



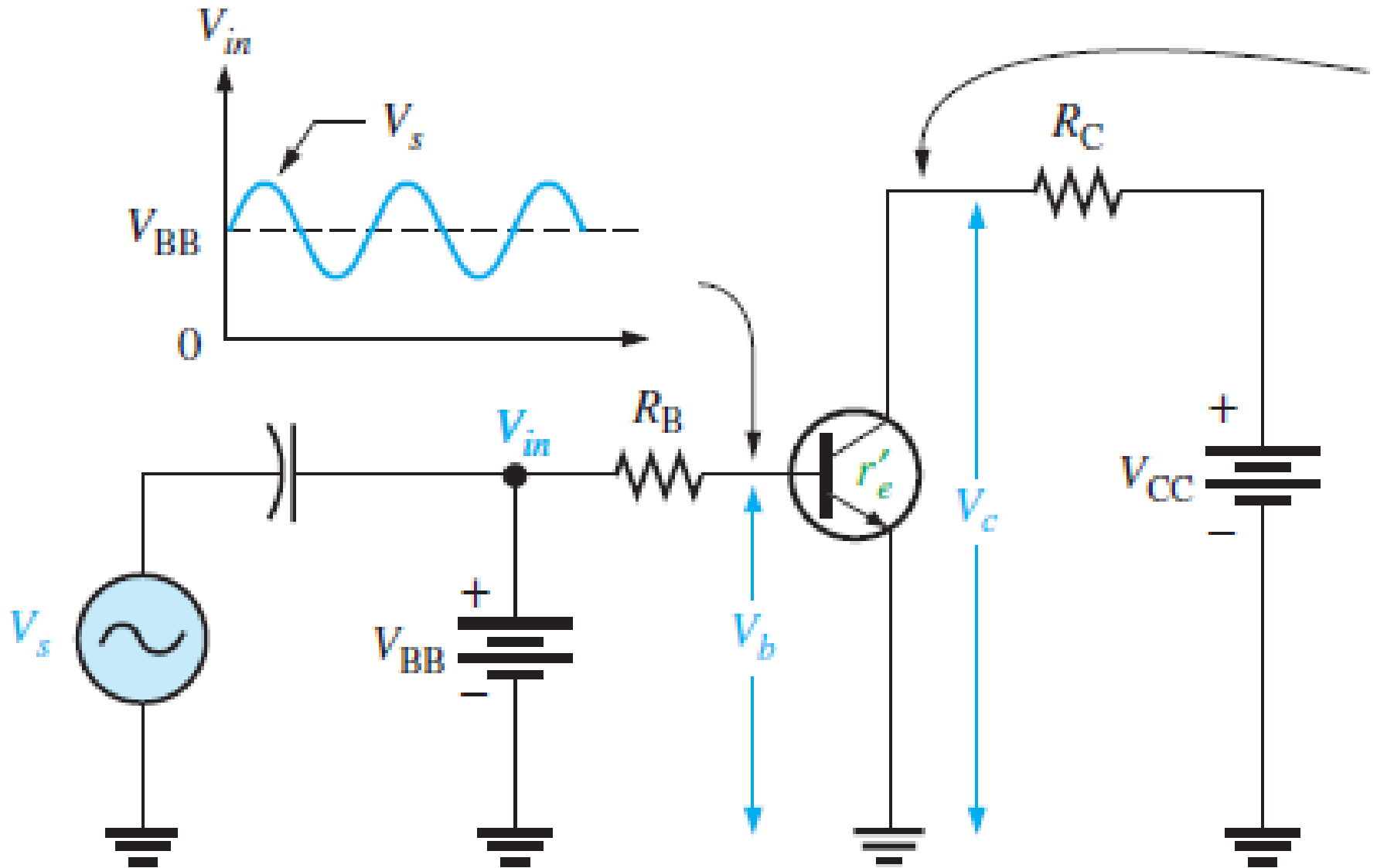
Project (01)

