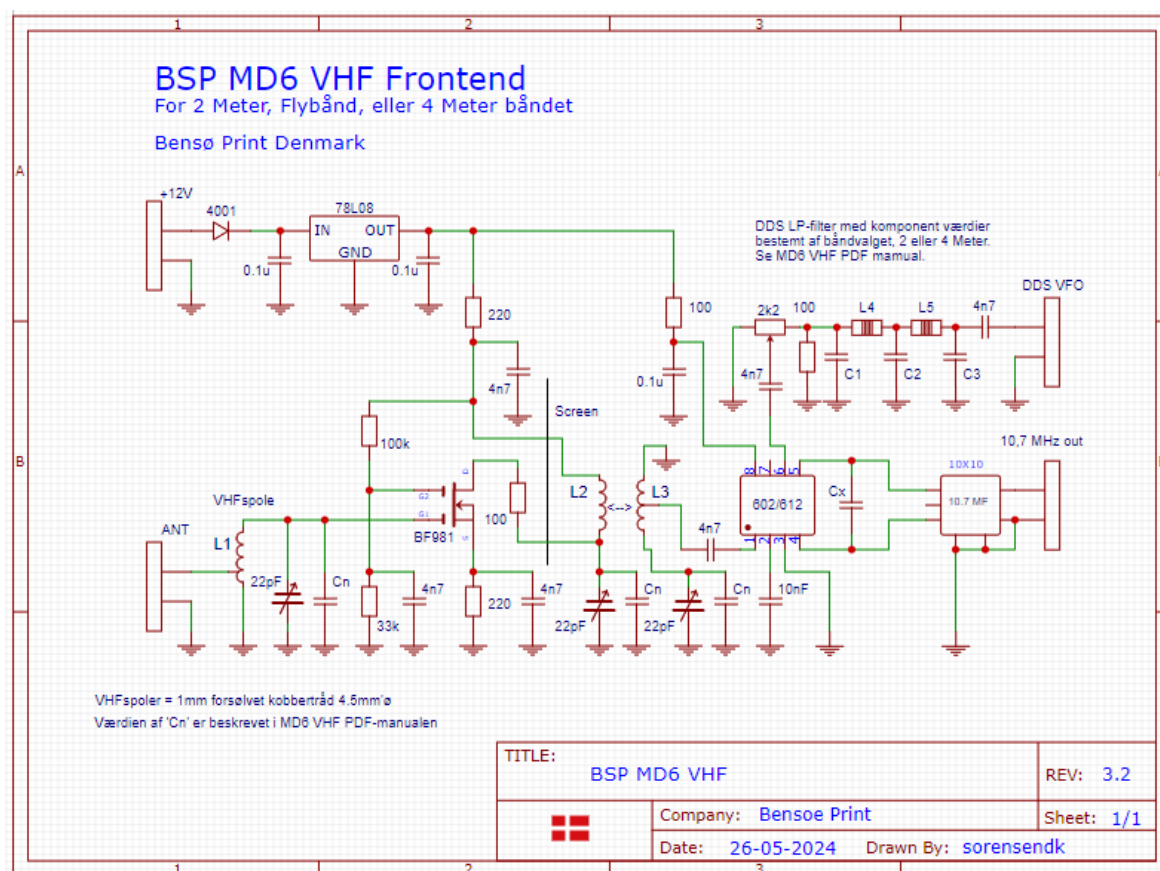
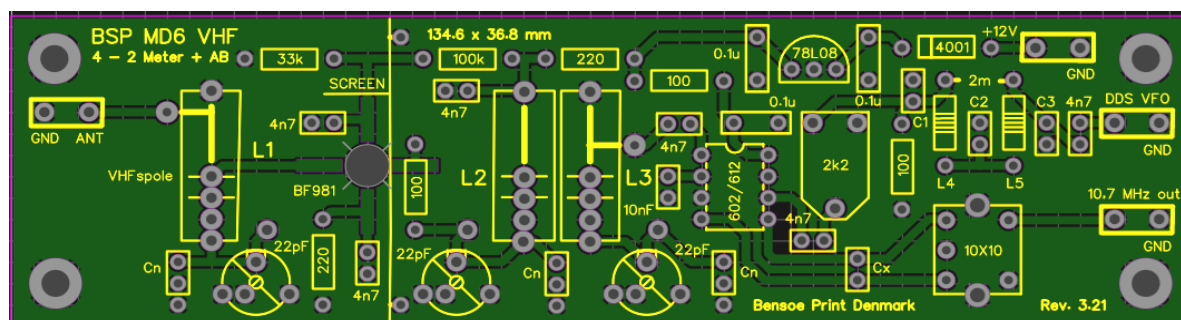


