

EE 3113

INTRODUCTION INTO RF

CIRCUIT DESIGN

Lecture Notes for A-term 1999

LECTURE 23

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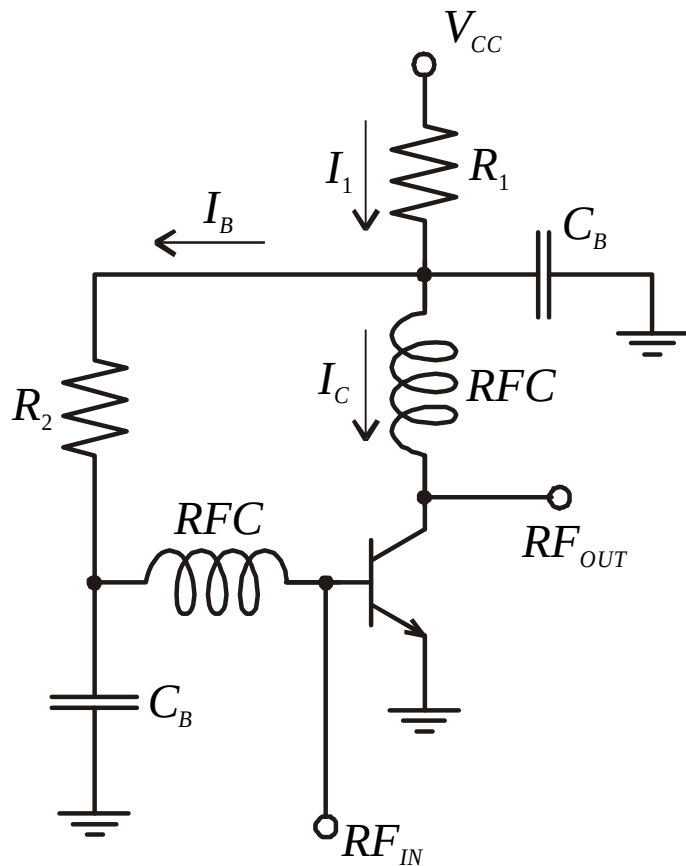
Biasing networks

- Biasing networks are needed to set appropriate operating conditions for active devices

There are two types:

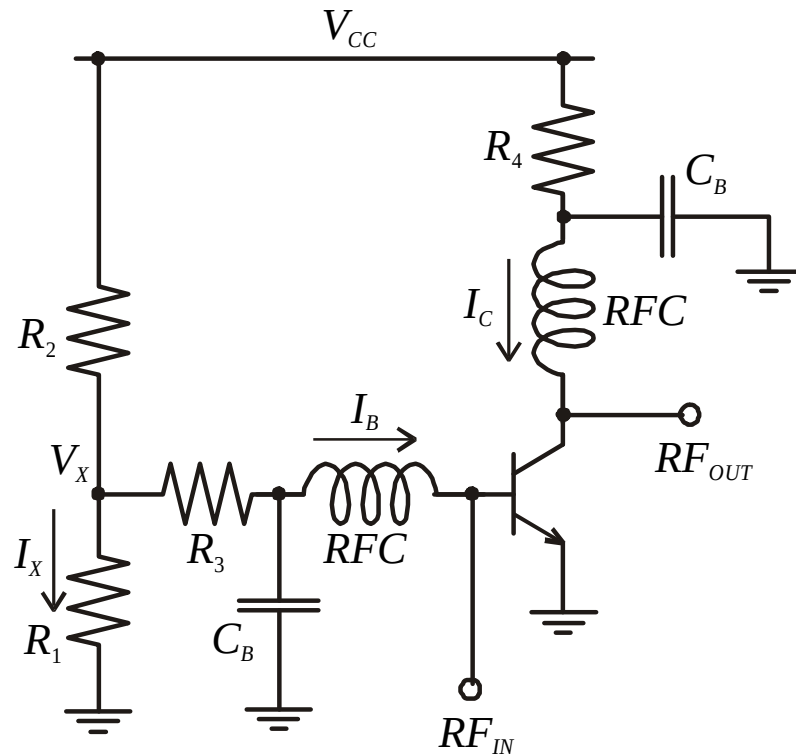
- Passive biasing (or self-biasing)
 - resistive networks
 - drawback: poor temperature stability
- Active biasing
 - additional active components (thermally coupled)
 - drawback: complexity, added power consumption

Passive biasing



- Simple two element biasing
- blocking capacitors C_B and RFCs to isolate RF path
- Very sensitive to collector current variations

