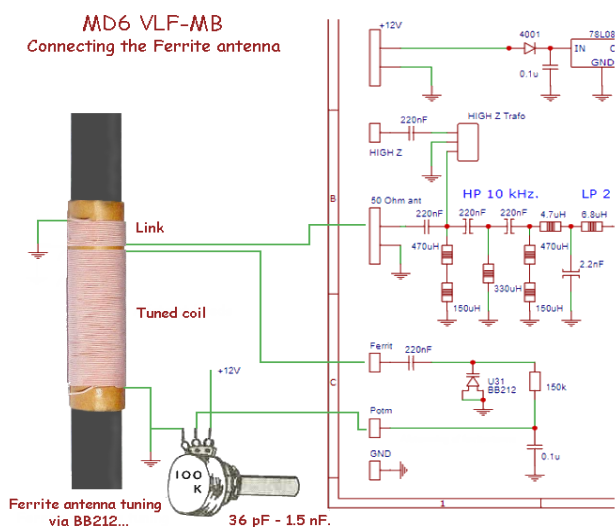
The MD6 VLF-MB is intended for listening from the lowest frequencies suitable for 'radio use' (10 kHz.) and up through Longwave 'LW' through Mediumwave 'MW', ending where the shortwave band really begins at 2 MHz. By terminating at 2 MHz. the 160 meter radio amateur band (1.8 to 2 MHz.) is included in the module's coverage area.

The module primarily consists of a double filter (High Pass and Low Pass), which partly ensures that frequencies lower than 10 kHz. does not interfere with listening (50-100 Hz./hum and more) and other noise from this area.



The 'other end' of the filter (2 MHz). ensures that disturbing signals from the other shortwave band (above 2 MHz.) are removed/attenuated strongly.

The filter is finished with a 'buffer' which, in addition to a little amplification, also adapts to the subsequent balanced mixer/mixer '602/612'. The mixer's 'second port' receives a signal from e.g. our 'DDS VFO' so that a 10.7 MHz. signal is created and passed on to the intermediate frequency (IF).



The module can be connected to 3 types of antennas.

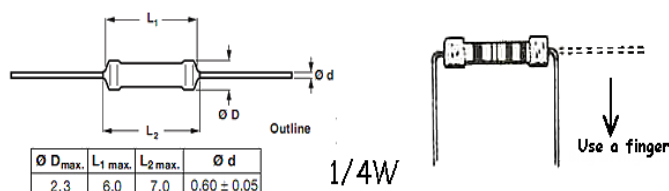
A 50 Ohm (Mini Web antenna) e.g.
A 'High Z' (Rod Antenna / Wire Antenna).
Or a 'Ferrite antenna'.

Here is how to connect a Ferrite antenna with tuning.

Assembling the PCB:

It is recommended that a soldering tip with the same width as the diameter of the small pads (2mm) is used, with 'reasonably thin' solder lead.

Should you happen to misplace a component in the plated solder pad, then use a 'solder wick' or a desoldering pump, first from the top (if possible) and then from the bottom.

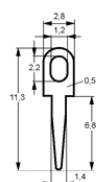


To create some distance between the print itself and the bottom of the 'soon-to-be cabinet', start by mounting 3 mm. threaded rods or 'solderable brass tubes' in the four mounting holes.

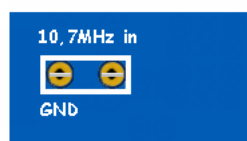


If you use brass tubes without threads, you can initially mount them into the 'four mont holes' with a 3 mm screw and nut, solder the tube onto the print and remove the bolt and nut again. **Be careful... A soldered brass tube stays hot for quite a while (ouch).**

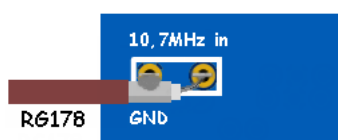
Installation of RG 178:



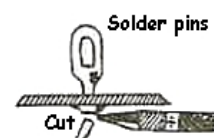
For 1,2 mm



Turn the 'solder pins' as shown



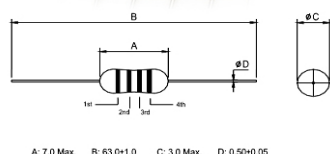
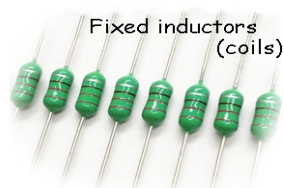
Solder the cable as shown



Fit all solder pins. PS: In the places where screen cables are to be mounted, turn the 'pins' as shown in the picture when they are mounted.