Instructions for mounting of the BSP module MD6 VHF

Bensoe Print Denmark.

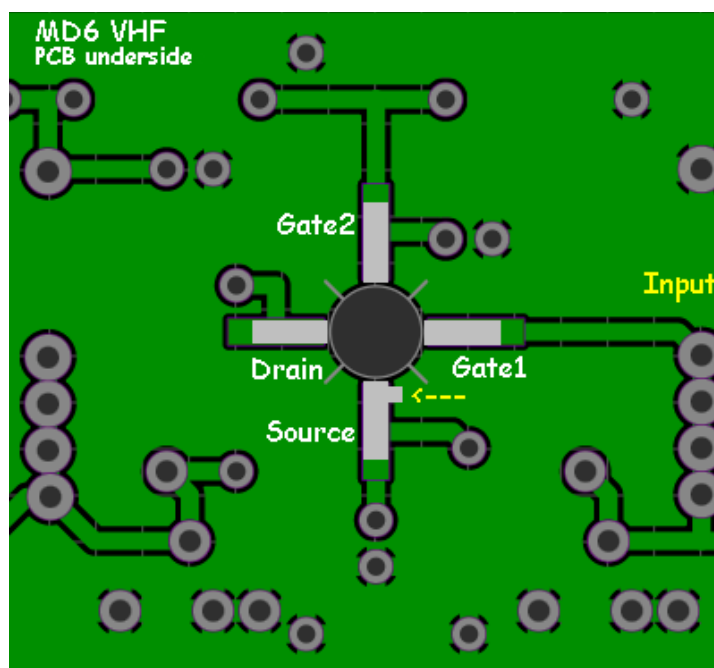


Description:

BSP MD6 VHF 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 module is the 'first step' in a 'double super receiver'.

The MD6 VHF is intended for listening on 2 meters, flight airband or in the 4 meter band. Initially, it was intended that the module should also be used to cover the 6 meter band, but this was abandoned as the coils in the module would be too difficult to make. Therefore, the module must 'BSP MD6 VHF6M' is used instead to listen in this band.

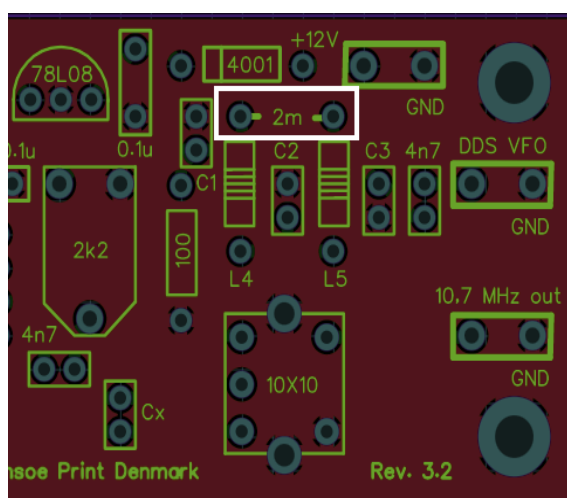
The module consists of the rather 'hot-headed' BF 981 dualgate FET transistor, which is kept 'slightly under control' by a 100 Ohm resistor inserted between the drain and L2, as well as a 'shielding plate' (see diagram and text). PS: The transistor is protected by internal fuse diodes, so don't be afraid to 'handle it'.



BF 981 must be mounted as shown, on the 'underside' of the PCB.

In general, the module is built according to a 'known recipe' with a tuned input circuit and a 'capacitive coupled filter' consisting of 2 tuned circuits. The mix to 10.7 MHz. happens as in our other front-end modules via an NE 602/612 mixer circuit.