Audio Amplifier

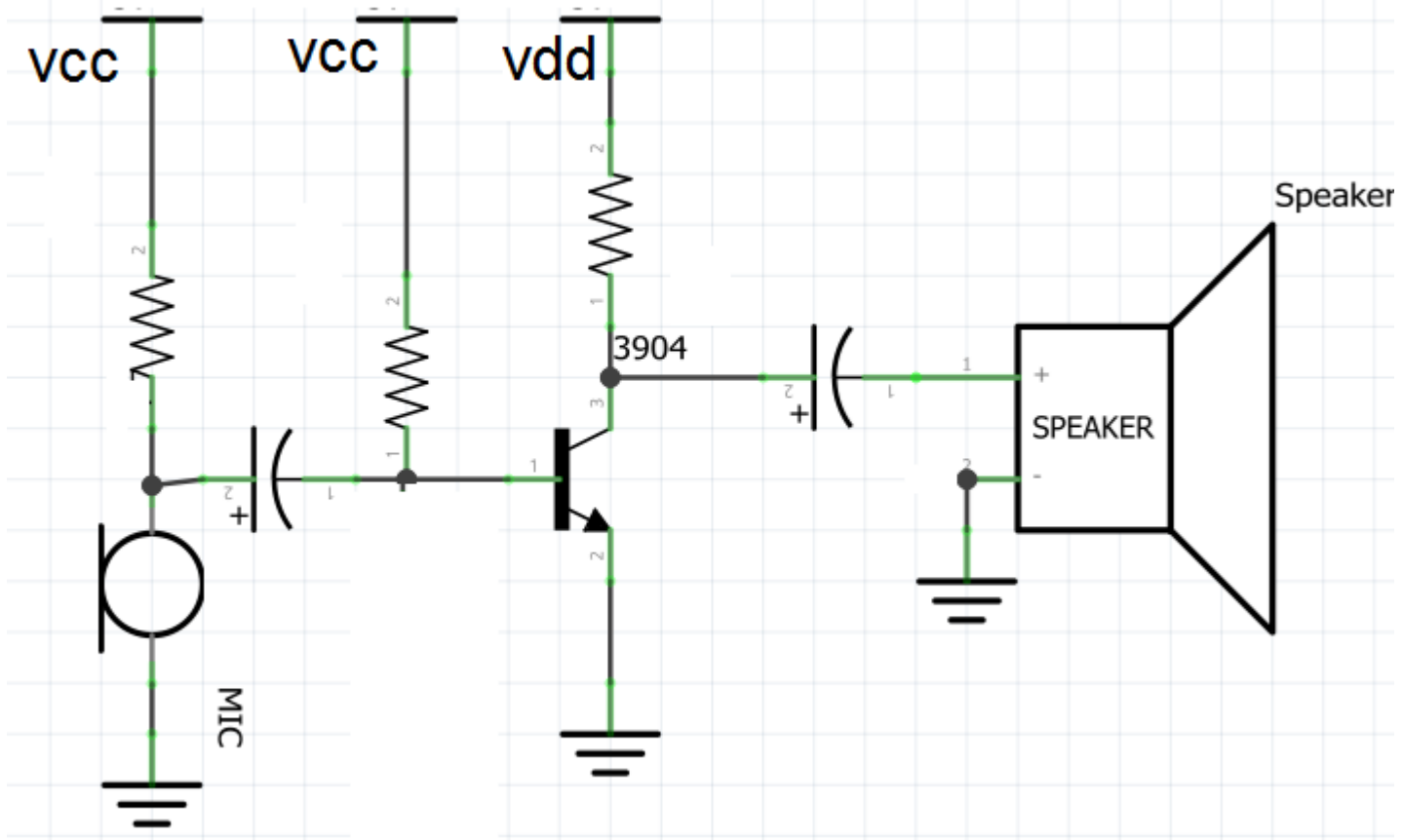
By:

Dr. Ahmed ElShafee

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- Build simple audio amplifier based on 3904 NPN transistor.
 - build suitable regulation circuit, to make sure that voltage that feed the amplifier is 5/12 volts.
 - In the following few slides you will find captures from microphone, transistor data sheets.
 - Build a report to state the main design rules to find suitable resistor, capacitors of your circuits, and how did you decide used values.