Then fit the 'lowest components' first, resistors, the IC socket, one-module ceramic capacitors, two-module capacitors (100 & 220 nF.), transistor and finally the IF can.

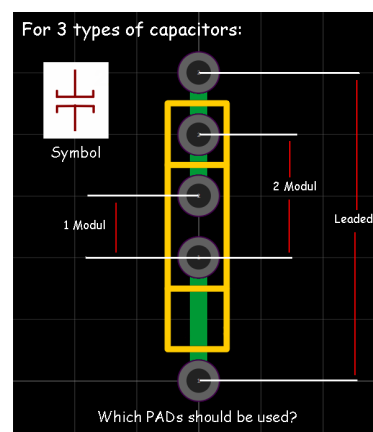
Be especially careful when fitting the 'Fixed inductors' that the correct ones come in the correct holes.



The slightly special 'capacitor print figure' that is used in the filter section is intended for 3 sizes capacitors can be selected, 1 module, 2 modules or e.g. a leaded capacitor (Styroflex or Silver mica), or whatever the 'drawer' can offer.

It should be added that you can easily design filters yourself to other frequencies and use them in MD6 VLF-MB.

[LC Filter Design Tool \(markimicrowave.com\)](http://markimicrowave.com)



Trimming and testing:

Is there a hole through? ***

When the module is fully assembled, connect the module to a 10.7 MHz. intermediate frequency (IF), e.g. one of those from our 'MD6 series' and a VFO signal is fed, e.g. from the MD6 VFO.

In order to make the test as optimal as possible, the 'IF' must have a AF amplifier (eg MD6 AF-LF) and a speaker, and a 'S-meter' must be connected.

Connect some form of antenna to the antenna input and connect 12 – 13.5V. Preferably do not use a digital power supply, as these tend to make a lot of noise, especially in the VLF area.

What can you hear? ***

Start by setting the VFO to 10 kHz. Here you will encounter the 'edge' of a strong 'empty' signal. It originates from the 'frequency' 0 Hz. (DC) and cannot be used for very much. (nor to charge your 'mobile phone' :-D).

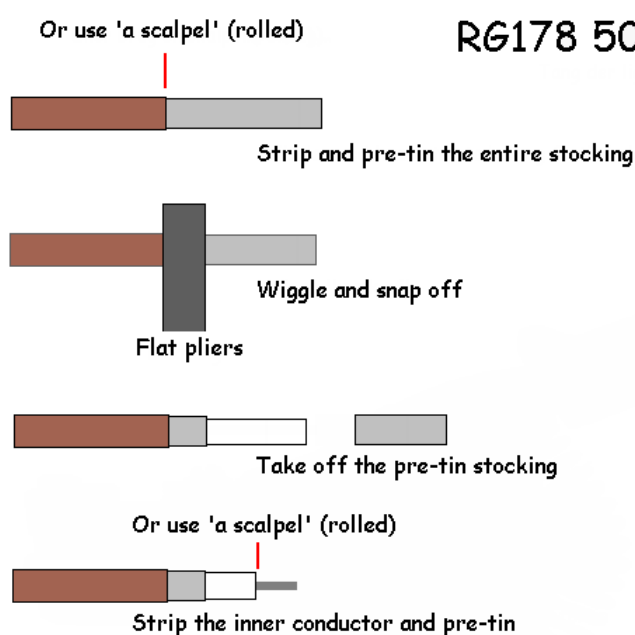
Already here, you can fine-tune 10.7 MHz. The MF box for max on the S meter.

The reason why you can hear this 10 kHz. from '0', the bandwidth of '455 CFU' is due to the filter in the intermediate frequency, but already at 15 kHz. is it gone again.

If you test with 'a little wire on the table' as an antenna, you have to switch off everything 'digital' (computer screen, computer, PS in sockets), if you don't do that, then there are lots of unpleasant things to hear, all the way through medium wave. So already now it is a good idea to think about an outdoor antenna solution.

