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│                    NEW IDEAS FOR                        │
│        VERY SIMPLE SOFTWARE-DEFINED DSB RADIOS          │
│              by Eduardo Alonso, EA3GHS                  │
│             http://ea3ghs.googlepages.com              │
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It's possible to build very simple and didactic receivers if
you use a personal computer as a intermediate frequency
amplifier and filter. With simple circuits is possible to see
that each component makes and what gain/losses has every
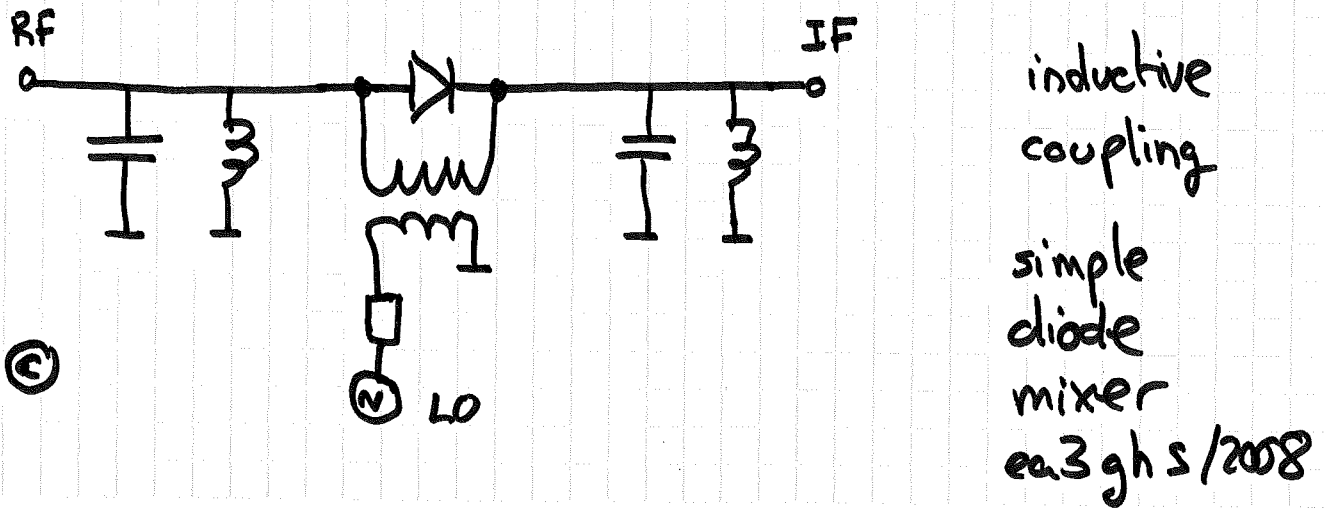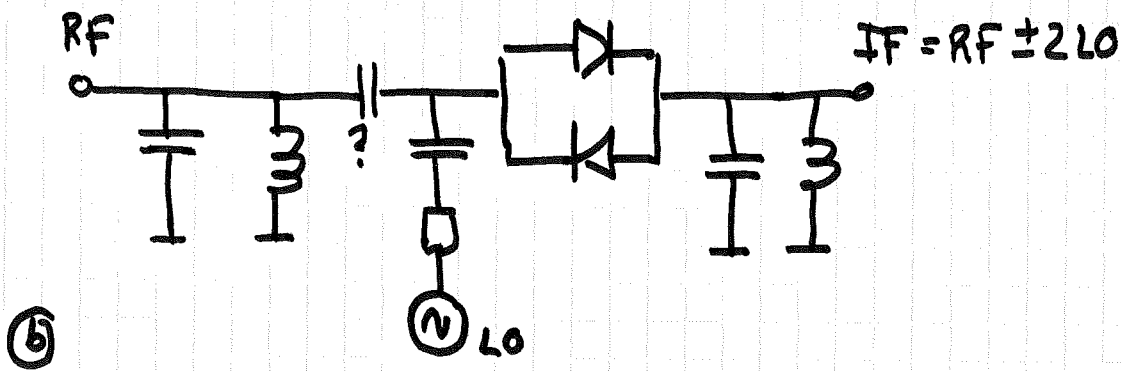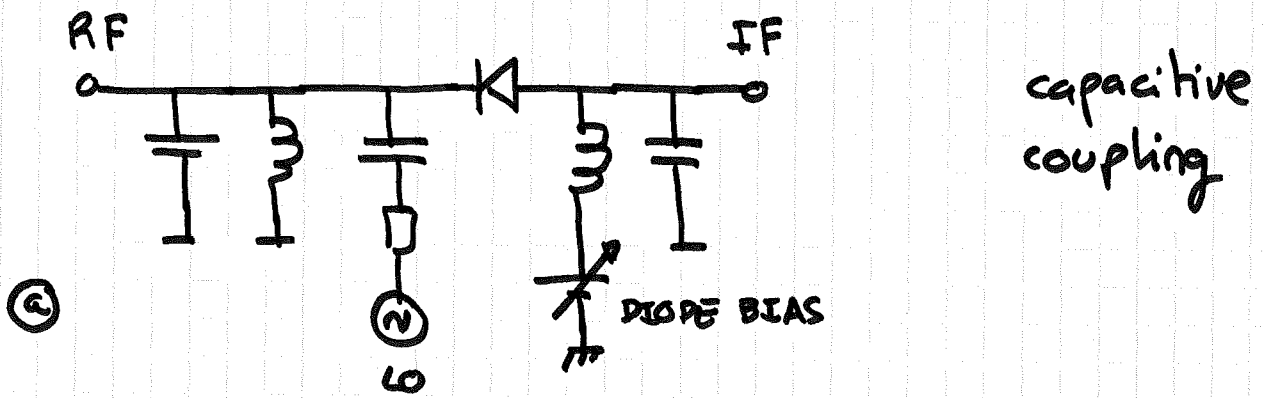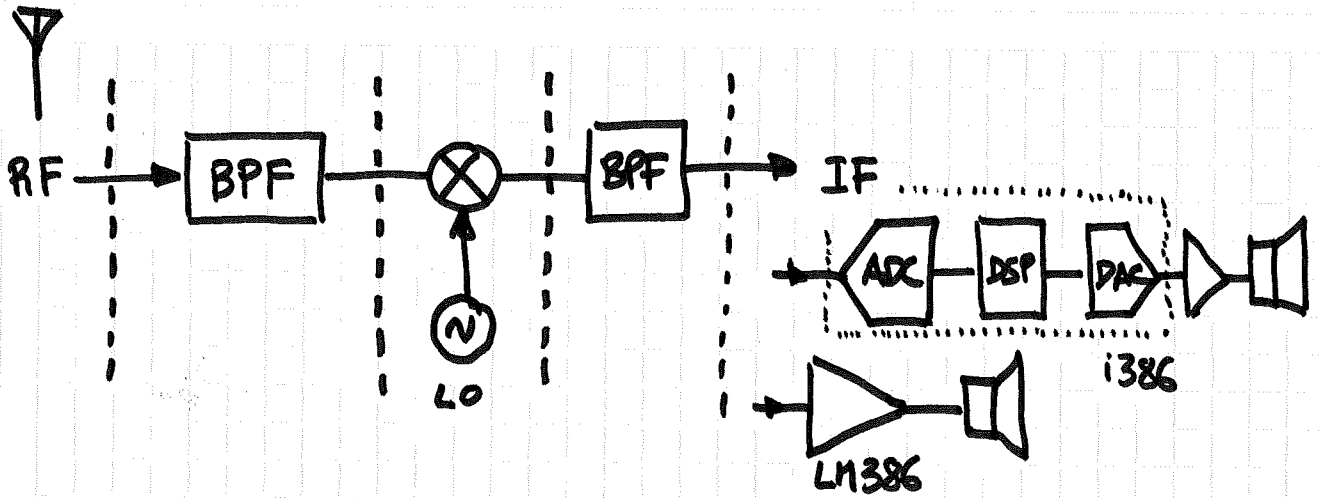stage. Also, it's more simple simulate with SPICE/APLAC.