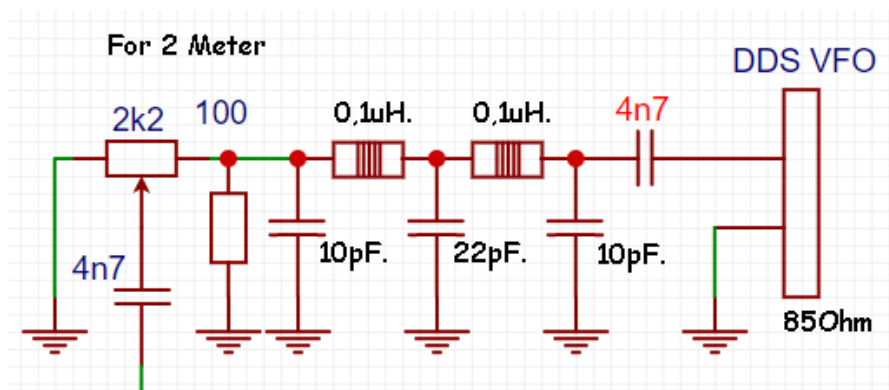
The built-in 'PLL filter' is perhaps a bit 'shooting sparrows with cannons', as the harmonics from the PLL signal lie in the area above 160 MHz. for both 2 and 4 meters, an area where the chance of hearing unwanted signals from is quite limited.



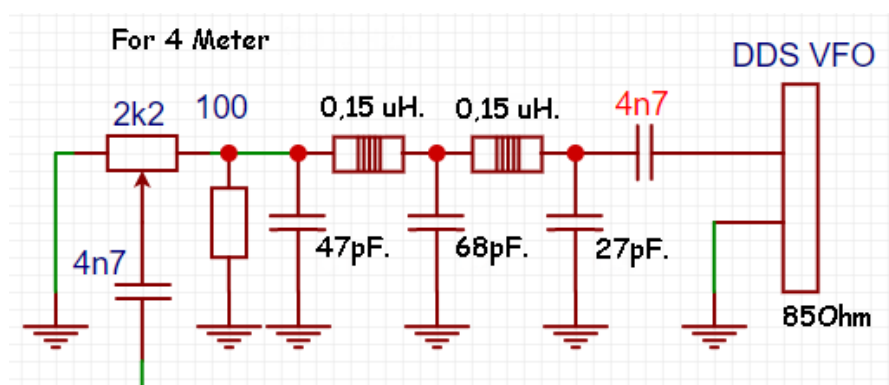
If the PLL filters are not used, one must mount 'a lice' in the shown holes 'o- 2m -o'.

The PLL filter itself consists of the capacitors C1 – C3 and the coils L4 and L.

If it turns out that higher-lying signals cause problems, then the 'lice' simply needs to be removed and one of the filters below installed (see also diagram).



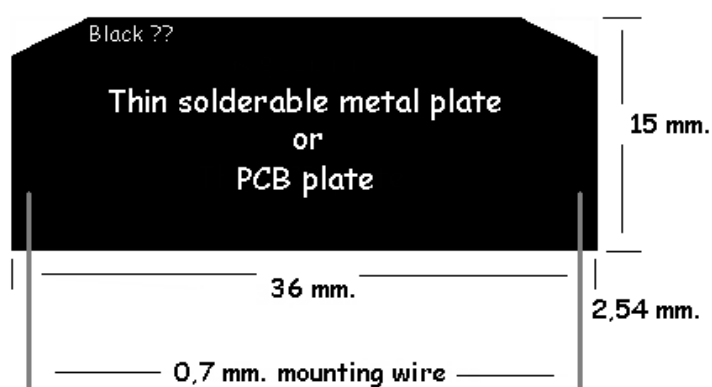
For 2 meter and Airband..



For the 4 meter band.

Before installing components:

Coils must be wound and a 'shielding plate' made.



We starts with the 'shielding plate':

In our 'test models' we have used 'smoothed tin can', a 1mm thin PCB circuit board is also fine and both are easy to cut out with ordinary scissors. Use 0.7 mm mounting wire as 'plate legs', or you can also use 'component clips'. Maybe the tin just needs to be cleaned and sanded a bit to accept the solder better.