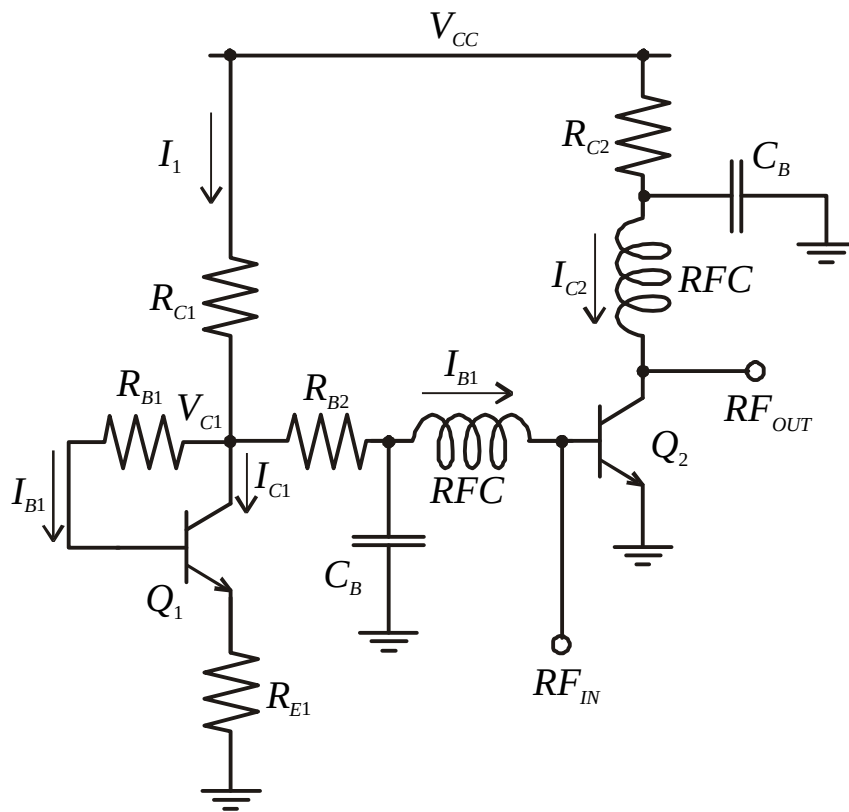
Passive biasing



$$I_B \sim 10 I_X$$

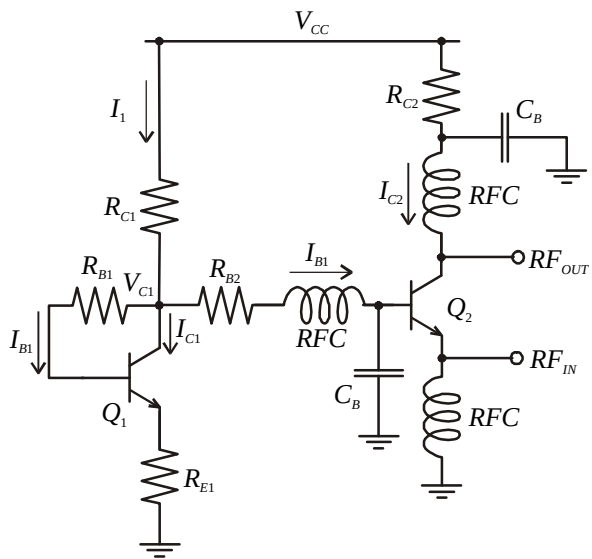
- Voltage divider to stabilize V_{BE}
- Freedom to choose suitable voltage and current settings (V_X , I_X)
- Higher component count, more noise susceptibility

Active biasing



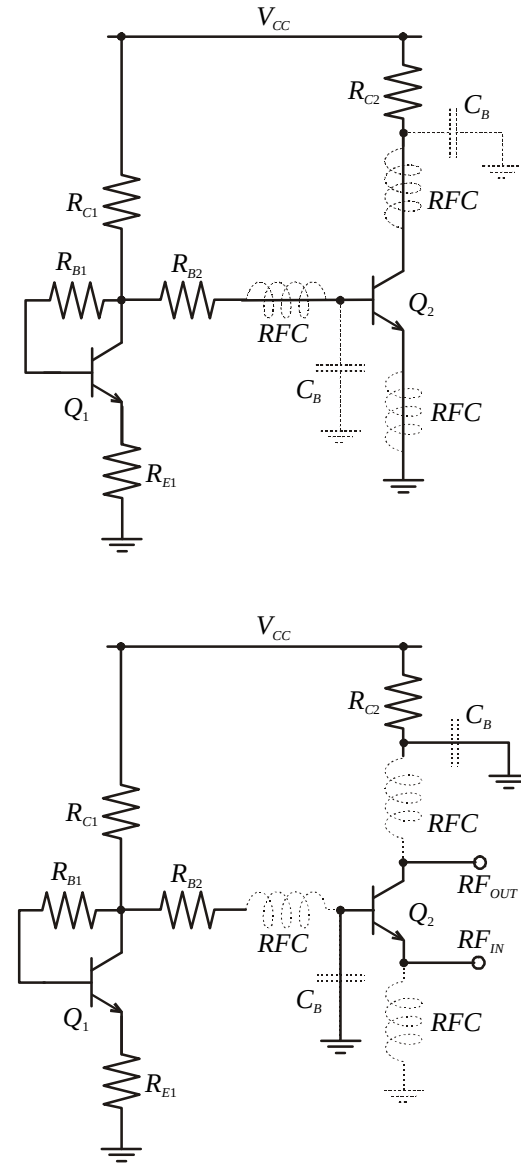
- Base current of RF BJT (Q_2) is provided by low-frequency BJT Q_1
- Excellent temperature stability (shared heat sink)
- high component count, more complex layout

Active biasing in common base



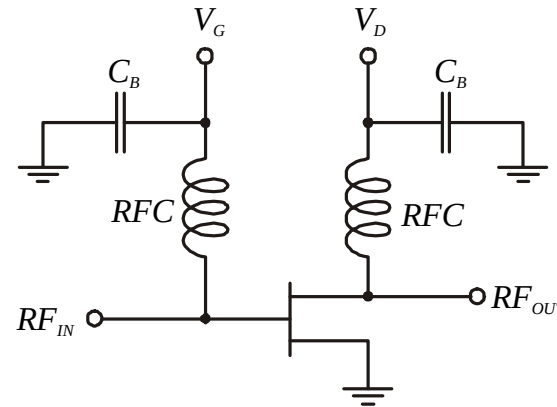
DC path

RF path



FET biasing

Bi-polar power supply



$$V_G < 0 \text{ and } V_D > 0$$

Uni-polar power supply