Reviewing my "Very Simple SDR DSB RX" circuit again,

1) I am not happy that the adjustable resistor moves the bias
point of the diode and the oscillator level simultaneously. A
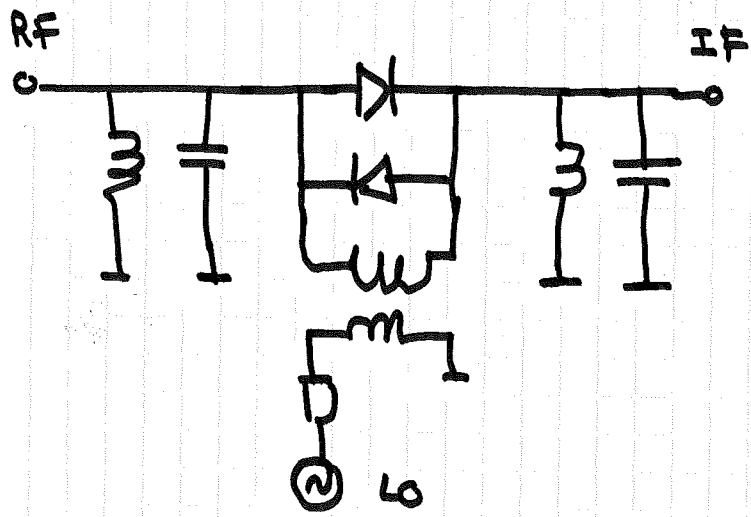posible solution is the circuit (a).

2) Is possible to build a lot of other simple circuits
changing only the mixer. The oscillator and input (RF
preselector) and output (ADC anti-aliasing) filter can be the
same. See the attached figures. There are ideas to be tested.

I am very happy with the circuits (c) "simple diode mixer"
and (d) "double diode doubler mixer".

The impedance adaptation between each stage must be checked.
These circuits have not gain, and then they should have small
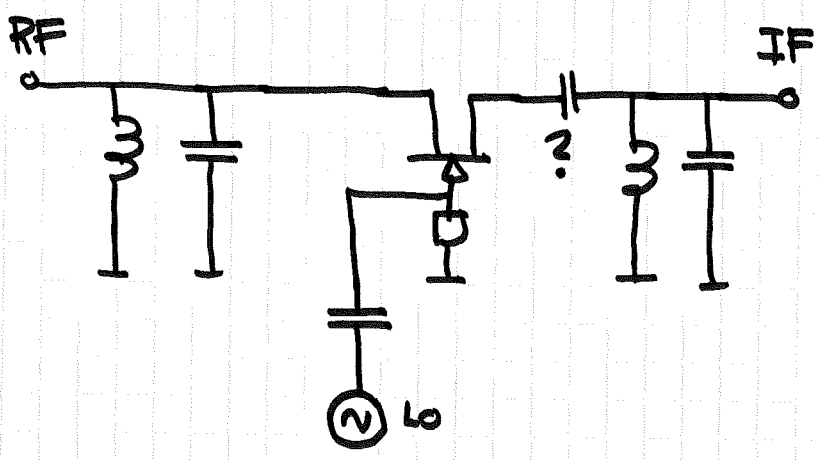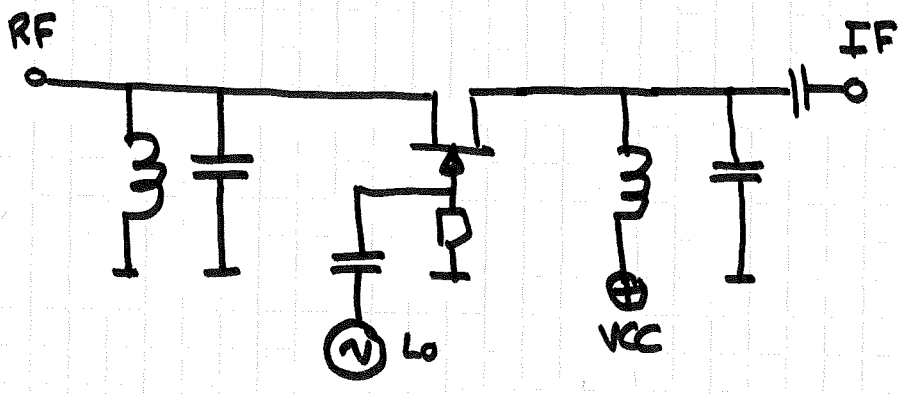losses !! Maybe the circuit (i) is a low cost solution..