For 'cosmetic reasons', you can eventually e.g. paint the plate black on both sides, we have used a black waterproof speed marker with fine results.

Remember (when you get there) to mount the plate so that it stands directly on the circuit board, so that the shielding between L1 and L2 will be as effective as possible.

Winding of coils:

The coils L1, L2 and L3 are all wound with 1 mm silver-plated wire. The wire should not be bought from an 'electronics dealer', but from a company where they sell items for jewelry making.

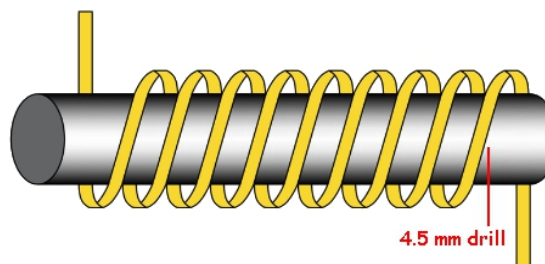
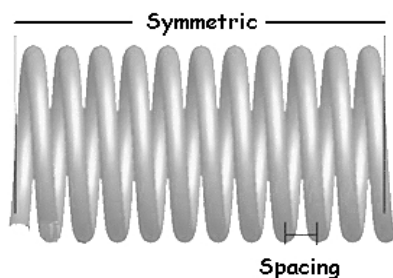


Here 4 meters of 1mm silver-plated wire. (see Parts List).

In general and before winding: See also 'Winding data' on page 5:

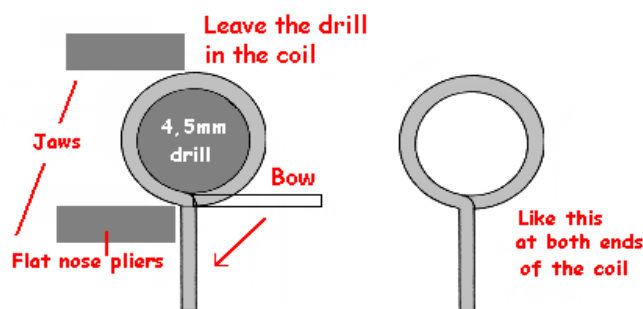
The coils for both the 2 and 4 meter band are all wound on a 4.5 mm 'drill/mandrel' clamped in a vise. The 2 meter coils all consist of 5 turns and those for 4 meters, 10 turns tightly wound.

For 2 meters, cut a good 25 cm of silver wire, for the 4 meter band, use 40 cm of silver wire. When the winding is done, the 'still sitting on the drill' must be adjusted (spaces) so that the individual windings do not touch each other and look nice 'symmetrical'.



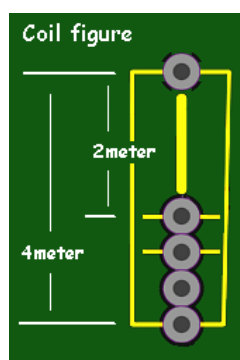
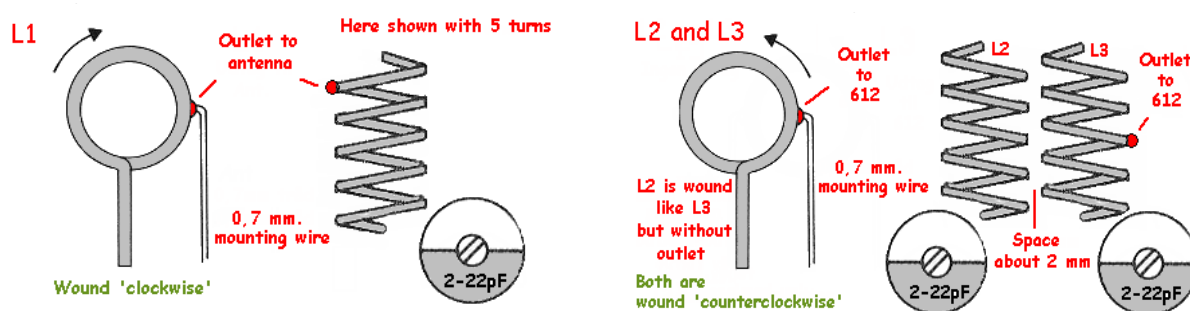
The spacing between the individual turns 'gives itself' if the coil is wound neatly symmetrically when it is mounted in the 'coil shape'.

