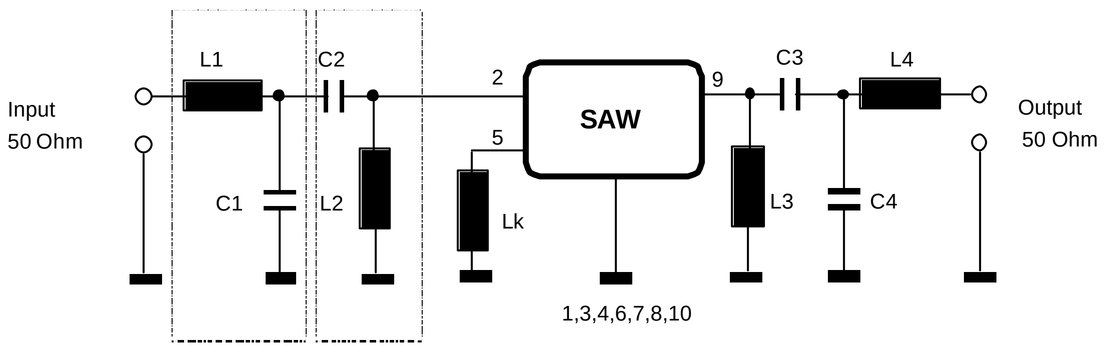
1. General

The filter is unbalanced driven. It is matched to 50 Ω

The values of matching components have been calculated for transformation of impedance from 50 Ohms to the termination impedances given in the specification. Parasitics on the customer PCB will change the values of the matching elements.

2. Theoretical matching

The termination impedances for filter input and output are:
Input: 393 Ω || - 6.6 pF
Output: 467 Ω || - 5.5 pF



The calculated matching elements for two stage matching network are:

L1 = 63 nH	C1 = 9 pF
L2 = 90 nH	C2 = 5 pF
L3 = 105 nH	C3 = 4.3 pF
L4 = 67 nH	C4 = 8.8 pF
Lk = 94 nH	

In the theoretical matching two seperate transformation stages are used. The reason for that is the high ratio of transformation. As a matter of principle one transformation stage can be used, but two stages are more stable. If two transformation stages are used, the transformation ratios of both of them have to be nearly equal to get more stability.

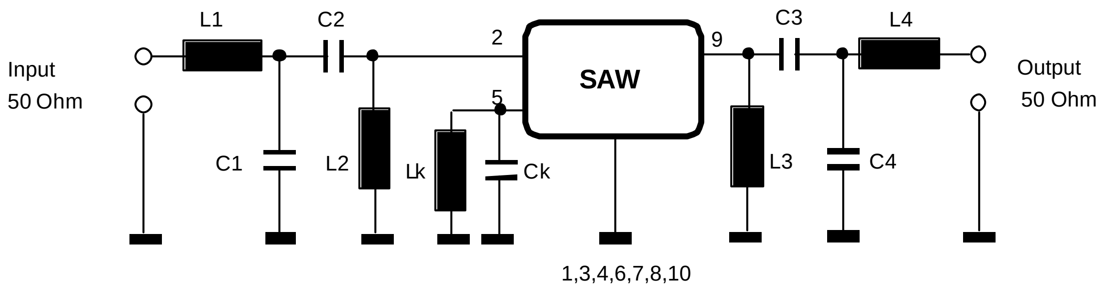
3. Matching on the PCB

The matching on the PCB will slightly differ from the theoretical matching. The reason for that are parasitics of the PCB and of the transformers. This means that the matching elements have to be slightly adjusted.

VI TELEFILTER
Potsdamer Straße 18
D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-52 / Fax: (+49) 3328 4784-30
E-mail: tft@telefilter.com

Vectron International, Inc.
267 Lowell Road
Hudson, NH 03051 / USA
Phone: (603) 598-0070 Fax: (603) 598-0075
e-mail: vti@vtinh.com

Both in line and shunt elements change both pass band tilt and pass band ripple.
The coupling coil mainly influences the bandwidth in pass band of the filter.



L1	=	120	nH	C1	=	8,2	pF
L2	=	82	nH	C2	=	39	pF
L3	=	82	nH	C3	=	39	pF
L4	=	100	nH	C4	=	6,8	pF
Lk	=	68	nH	Ck	=	1	pF

The strategy to match the filter on the customers board should be as follows:

- match the filter according to theoretical values to 50 Ohm.
  Use your final PCB for this matching to be sure to have the stray elements of the PCB then before.

- Adjust external coil according to stray elements of the PCB.
  The external coil influences the bandwidth of the filter by influencing the upper transition band of the filter only. The position of the lower transition band is not influenced. That means a wrong value for the external coil will lead to wrong bandwidth and wrong centre frequency. The group delay of the filter is influenced in the same way. There are two peaks in group delay behaviour for the matched filter. The peaks in group delay are located at the pass band edges of the filter. Finally this means that only the higher frequency peak in group delay is influenced by the external coil. This makes the adjustment of this coil very easy. Make sure that the distance in frequency of the two group delay peaks is identical with the distance shown in the delivered plots. (around 340 kHz) The matching of the filter will influence the position of the filter only slightly. The height of the peaks is influenced mainly.

- Adjust matching at filter input and filter output.
  Check VSWR for filter input and output.

- Carry out the matching for the actual source and load impedance in three steps.
  Steps one and two are matching of the filter for input or output to source or load impedance respectively. The result of the matching of the filter input to the actual source can be checked via the VSWR at the filter output which is still matched to 50 Ohms and vice versa.
  The third step is the matching of the filter input to the actual source and the filter output to the actual load.

VI TELEFILTER
Potsdamer Straße 18
D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-52 / Fax: (+49) 3328 4784-30
E-mail: tft@telefilter.com

Vectron International, Inc.
267 Lowell Road
Hudson, NH 03051 / USA
Phone: (603) 598-0070 Fax: (603) 598-0075
e-mail: vti@vtinh.com

VI TELEFILTER
Potsdamer Straße 18
D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-52 / Fax: (+49) 3328 4784-30
E-mail: tft@telefilter.com

Vectron International, Inc.
267 Lowell Road
Hudson, NH 03051 / USA
Phone: (603) 598-0070 Fax: (603) 598-0075
e-mail: vti@vtinh.com

If you match the filter immediately to your source and load impedance without following the steps before you will probably find a quite good matching for filter amplitude and group delay performance. But there is no guarantee that VSWR is as good. This may increase insertion loss and decrease the stability of filter parameters in production.

In case of questions please contact us.

VI TELEFILTER
Potsdamer Straße 18
D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-52 / Fax: (+49) 3328 4784-30
E-mail: tft@telefilter.com

Vectron International, Inc.
267 Lowell Road
Hudson, NH 03051 / USA
Phone: (603) 598-0070 Fax: (603) 598-0075
e-mail: vti@vtinh.com