RF → BPF → ⊗ → BPF → IF ..... → ADC → DSP → DAC → ▷ speaker   i386

LO (N)

→ ▷ speaker   LM386

RF .... IF   capacitive coupling

LO (N)   DIODE BIAS

ⓒ

RF .... IF = RF ± 2 LO

LO (N)

ⓑ

RF .... IF   inductive coupling

LO (N)

ⓒ

simple diode mixer

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RF   IF   double
                        diode
                        doubler
                        mixer

(d)

Lo

RF   IF
                        FET
            ?   as
                        switcher

(e)

Lo
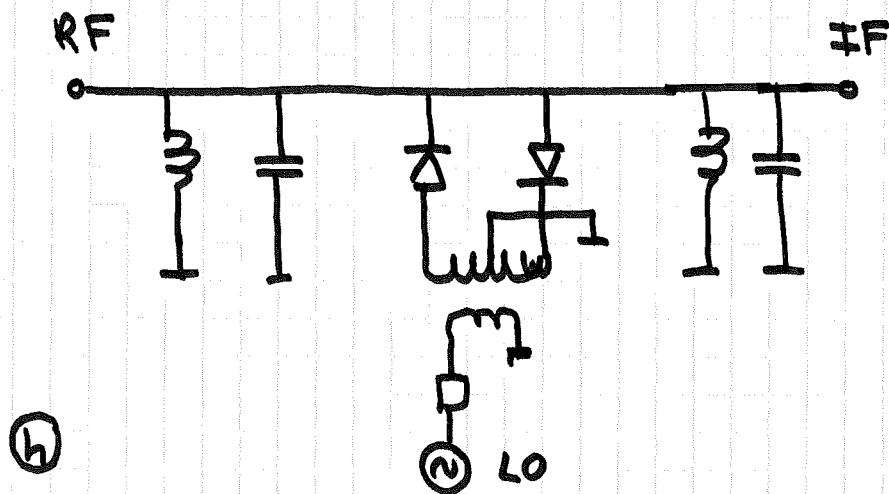
RF   IF
                        FET
                        as
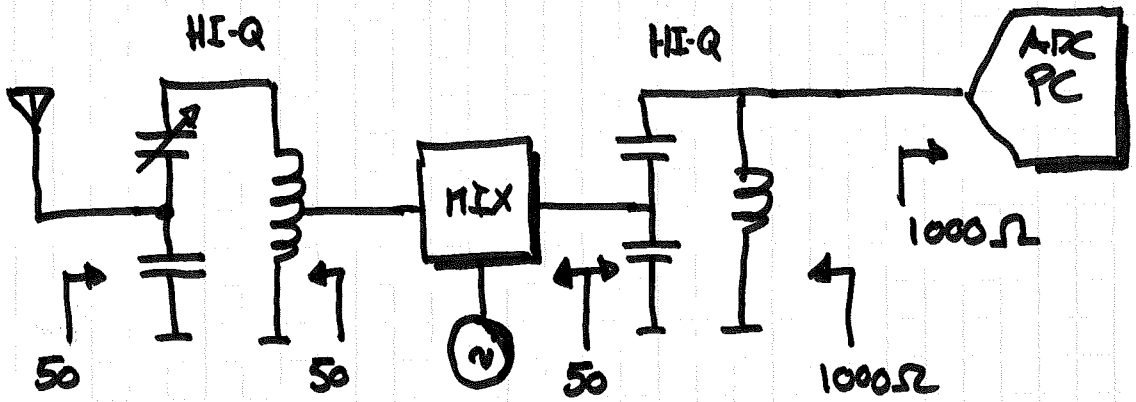   non-linear
                        amplifier

Lo   VCC

(g)

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RF ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯ ⌁⌁⌁ ⎯⎯ IF

(g)

               ?