Finish with the ends of the bobbin thread going out horizontally as shown in the figure on the right and cut to a length of just over 2 cm ready for end bending.



Bending the ends: Hold the coil firmly on the drill with a flat-nose pliers and bend the ends of the thread as shown.

Winding data: Winding directions and outlet:

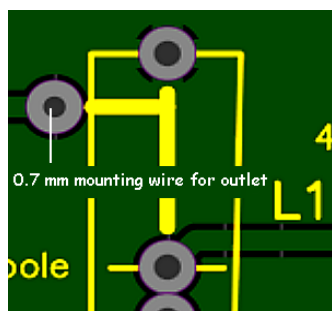


Adjust the lengths of the coils to fit to the holes in the 'coil figure'.

It is a good idea to leave the coil on the drill while working with it.

When the coils are finished winding, they are mounted on the PCB, so there is better control over them. If necessary, straighten them with a 4.5 mm drill bit after installation, so that they sit nicely straight and with a distance of approx. 2 mm between L2 and L3 (must not touch each other).

Then mount the outlets for L1 and L3:



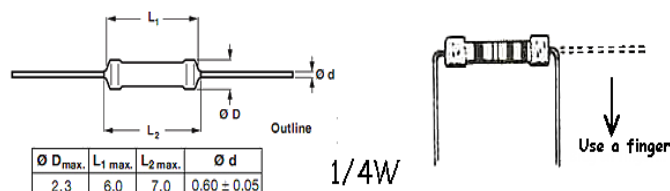
First fit the 0.7 mm wire in the 2 'outlet holes' for L1 and L3. Then bend the thread to the winding where the outlet must be plumb and cut.

Be careful not to solder windings together, applies especially to 10 wind coils. PS: Use a slightly extra hot 'solder tip'.

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.



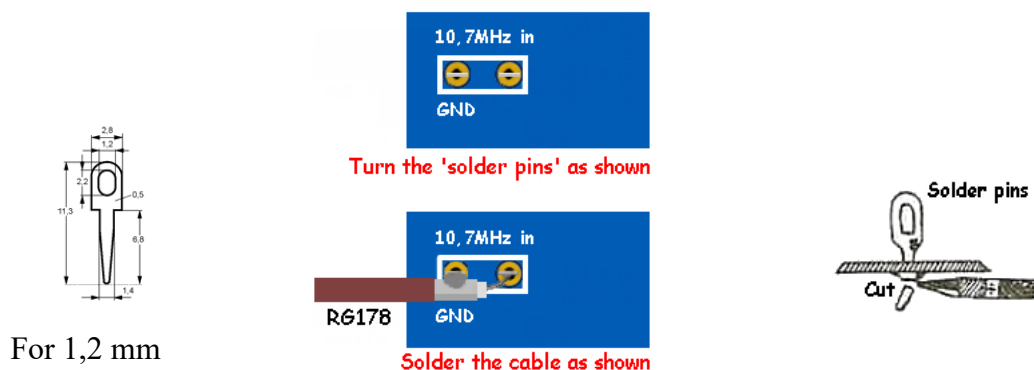
To create some distance between the print itself and the bottom of the 'soon-to-be cabinet', start by mounting 3 mm. threaded rods or 'solderable brass tubes' in the four mounting holes.



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.

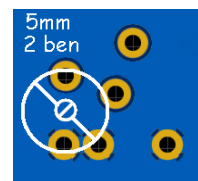
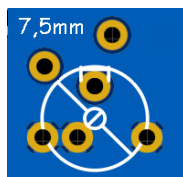
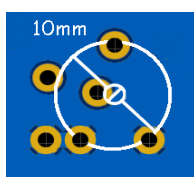
Be careful... A soldered brass tube stays hot for quite a while (ouch).