But no matter what is done with the antenna, you can encounter individual 'empty carrier waves' in the low frequency range. They are primarily due to internal radiation from the 'DDS VFO's internal machinery' itself and are not immediately removable.

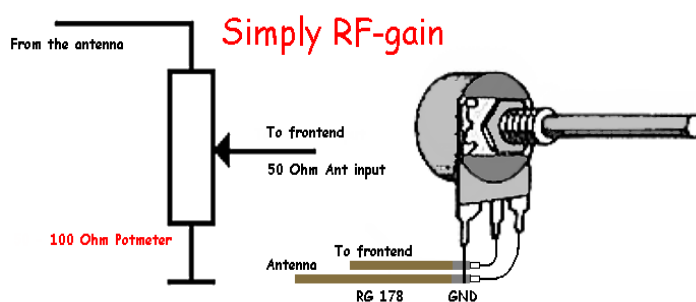
PS: Remember that signals on medium wave only really start to appear after sunset.



RG178 50 Ohm Teflon 1,8mm/ø



Practice with some bits and pieces first



*** Parts list ***

Resistors (1/4 W 7 mm):

10 1 pcs. 56 1 pcs. 100 1 pcs. 150 1 pcs. 470 1 pcs. 1k 1 pcs. 3,3k 1 pcs. 150k 1 pcs.

Capacitors (keramiske 1 module):

2,2nF 2 pcs. 22nF 1 pcs.

Capacitors 2 module:

100nF 6 pcs. 220nF 7 pcs.

Electrolyte 1 module vertikal:

10uF 1 pcs.

Fixed inductors:

1uH 1 pcs.

4,7uH 2 pcs.

6,8uH 1 pcs.

150uH 2 pcs.

330uH 1 pcs.

470uH 2 pcs.

Diodes:

1N4001 1 pcs. BB212 1 pcs.

Transistor:

BC547 1 pcs.

ICs:

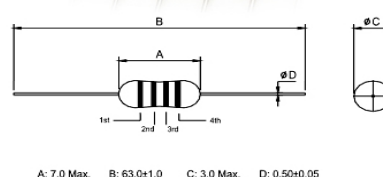
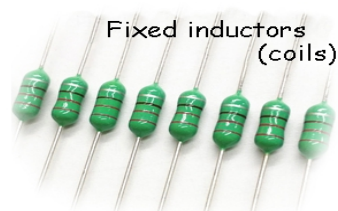
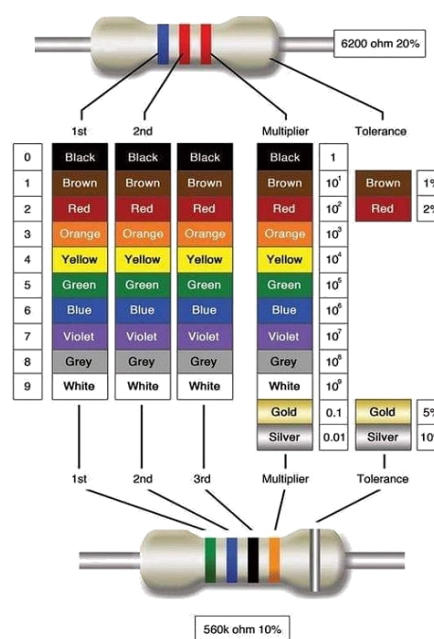
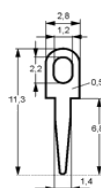
78L08 1 pcs. NE602 / 612 1 pcs.

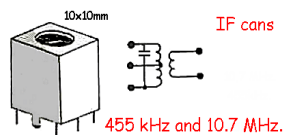
IC-sockets:

8 pin 1 pcs.

Solder pins:

1,2mm hul 12 pcs.



IF-can:

10,7 MHz. Green or Kank 3334R ($C_x = 39\text{pF}$).
(Ca. 4,8uH. - 3uH.) 1 pcs.

PCB:

BSP MD6 VLF-MB.

Component purchase:

Bensø Print:

[Project2024](#)

[Price List](#)

and

Your local dealers in your country...

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