           LO

RF ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯ IF

(h)

           LO

SOUND CARD ADC

LINE-IN

Z_{in}

16..24 bits $\simeq -120\,dBFS$
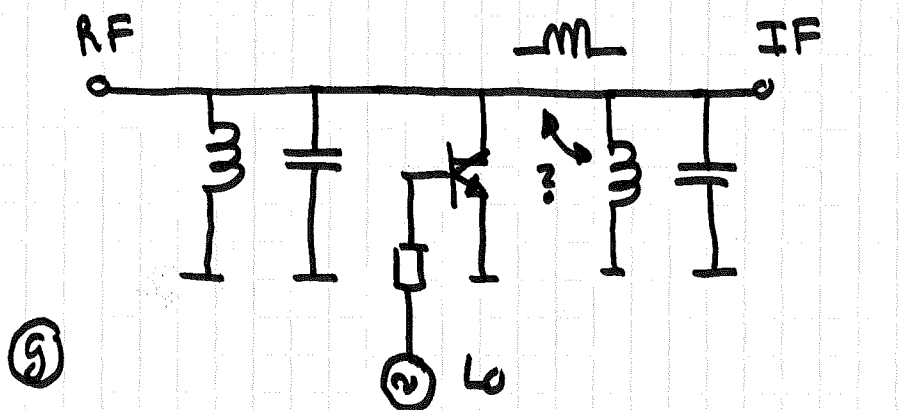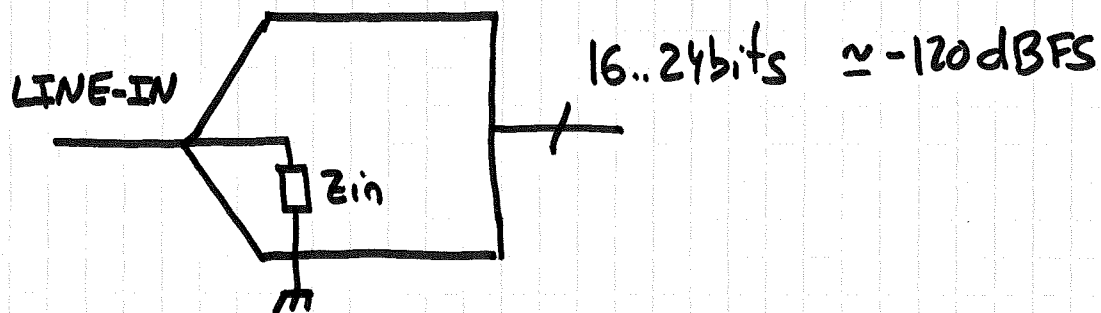
Zin notwell defined, $Z_{in} \simeq 10k\Omega$

$V_{MAX} = 1\,VRMS = 2'8\,V_{p-p}$

$1VRMS@1K\Omega = \emptyset\,dBm = \emptyset\,dBFS$

HI-Q   HI-Q   ADC
                                      PC

                                      1000 Ω

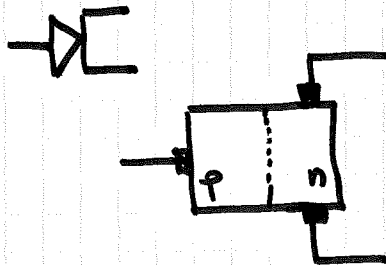50   50   (N) 50   1000 Ω

using capacitive transformators
to match stages

(i)
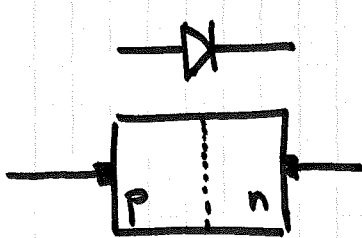
diode   fet = diode with 3 terminals

Lo   IF

(N)