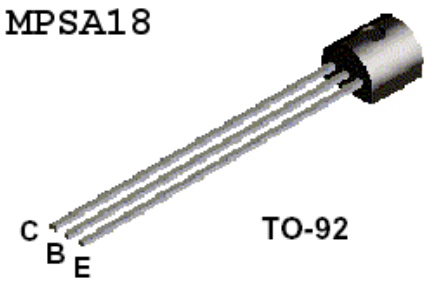
Dee/Mitch-dyne

1AD TRANSISTOR SHORTWAVE RADIO

VERSION 1 ©2008



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1. ABSTRACT

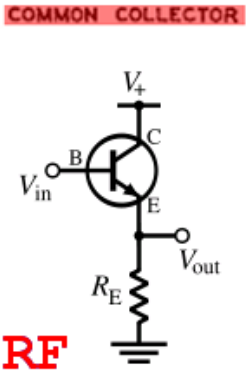
The Dee/Mitch-dyne is a single-transistor regen-reflex radio capable of driving earphones. The circuit uses common-collector mode for RF and common-base mode for AF. The radio covers 31M, 41M, 49M, and 60M SW bands. Only one potentiometer is necessary for regen-reflex control.

2. MPSA18 TRANSISTOR

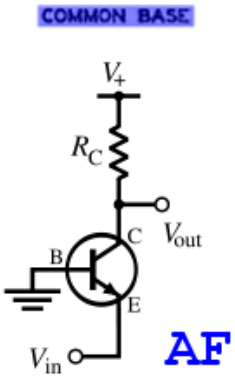
My MPSA18 NPN transistor had a measured hfe of 570 or +55 dB of gain. The noise figure for the device is low. The transistor is mentioned on *Charles Wenzel*'s website (*www.techlib.com*).

3. Sir Douglas Hall

While in school I designed several circuits. After a recent extensive search I found that I was "beat to the punch" by *Sir Douglas Hall*. His circuits adorned a UK magazine; be sure to see *Geoff*'s excellent website (*www.radioconstructors.info*). The only design of mine of this type that he did not define was a purely one-transistor regen-reflex. I call this circuit the Dee/Mitch-dyne.

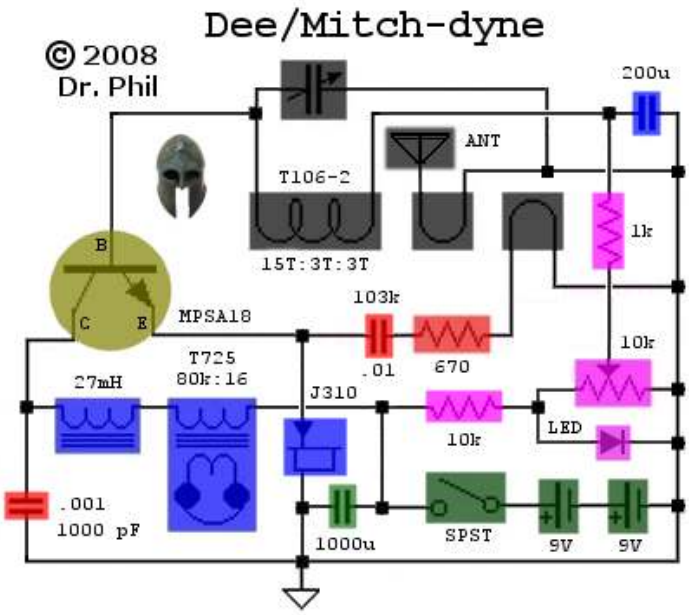


Common Collector		Common Base
High	Input Impedance	Low
Low	Output Impedance	High
High	Current Gain	Low
Low	Voltage Gain	High
0°	Phase Shift	0°



4. THEORY

The tank circuit and transformer-earphone both have high-impedance. How do we get high impedance both into and out of a transistor? Easy, we run RF from the tank into the transistor in common-collector mode, detect it at low impedance, and then run the AF back through the device in common-base mode. We also siphon some of the RF energy at the detector for regeneration. It should be noted that there is no phase shift as is present in common-emitter circuits. There is first a current gain, which is perfect for driving regeneration and detection. Then a voltage gain is used to drive the earphones. My "hat is off" to Sir Douglas Hall for his thought provoking radio designs.



5. CIRCUIT DESCRIPTION

One unique feature of this radio is using a fixed regeneration circuit resistor (670 ohms). I recommend replacing this with a potentiometer for fine tuning, especially for a BCB build-up. The premise being that input impedance, for the tank, is defined as hfe times load. I ensured that the input impedance will be ~382k ohms so that tank Q will not be compromised. With a pot you can go even higher. Some "2AD" designs use this pot for regen but it often alters both Q and tuning.

Another unique feature is altering base bias to control regeneration and volume. The LED doubles as '**ON**' indicator and voltage stabilizer. The 200 uF capacitor keeps the DC headed to the base of the MPSA18. I also use a J310 n-JFET as a low impedance diode. This is accomplished by tying its drain and source together at ground. Other diodes (1N34A) worked but not quite as well. I also use low impedance 16-ohm Koss Sparkplug (thanks *Neutrodyne*) brought up to 80k-ohms via a Bogen T725 transformer. This reduces the eardrum-shattering pops experienced with piezos. Audio frequency energy passes through the tank inductor: make sure its core does not saturate.

Performance of this circuit is very good and the big stations can be heard at a comfortable listening volume. Piezo or SP phones can be used for DX but beware of noise. Sparkplug earbuds are sensitive: rated at 112 dB SPL/mW. This circuit was named after my mother, who raised three doctors and an engineer; and father, who designed 500+ devices for the DoD and other agencies. Have a suggestion? Please write me! I will update this copyrighted PDF and credit all contributors.

Be sure to visit Jeff Duntemann's 12V Space Charge page (www.duntemann.com/12vtubes/12vtubesindex.htm).
Also see *Greg Cooney*'s Hikers One page (www.oldradios.co.nz/hikers/).

REFERENCE

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