Installation of RG 178:



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 mount the 'lowest components' first, resistors, one-module ceramic capacitors, two-module capacitors (100 nF.), trimmers, 78L08, BF 981, NE 612 (must be soldered, don't use a IC socket) and finally the IF can and the screen plate.



The MD6 VHF board is laid out so that 3 types of 'green 22 pF' trimmers can be used.

Trimming and testing:

Is the line clear?

When the module is fully assembled, connect it 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), a speaker, and a 'S-meter' must be connected. Connect some form of antenna to the antenna input and connect 12 – 13.5V.

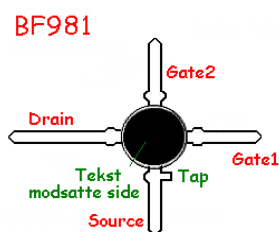
What can you hear? ***

PS: If you have chosen that the MD6 VHF should listen on the 4 meter band, you must install 1 module 15pF capacitors in the 3 'Cn' slots, close to the trimmers.

Start by setting the VFO to the center of the selected band and turn the trimmers to the center position. Now you just have to have a signal to trim on and here is perhaps a problem, i.a. because the signal should preferably be a bit strong for the untrimmed module?

Besides the best, a Signal Generator, choose a known active frequency, a signal from an acquaintance, or one of our VFO modules set up as a 'generator' can also be used.

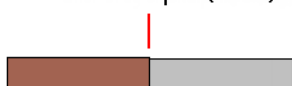
Play a little with the 'trimmers' to get optimal sensitivity in the entire 2 meter band.



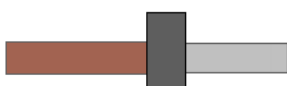
Text down



Or use 'a scalpel' (rolled)



Strip and pre-tin the entire stocking



Flat pliers

Wiggle and snap off



Take off the pre-tin stocking

Or use 'a scalpel' (rolled)



Strip the inner conductor and pre-tin

RG178 50 Ohm Teflon 1,8mm/ø



Practice with some bits and pieces first

*** Parts list ***

Resistors (1/4 W 7 mm):

100 3 pcs. 220 2 pcs. 33k 1 pcs. 100k 1 pcs.

Trim Potmeter:

2,2k 1 pcs.

Capacitors (keram.1 module):

4,7nF 5 pcs. 10nF 1 pcs.

(Til 4 meterversion), 15pF 3 pcs.

Trim capacitors (Green Philipstype) :

22pF 3 pcs.

Capacitors 2 module:

100nF 3 pcs.

Diode:

1N4001 1 pcs.

Transistor:

BF 981 1 pcs.

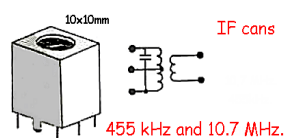
ICs:

78L08 1 pcs. NE602 / 612 1 pcs.

Solder pins:

1,2mm hul 8 pcs.

IF-can:



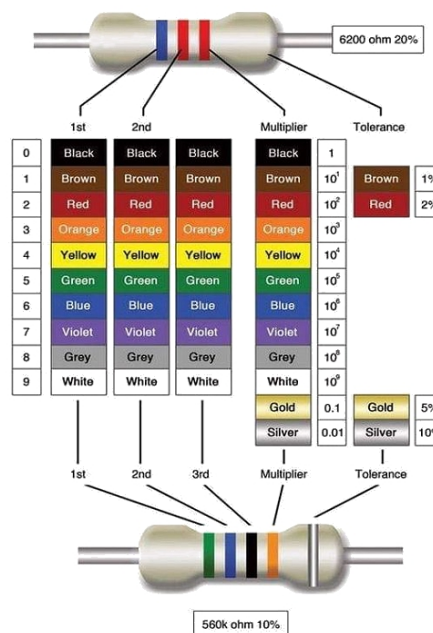
10,7 MHz. Green or Kank 3334R ($C_x = 39\text{pF}$).
(Ca. 4,8uH. - 3uH.) 1 pcs.

PCB:

BSP MD6 VHF.

Other components for filters:

See PLL filter examples page 3 of this manual.



Component purchase:

Bensø Print:

[Project2024](#)

[Price List](#)

and

Your local dealers in your country...

Projekt2024