Amplifier : schematic

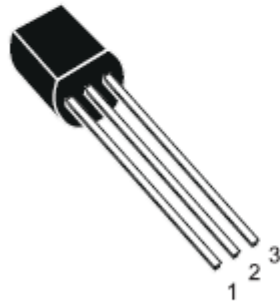


Transistor: data sheet

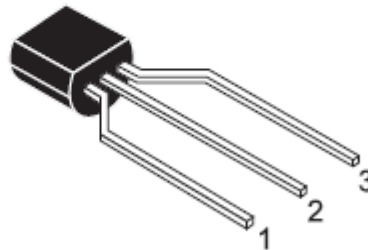
2N3904

GENERAL NPN TRANSISTOR

PRELIMINARY DATA



**TO-92
Bulk**



**TO-92
Ammopack**

ABSOLUTE MAXIMUM RATINGS

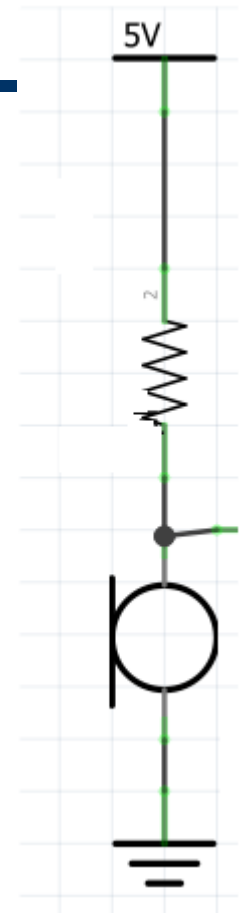
Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage ($I_E = 0$)	60	V
V_{CEO}	Collector-Emitter Voltage ($I_B = 0$)	40	V
V_{EBO}	Emitter-Base Voltage ($I_C = 0$)	6	V
I_C	Collector Current	200	mA
P_{tot}	Total Dissipation at $T_C = 25\text{ }^\circ\text{C}$	625	mW
T_{stg}	Storage Temperature	-65 to 150	$^\circ\text{C}$
T_j	Max. Operating Junction Temperature	150	$^\circ\text{C}$

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}^*$	Collector-Emitter Saturation Voltage	$I_C = 10 \text{ mA}$ $I_B = 1 \text{ mA}$			0.2	V
		$I_C = 50 \text{ mA}$ $I_B = 5 \text{ mA}$			0.2	V
h_{FE}^*	DC Current Gain	$I_C = 0.1 \text{ mA}$ $V_{CE} = 1 \text{ V}$	60		300	
		$I_C = 1 \text{ mA}$ $V_{CE} = 1 \text{ V}$	80			
		$I_C = 10 \text{ mA}$ $V_{CE} = 1 \text{ V}$	100			
		$I_C = 50 \text{ mA}$ $V_{CE} = 1 \text{ V}$	60			
		$I_C = 100 \text{ mA}$ $V_{CE} = 1 \text{ V}$	30			

Microphone data sheet

SPECIFICATIONS

PARAMETERS	VALUES	UNITS
DIRECTIVITY	OMNI	-
SENSITIVITY	-46 ± 3	dB
STANDARD OPERATING VOLTAGE	1.5	Vdc
MAX OPERATING VOLTAGE	10	Vdc
CURRENT CONSUMPTION (MAX)	0.5	mA
IMPEDANCE	2.2	KOhm
SIGNAL TO NOISE RATIO (MIN.)	60	dB
TERMINAL	PIN	-
INTERNAL CAPACITOR	N/A	pF





Thanks,..
See you next week (ISA),...